


Selected Annotated
Oral Health Bibliography

National *Interprofessional Initiative*
on Oral Health

*engaging clinicians
eradicating dental disease*




Prepared by Wendy Nelson & Rebecca Huntley

Initiative activities are made possible as a result of funding from the DentaQuest Foundation and the Washington Dental Service Foundation

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ENGAGING PRIMARY CARE MEDICAL PROVIDERS IN PREVENTING DENTAL DISEASE

Early Prevention and Cost Benefit

Savage MF, et al. *Early Preventive Dental Visits: Effects on Subsequent Utilization Costs*. Pediatrics, 2004, 114 (4) e418-e423. <http://pediatrics.aappublications.org/cgi/reprint/114/4/e418>

Audience/Relevance: Primary care clinicians, the dental community, health care professionals, insurance providers, and policymakers.

This investigation looks at the effects of early preventive dental visits on subsequent utilization and costs of dental services among preschool-aged children. It studied 9,204 North Carolina children enrolled continuously in Medicaid from birth for a five-year period.

- Preschool-aged children from racial minority groups have greater difficulty than their peers in finding access to dental care.
 - Preschool-aged, Medicaid-enrolled children who had an early preventive dental visit are more likely to use subsequent preventive services and to experience lower dental-related costs.
 - The age at the first preventive dental visit has a significant positive effect on dental-related expenditures, with the average dental-related costs being less for children who receive earlier preventive care.
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Yee JY, Bouwens TJ, Savage MF, Vann Jr. WF. *Examining the Cost-Effectiveness of Early Dental Visits*. Pediatric Dentistry, 2006 28(2) 102-105. <http://www.allhealth.org/briefingmaterials/lee-costeffectiveness-1269.pdf>

Audience/Relevance: Primary care clinicians, the dental community, health care professionals, insurance providers, and policymakers.

The purpose of this paper is to review the scientific evidence and rationale for early dental visits as a means to prevent disease and reduce costs.

- During the age-one dental visit, there is strong emphasis on prevention. Parents are given counseling on infant oral hygiene, home and office-based fluoride therapies, dietary counseling, and information relative to oral habits and dental injury prevention.
 - There is evidence that the early preventive visits could reduce the need for restorative and emergency care, therefore reducing dental-related costs among high-risk children.
 - Evidence suggests that to be successful in preventing dental disease, dentists must begin preventive interventions in infancy.
 - Preschool Medicaid children who have an early preventive dental visit by age one are more likely to use subsequent preventive services and experienced less dentally related costs.
 - More research is needed to examine early dental visits for low-risk population as these findings could have significant policy implications.
 - The medical community has promoted the concept of a medical home to improve families' care utilization. Establishment of the home early in the child's life can introduce children and their families to prevention and early intervention prior to the development of dental problems.
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Training and Adoption of Oral Health Services by Primary Care Providers

AAP Section on Pediatric Dentistry. *Preventive Oral Health Intervention for Pediatricians*. Pediatrics 2008; 122:1387-1394. <http://aappolicy.aappublications.org/cgi/reprint/pediatrics;122/6/1387.pdf>

Audience/Relevance: Primary care clinicians, health care professionals, and the dental community.

This policy statement, in conjunction with the oral health recommendations of the American Academy of Pediatrics Bright Futures: Guidelines for Health Supervision of Infants, Children, and Adolescents, 3rd edition, provides information for pediatricians and other clinicians in addressing dental caries. With dental caries being such a common and consequential disease process in the pediatric population, it is essential that primary care professionals include oral health in their daily practice of pediatrics. The policy contains the following recommendations:

- An oral health risk assessment should be administered periodically to all children.
- Oral health risk-assessment training should be recommended for medical practitioners who are in training programs and those who currently administer care to children.
- Dietary counseling for optimal oral health should be an intrinsic component of general health counseling.
- Anticipatory guidance for oral health should be an integral part of comprehensive patient counseling.
- Administration of all fluoride modalities should be based on an individual's caries risk. Patients who have a high risk of caries are candidates for consideration of more intensive fluoride exposure after dietary counseling and oral hygiene instruction as compared with patients with a lower risk of caries.
- Supervised use of fluoride toothpaste is recommended for all children with teeth.
- The application of fluoride varnish by the medical practitioner is appropriate for patients with significant risk of dental caries who are unable to establish a dental home.
- Every child should have a dental home established by 1 year of age.
- Collaborative relationships with local dentists should be established to optimize the availability of a dental home.

Close K, Rozier RG, Zeldin LP, and Gilbert AR. *Barriers to the Adoption and Implementation of Preventive Dental Services in Primary Medical Care*. Pediatrics, 2010, 125(3) 509-517. <http://pediatrics.aappublications.org/cgi/content/abstract/125/3/509>

Audience/Relevance: Primary care clinicians, the dental community, health care professionals, insurance providers and policymakers.

The purpose of this study is to determine the barriers to adopting preventive oral health procedures in medical primary care. Questionnaires were distributed to 231 medical providers who participated in a Medicaid demonstration in North Carolina. Participants from 49 pediatric practices and 28 family physician practices reported their experiences with providing preventive dental services for children from birth to three years of age. The authors found:

- Program-adoption rated highly, with 70.3% of the participants providing dental services on a routine basis.
- Attitude and external factors are positively associated with adoption, particularly with difficulty in applying the varnish, integration of the dental procedures into practice, resistance among staff and colleagues, and dentist referral difficulties.
- The number of barriers to adopting preventive dental procedures in primary care medical practices is associated with implementation, similar to those identified in the literature on changing patient care, with the unique aspects of fluoride application to teeth.
- Training physicians in preventive dentistry should identify and target potential barriers with information and options for introducing office-based systems to improve the chances of adoption.

Dela Cruz GG, Rozier RG, and Slade G. *Dental Screening and Referral of Young Children by Pediatric Primary Care Providers*. *Pediatrics*, 2004, 114 (5) e642-e652.
<http://pediatrics.aappublications.org/cgi/reprint/114/5/e642>

Audience/Relevance: Primary care clinicians, the dental community, health care professionals, insurance providers, and policymakers.

This article looked at a cross-sectional survey of primary care clinicians (69 pediatric practices and 49 family medicine practices) in North Carolina, who were enrolled in a study to evaluate a pediatric preventive dentistry program that targeted Medicaid-eligible children. The authors found:

- Because most children are exposed to medical care at an early age, but not necessarily dental care, primary care medical providers have the opportunity to play an important role in helping children and their families gain access to dental care.
- When pediatric primary care clinicians provide oral health promotion and disease prevention activities, the need for dental treatment at a very young age is eliminated or delayed.
- In order for there to be effective and appropriate involvement of pediatric primary care clinicians, the clinicians must receive suitable training and encouragement.
- The referral environment is more important than provider knowledge, experience, opinions, or patient characteristics in determining whether medical practitioners refer at-risk children for dental care.
- A significant change in outcomes can be achieved with an increase in dentists' participation in Medicaid, such as increases in reimbursement rates; training general dentists to treat young children; and community organization activities to link families, primary care clinicians, dentists, and public programs such as Early Head Start.

Douglass JM, Douglass AB, Silk H. *A Practical Guide to Infant Oral Health*. *American Family Physician* 2004; 70:2113-2120,2121-2122. <http://www.aafp.org/afp/2004/1201/p2113.html>

Audience/Relevance: Primary care clinicians, the dental community, and health care professionals.

Physicians should examine children's teeth for defects and cavities at every well-child visit. Early childhood caries may develop as soon as teeth erupt. Bacteria, predominately mutans streptococci, metabolize simple sugars to produce acid that demineralizes teeth, resulting in cavities.

- Any child with significant risk factors for caries (e.g., inadequate home dental care and poor oral hygiene, a mother with a high number of cavities, a high sugar intake, enamel defects, premature birth, special health care needs, or low socioeconomic status) should be referred to a dentist by 12 months of age.
- Promoting appropriate use of topical and systemic fluoride and providing early oral hygiene instruction can help reduce caries in young patients, as can regularly counseling parents to limit their child's consumption of sugar.

Pierce KM, Rozier RG, and Vann Jr. WF. *Accuracy of Pediatric Primary Care Providers' Screening and Referral for Early Childhood Caries*. *Pediatrics*, 2002, 109(5) e82-e88.
<http://pediatrics.aappublications.org/cgi/content/full/109/5/e82>

Audience/Relevance: Primary care clinicians, health care professionals, and policymakers.

The purpose of this study is to determine the accuracy of pediatric primary care providers' screening and referral for Early Childhood Caries (ECC). The study was conducted at a private pediatric group practice (11 pediatricians and one nurse practitioner) of 258 preschool-aged children in North Carolina.

- The pediatric primary care providers in this study received two hours of training in infant oral health and were found to achieve an adequate level of accuracy in identifying children with cavitated carious lesions.
 - The study found that dental screenings could easily be incorporated into a busy pediatrics practice.
 - Pediatric primary care providers significantly contributed to the overall oral health of young children by identifying those who need to be seen by a dentist.
 - Additional training and research is needed to optimize pediatric primary care providers' identification of carious teeth if that were the goal of screening.
 - It is also recommended that further research be done to determine how to improve dental referrals by pediatric primary care providers.
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Fluoride Varnish

Autio-Gold J, and Courts F. *Assessing the Effect of Fluoride Varnish on Early Enamel Carious Lesions in the Primary Dentition*. JADA, 2001, 132(Sept) 1247-1253. <http://www.jada.info/cgi/content/full/132/9/1247>

Audience/Relevance: Primary care clinicians, the dental community, health care professionals, insurance providers, and policymakers.

The aim of this study is to evaluate the effect of fluoride varnish on enamel caries progression in the primary dentition. (Fluoride varnishes have been the standard of practice for the professional application of topical fluoride in Europe for more than 25 years.) The study took place in Head Start schools where 142 children ages three to five years old were randomized into the varnish and control groups. The authors concluded:

- At the nine-month point, the mean decayed surfaces value in the varnish group is significantly lower than it was at the baseline.
 - The groups at highest risk of developing dental decay— the poor and minorities—have lower rates of dental care use than the mean rate in the United States.
 - Fluoride varnish can offer an effective means of arresting early enamel lesions in the primary dentition.
 - While detecting and monitoring lesions is critical in determining effectiveness, fluoride varnish applications can offer an efficient, nonsurgical approach to the treatment of decay in children.
 - Fluoride varnishes are safe, easy to apply, and well accepted by patients.
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Helfenstein U, Steiner M. *Fluoride Varnishes (Duraphat): A Meta-analysis*. Community Dental Oral Epidemiology 1994; 22:1-5. <http://onlinelibrary.wiley.com/doi/10.1111/j.1600-0528.1994.tb01559.x/abstract>: Requires subscription.

Audience/Relevance: Primary care clinicians, the dental community, and health care professionals.

In this article, a series of study designs are analyzed to detect the caries-preventive effect of fluoride varnish (Duraphat) by means of meta-analysis, a collection of statistical methods designed to investigate and to summarize a series of investigations.

- The authors applied a systematic literature search to find previous studies concerned with the clinical effects of Duraphat.
- Papers were included independent of results when they fulfilled a checklist of well-defined methodological selection criteria.
- In order to aggregate the results of the Duraphat-studies, different complementary statistical approaches were used.
- The heterogeneity of the studies suggested exploring possible sources by investigating the dependence of caries reduction on variables characterizing the studies.

- It was found that caries reduction is negatively correlated with study duration. This finding provided a study-duration-adjusted effect of caries reduction.
 - Several tables appeared in the article, which would be useful in helping the reader understand the process, statistical method and outcomes of the study.
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Hutter JW, Chan JT, Featherstone JDB, et al. *Professionally Applied Topical Fluoride: Evidence-Based Clinical Recommendations*. American Dental Association, Council on Scientific Affairs, May 2006.

<http://jada.ada.org/cgi/content/full/137/8/1151>

Audience/Relevance: Primary care clinicians, the dental community, and health care professionals.

The evidence-based clinical recommendations in this report were developed by an expert panel established by the American Dental Association Council on Scientific Affairs that evaluated the collective body of scientific evidence on the effectiveness of professionally applied topical fluoride for caries prevention. MEDLINE and the Cochrane Library were searched for systematic reviews and clinical studies of professionally applied topical fluoride—including gel, foam and varnish—through October 2005. Panelists were selected based upon their expertise in the relevant subject matter. Panel conclusions based on the evidence include:

- Fluoride gel is effective in preventing caries in school-aged children.
 - Patients whose caries risk is low, as defined in this document, may not receive additional benefit from professional topical fluoride application.
 - There are considerable data on caries reduction for professionally applied topical fluoride gel treatments of four minutes or more. In contrast there is laboratory, but no clinical equivalency, data on the effectiveness of one-minute fluoride gel applications (IV).
 - Fluoride varnish applied every six months is effective in preventing caries in the primary and permanent dentition of children and adolescents.
 - Two or more applications of fluoride varnish annually are effective in preventing caries in high-risk populations.
 - Fluoride varnish applications take less time, create less patient discomfort, and achieve greater patient acceptability than fluoride gels, especially in preschool-aged children.
 - Four-minute fluoride foam applications, every six months, are effective in caries prevention in the primary dentition and newly erupted permanent first molars.
 - There is insufficient evidence to address whether or not there is a difference in the efficacy of NaF vs. APF gels.
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Guideline on Fluoride Therapy. American Academy of Pediatric Dentistry, Revised 2008.

http://www.aapd.org/media/Policies_Guidelines/G_FluorideTherapy.pdf

Audience/Relevance: Primary care clinicians, the dental community, health care professionals, and parents.

This document provides guidelines to help practitioners and parents make decisions concerning appropriate use of fluoride as part of comprehensive oral health care for infants, children, adolescents, and persons with special health care needs. Guidelines include:

- The use of fluorides for the prevention and control of caries is documented to be both safe and highly effective.
- Fluoride has several caries-protective mechanisms of action including enamel remineralization and altering bacterial metabolism to prevent caries.
- Systemically administered fluoride supplements should be considered for all children drinking fluoride-deficient water.
- Professional-applied topical fluoride treatments should be based on caries-risk assessment.

- When a dental home cannot be established, periodic applications of fluoride varnish by a trained non-dental healthcare professional may be effective in reducing the incidence of early childhood caries.
 - Therapeutic use of fluoride for children should focus on regimens that maximize topical contact (e.g. fluoridated toothpaste), preferably in lower-dose, higher-frequency approaches.
 - At-home topical fluoride regimens utilizing increased concentrations of fluoride should be considered for children at high risk for caries.
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Lewis C, Lynch H, and Richardson L. *Fluoride Varnish Use in Primary Care: What Do Providers Think?* Pediatrics, 2005, 115(1) e69-e76. <http://pediatrics.aappublications.org/cgi/reprint/115/1/e69>

Audience/Relevance: Primary care clinicians, health care professionals, insurance providers, and policymakers.

This qualitative study looked at 12 pediatric, nurse practitioner, and family medicine practices in Washington state that underwent training for the use fluoride varnish in practice. The authors found:

- Fluoride varnish application could be adopted successfully into medical practice when there is commitment and openness from primary care clinicians and staff.
 - Training is important because it motivates participants and provides them with necessary background information.
 - Primary care clinicians' involvement with fluoride varnish provides opportunities to discuss preventive oral health with families and emphasizes the importance of good oral health and professional dental care.
 - When fluoride varnish is adopted successfully by medical offices, it offers an effective and straightforward caries-prevention strategy for children who traditionally have difficulty gaining access to professional dental care.
 - Specific recommendations to encourage fluoride varnish diffusion in other settings are offered for program planners and primary care clinician offices.
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Marinho VCC, Higgins JPT, Logan S, Sheiham A. *Fluoride Varnishes for Preventing Dental Caries in Children and Adolescents*. Cochrane Database of Systematic Reviews, 2002 Issue 1. <http://onlinelibrary.wiley.com/o/cochrane/clsysrev/articles/CD002279/frame.html>: Requires subscription.

Audience/Relevance: Primary care clinicians, the dental community, health care professionals, insurance providers, and policymakers.

The purpose of this review is to determine the effectiveness and safety of fluoride varnish in the prevention of dental caries in children and to examine factors potentially modifying their effect. The review found:

- Topically applied fluoride varnishes have been used extensively as an operator-applied caries-preventive intervention for more than two decades.
 - The review suggests a substantial caries-inhibiting effect of fluoride varnish in both the permanent and the deciduous dentitions, based largely on trials with no treatment controls.
 - Fluoride varnishes applied professionally two to four times per year can substantially reduce tooth decay in children.
 - There is little information about acceptability of treatment or possible side effects in the included trials.
 - More high-quality research is needed to determine the degree to which treatment can make a difference, and to study the acceptability and adverse effects of fluoride varnish.
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Pendrys DG. *Risk of Enamel Fluorosis in Non-fluoridated and Optimally Fluoridated Populations: Considerations for the Dental Professional*. Journal of the American Dental Association. 2000; 131(6):746-55. <http://www.jada-plus.com/cgi/reprint/131/6/746>

Audience/Relevance: Primary care clinicians, the dental community, and health care professionals.

The author of this study conducted research to determine attributable risk percent estimates for mild-to-moderate enamel fluorosis in two populations of middle school children aged 10 to 14. One group of 429 had grown up in non-fluoridated communities; the other group of 234 had grown up in optimally fluoridated communities. Trained examiners measured enamel fluorosis using the Fluorosis Risk Index and measured early childhood fluoride exposure using a questionnaire completed by the parent. The study found:

- At least one-third of the fluorosis cases in non-fluoridated areas and two-thirds of the cases in optimally fluoridated areas can be explained by specific patterns of early fluoride toothpaste use.
- These findings reinforce the important role that health professionals can have in reducing the prevalence of enamel fluorosis in U.S. children.
- Much of the clinically noticeable enamel fluorosis seen today can be prevented by specific changes in early childhood behaviors.
- Providing the parent of a young child with appropriate advice regarding the early use of fluoride toothpaste and fluoride supplements may have a significant impact on the prevalence of enamel fluorosis in both non-fluoridated and optimally fluoridated populations.

Topical Fluoride Recommendations for High-Risk Children, Recommendations from the Maternal and Child Health Bureau Expert Panel, 2008. <http://www.ws-ohc.org/documents/TopicalFluorideRpt.pdf>

Audience/Relevance: Primary care clinicians, the dental community, health care professionals, and individuals working with high-risk children.

This report presents a summary of the process undertaken by a 2008 Maternal and Child Health Bureau Expert Panel assembled to develop a Decision Support Matrix and topical fluoride recommendations.

- Members of the panel participated in facilitated discussions that addressed the definition of “high risk,” which children meet this definition, and what fluoride modalities were appropriate by age.
- The focuses of the discussions were on those children considered to be at high risk, with the goal of providing substantial dental caries prevention while minimizing risk of dental fluorosis.
- The matrix developed is primarily for a nondental audience—programs, paraprofessionals, and professionals without formal dental education working in public health settings (e.g., childcare centers, Head Start programs, WIC programs, primary care, and pediatric clinics)—but could also be beneficial to parents.
- The matrix is designed to be used by individuals working with groups of high-risk children to support the implementation of a fluoride intervention (e.g., tooth brushing routine using fluoride toothpaste, fluoride varnish program), complemented by other important oral health promotion and disease prevention activities. These include conducting education, providing anticipatory guidance, making dental referrals, and promoting establishment of the dental home by age one.
- A copy of the matrix developed by the group is provided in the article.

DIABETES AND ORAL HEALTH

Associations between Periodontal Disease and Diabetes Mellitus. Research Review, September 2009. This report was supported by funding from Delta Dental Plans Association and performed by George W. Taylor, Wenche S. Borgnakke & Patricia F. Anderson, and M. Carol Shannon at the University of Michigan.

Audience/Relevance: Primary care clinicians, dental professionals, and health care professionals.

This report provides a description of the current state of the evidence supporting a bidirectional relationship between diabetes and periodontal disease. The evidence reviewed in this report supports the following conclusions:

- Bidirectional associations exist between diabetes mellitus and periodontal health.
- Diabetes is associated with increased development and progression of periodontitis.
- The evidence suggests periodontal infection is associated with poorer glycemic control in people with diabetes.
- Gestational diabetes may adversely affect periodontal health.
- Periodontal disease is associated with increased risk for diabetes complications, might be associated with the development of type 2 diabetes, and perhaps the development of gestational diabetes.
- The report suggested that while treating periodontal infection in people with diabetes is clearly an important component in maintaining oral health, it may also play an important role in establishing and maintaining glycemic control, and possibly delay the onset or progression of diabetes and its complications.
- For individuals with diabetes and gestational diabetes, dental health professionals fulfill an important role in maintaining or improving health and ultimately quality of life, and may also help to lessen the immense burden of diabetes and periodontal diseases in general.

For the Dental Patient: Diabetes and Oral Health. Journal of the American Dental Association 2002; 133: 1299. http://www.ada.org/sections/scienceAndResearch/pdfs/patient_18.pdf

Audience/Relevance: Health care professionals and lay audiences.

This article provides an overview of the relationship between diabetes and oral health, and outlines steps people with diabetes should take to improve oral health. Included is:

- Information about common oral health problems associated with diabetes.
- Information about diet, tooth decay, symptoms that require patients to see a dentist immediately, information on fungal infections, and guidance for caring for your teeth.

Keep your Teeth and Gums Healthy. National Institute of Diabetes and Digestive and Kidney Diseases. http://diabetes.niddk.nih.gov/dm/pubs/complications_teeth/index.htm

Audience/Relevance: Health care professionals and lay audiences.

This article provides a basic overview of diabetes, oral health, and their relationship to one another.

- Information includes an explanation of diabetes, how diabetes can hurt the teeth and gums, how to tell if you have damage to your teeth and gums, how to keep the teeth and gums healthy, and how dentist can help.

Kidambi S, Patel SB. *Diabetes Mellitus: Considerations for Dentistry*. Journal of the American Dental Association 2008; 139: 8S-18S. http://jada.ada.org/cgi/content/full/139/suppl_5/8S

Audience/Relevance: Primary care clinicians, dental professionals, and health care professionals.

A physician wrote this article for dentists, giving a complete overview of diabetes and offering guidance for the management of diabetes in the dental office. Information shared includes:

- Diabetes is a relatively common condition and one that practicing dentists may encounter frequently.
- There is strong evidence that the presence of periodontal disease is associated with increased cardiovascular morbidity in patients with diabetes.
- The article provides an overview of classification and pathogenesis, diagnosis, complications, treatment, and monitoring of diabetes.
- The article includes a section on managing the dental care of patients with diabetes, including dealing with hypoglycemia and hyperglycemia.

Lamster IB, Lalla E, Borgnakke WS, Taylor GW. *The Relationship between Oral Health and Diabetes Mellitus*. Journal of the American Dental Association 2008; 139: 19S-24S.

http://jada.ada.org/cgi/reprint/139/suppl_5/19S

Audience/Relevance: Primary care clinicians, dental professionals, and health care professionals.

The authors provide an overview of the connection between oral health and diabetes. The article outlines the bidirectional relationship between diabetes and periodontal disease.

- Periodontal (gum) disease is a recognized and well-documented complication of diabetes.
- Approximately 30 percent of people with diabetes are undiagnosed, placing dental practitioners in a unique position to identify diabetes early, whereas periodontal changes are the first clinical manifestations of diabetes.
- Poorly controlled diabetes is associated with a greater risk of periodontitis, and periodontitis can adversely effect glycemic management.
- Oral health care can have a positive effect on the oral and general health of patients with diabetes.
- In the management and care of patients with diabetes, a greater role for the oral health care team is warranted and appropriate.

Mealey B. *Periodontal Disease and Diabetes: A Two-Way Street*. Journal of the American Dental Association 2006; 137: 26S-31S. http://jada.ada.org/cgi/reprint/137/suppl_2/26S

Audience/Relevance: Primary care clinicians, dental professionals, and health care professionals.

The author of this article reviews the bidirectional relationships between diabetes and periodontal diseases.

- A large base of evidence suggests that diabetes is associated with increases in the prevalence, extent, and severity of gingivitis and periodontitis.
- With their patients, dentists should discuss the relationship between diabetes and periodontal health, using the evidence as a basis for discussion.
- Diabetes is associated with an increased risk of developing inflammatory periodontal diseases, and glycemic control is an important determinant in this relationship.
- While inflammation plays an obvious role in periodontal diseases, evidence in the medical literature also supports the role of inflammation as a major component in the pathogenesis of diabetes and diabetic complications.

- Treatment of periodontal disease and reduction of oral inflammation may have a positive effect on the diabetic condition.
 - Patients with poor glycemic control may be at greater risk for periodontitis than patients with well-controlled diabetes.
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Mealey B, Oates TW. *Diabetes Mellitus and Periodontal Disease*. Journal of Periodontology. August 2006: 1289-1303. <http://www.perio.org/resources-products/pdf/lr-diabetes.pdf>

Audience/Relevance: Primary care clinicians, dental professionals, and health care professionals.

The purpose of this review is to provide the reader with practical knowledge concerning the relationship between diabetes mellitus and periodontal diseases. It provides a broad overview of the predominant findings from research published in English over the past 20 years, with reference to “classic” articles published prior to that time. The conclusions drawn by the author include:

- Diabetes increases the risk of periodontal diseases, and biologically plausible mechanisms have been demonstrated in abundance.
 - Inflammatory periodontal diseases may increase insulin resistance in a way similar to obesity, thereby aggravating glycemic control. Further research is needed to clarify this aspect of the relationship between periodontal diseases and diabetes.
 - Less clear is the impact of periodontal diseases on glycemic control of diabetes and the mechanisms through which this occurs.
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Mealey B. *The Interactions between Physicians and Dentists in Managing the Care of Patients with Diabetes Mellitus*. Journal of the American Dental Association 2008; 139: 4S-7S. http://adajournal.com/cgi/reprint/139/suppl_5/4S

Audience/Relevance: Primary care clinicians, dental professionals, and health care professionals.

The authors discuss research results that demonstrate that oral infections and inflammatory periodontal diseases may have adverse effects on the metabolic state in patients with Diabetes. They provide key information about the emerging relationships between the medical and dental professions around the issue of diabetes.

- There are many new efforts at the national level to expand interactions between the medical and dental communities, such as scientific sessions and symposia for dental and medical participants wherein the links between oral health and diabetes are presented.
 - The authors provide a section discussing to what dentists should do and what physicians should do with diabetes patients.
 - The article includes two tables covering the *Correlation between HbA1c Levels and Average Plasma Glucose Levels* and *Glycemic Recommendations for Adults with Diabetes Mellitus*.
 - The American Diabetes Association acknowledges the importance of oral health to the management of diabetes by including a dental examination in its *Standards of Medical Care in Diabetes: 2008* as a necessary referral for comprehensive diabetes evaluation.
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Oral Health & Oral Hygiene. American Diabetes Association. <http://www.diabetes.org/living-with-diabetes/treatment-and-care/oral-health-and-hygiene/>

Audience/Relevance: Primary care clinicians, dental professionals, health care professionals, and lay audiences.

This American Diabetes Association webpage provides an overview of oral health and diabetes. Information includes:

- A discussion of the link between diabetes and oral health., with a section on the two-way relationship suggested to exist between serious gum disease and diabetes.
 - Six informational sections: *Introduction, Diabetes and Oral Health Problems, A Big Plaque Attack, Warning Signs, Brush and Floss, and More On The Mouth.*
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Shultis W, Weil EJ, Looker HC, Curtis JM, Shlossman M, Genco R, Knowler W, Nelson R. *Effect of Periodontitis on Overt Nephropathy and End-Stage Renal Disease in Type 2 Diabetes.* Diabetes Care 2007; 30: 306-311. <http://care.diabetesjournals.org/content/30/12/e139.full>

Audience/Relevance: Primary care clinicians, dental professionals, and health care professionals.

This study investigated the effect of periodontitis on development of overt nephropathy, and end-stage renal disease (ESRD) in type 2 diabetes. The study examined 529 Individuals residing in the Gila River Indian Community over 25 years of age with type 2 diabetes. The study concludes:

- Periodontitis predicts the development of overt nephropathy and end-stage renal disease in people with type 2 diabetes and little or no preexisting kidney disease.
 - There is an independent association between periodontitis and the development of diabetic kidney disease.
 - Systemic inflammation is a proposed mechanism for the effect of periodontitis on the development of kidney disease.
 - Both periodontitis and kidney disease are associated with inflammatory markers.
 - Whether or not treatment of periodontitis reduces the risk of diabetic kidney disease is yet to be determined.
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Vernillo A. *Dental Considerations for the Treatment of Patients with Diabetes Mellitus.* Journal of the American Dental Association 2003; 134: 24S-33S. http://www.adajournal.com/cgi/reprint/134/suppl_1/24S

Audience/Relevance: Primary care clinicians, dental professionals, and health care professionals.

The author of this article describes new concepts in metabolic control for diabetes and the relationship of oral complications to diabetes mellitus including:

- The unique needs that patients with diabetes bring to their dental provider.
 - A team approach to treating diabetic patients that includes the dentist, dental hygienist, doctor, and nutritionist.
 - The treatment of acute oral infections and the dentist's role in supporting patients in smoking-cessation programs are approaches that may reduce morbidity from diabetes mellitus.
 - Glycemic control and oral complications of diabetes.
 - Suggestions for general management of diabetic patients and specific treatment guidelines, doses of medications, etc.
 - Three useful tables: *General Management Considerations for the Patient with Diabetes, Treatment for Oral Candidiasis, and Topical Medication for Angular Cheilitis.*
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PRENATAL/PERINATAL ORAL HEALTH

Associations between Periodontal Disease and Adverse Pregnancy Outcomes. Research Review, June 2010. This report was supported by funding from Delta Dental Plans Association and performed by George W. Taylor, Wenche S. Borgnakke & Patricia F. Anderson, and M. Carol Shannon at the University of Michigan.

Audience/Relevance: Primary care clinicians, dental professionals, and health care professionals.

This research review examines periodontal disease and pregnancy outcomes.

- Due to hormonal changes, the majority of pregnant women develop “pregnancy gingivitis.”
- The vascular permeability of inflamed periodontal tissues is increased, facilitating diffusion of bacteria and their byproducts into the host tissues and the blood stream, where they can locate anywhere in the mother and unborn child. This dissemination of the bacteria and other products is thought to contribute to a systemic inflammatory burden.
- Systemic burden of infection/inflammation are believed to be a major mechanism causing adverse pregnancy outcomes. Known risk factors are: history of preterm birth; alcohol, tobacco, and illicit drugs; low educational level; very young (<18) or old (>37) maternal age; lack of prenatal care; poor nutritional status; obesity, diabetes, and infections/inflammation. Periodontal pathogens and their antibodies have been detected in amniotic fluid, placenta, and umbilical cord, having crossed the placental barrier.
- Periodontal diseases cause adverse pregnancy outcomes.
- Research demonstrates that non-surgical periodontal treatment is effective in reducing levels of periodontal disease in pregnancy. Provision of such treatment is safe for both the mother and the child.
- Health care providers should work towards the prevention and treatment of periodontal diseases in their patients both before and during pregnancy.

Boggess KA, Edelstein BL. *Oral Health in Women during Preconception and Pregnancy: Implications for Birth Outcomes and Infant Oral Health.* Maternal Child Health Journal, 2006; 10:S169-S174.

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1592159>

Audience/Relevance: Primary care clinicians, dental professionals, and health care professionals.

This article provides an overview of research on relationships between a mother's oral health, her health status, optimal pregnancy outcome, and the infant's oral health. It examines the implications for clear policies around education and treatment before, during, and after birth.

- The relationship between oral health and general health is outlined, with this integration expressed a goal in its own right, whereas dental disease is preventable and manageable.
 - Maternal oral health appears to have significant implications for birth outcomes (preterm birth, development of preeclampsia, and/or the delivery of a small-for-gestational age infant). More research is necessary to determine direct causality.
 - Chronic maternal periodontal disease is associated with increased risk of such diseases as atherosclerosis, rheumatoid arthritis, and diabetes.
 - Data is well established that maternal oral health clearly impacts her offspring's risk of developing early and severe dental caries due to disease transmission from mother to child.
 - Science clearly supports interventions, education, and treatments before, during, and after pregnancy to limit intergenerational consequences.
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Boggess KA, Urlaub DM, Massey KE, Moos MK, Matheson MB, Lorenz K. *Oral Hygiene Practices and Dental Service Utilization among Pregnant Women*. Journal of the American Dental Association, 2010; 141; 553-561. <http://www.jada.info/cgi/content/full/141/5/553>: Requires subscription.

Audience/Relevance: Primary care clinicians, dental professionals, and health care professionals.

This study examines women's oral hygiene practices and use of dental services during pregnancy. The findings of the study are based upon a written oral health questionnaire administered to 599 pregnant women. The authors collected demographic information, as well as data on oral hygiene practices and use of dental services during pregnancy. The findings of the study include:

- Dental care utilization during pregnancy is limited, with significant disparities among women of various racial or ethnic backgrounds and economic status.
- The most significant predictor of a lack of routine dental care among women during pregnancy is a lack of routine dental care when they were not pregnant.
- Additional lack of financial resources and the inability to pay for care also are associated significantly with the lack of use of routine dental services during pregnancy.
- Addressing a woman's access to dental health care only during pregnancy is likely to have limited utility in affecting the oral health of the woman and her children.
- During pregnancy, women are often motivated to receive messages regarding their health, therefore providers of prenatal care can use the frequent visits made during the prenatal period to emphasize good oral hygiene practices and the importance of oral health.
- Dental and prenatal medical care providers should develop policies that address access to care to improve routine dental care use before and during pregnancy for these vulnerable women and their families.
- There is a need for policy strategies that will improve women's use of dental care during pregnancy and reduce the racial, ethnic, and economic disparities within oral health care.
- The article contains a number of useful tables and graphs.

Brown A, Zimmerman B, Health Systems Research, Inc – An Altarum Company. *Research to Policy and Practice Forum: Periodontal Health and Birth Outcomes*. Summary of a Meeting of Maternal, Child, and Oral Health Experts, Washington DC. December 11-12, 2006.

<http://www.mchoralhealth.org/materials/multiples/perioforum/Zimmerman.pdf>

Audience/Relevance: Primary care clinicians, dental professionals, and health care professionals.

This article provides information to support the importance of dental care during pregnancy. It addresses major barriers to oral health during perinatal period and has clear talking points for policy change. Findings include:

- Children whose mothers have poor oral health are five times more likely to have oral health problems than children whose mothers have good oral health.
- Women who have low incomes, belong to racial or ethnic minority groups, or participate in Medicaid are half as likely to receive oral health care while pregnant compared with women who have higher incomes, are White, or are privately insured.
- Obstetricians, pediatricians, and family physicians are often the first health professionals to consult with expectant parents about how to have a healthy pregnancy.
- Physiological changes during pregnancy may increase susceptibility to oral infections and hinder the body's ability to repair and maintain soft tissues within the mouth.
- When nausea and vomiting cause women to avoid oral hygiene practices the risk of tooth erosion and dental caries may increase.
- Food cravings may lead to frequent consumption of sugary snacks and to a corresponding increased risk of caries.
- National guidelines on oral health during the perinatal period are needed. Absence of guidelines may play a role in the wide variation in practice and that many women delay/avoid dental care.

California Dental Association Foundation. *Oral Health during Pregnancy & Early Childhood: Evidence-Based Guidelines for Health Professionals*. February 2010.
http://www.cdafoundation.org/library/docs/poh_guidelines.pdf

Audience/Relevance: Primary care clinicians, dental professionals, health care professionals, and policy makers.

These guidelines contain information that is comprehensive, easy to access, and useful for both medical and dental clinicians who are providing care during pregnancy and early childhood. Specific guidelines, forms, and parent education materials are included. Recommendations for system and policy changes are talking points for funders, policy makers, and medical and dental schools.

Practice Guidelines are outlined for each practice area: Prenatal Medical Care Professionals, Oral Health Care Professionals, Child Health Care Professionals, and community-based programs. The summary:

- Provides supportive evidence and details about treatment implications.
- Substantiates the relationship between health and oral health status.
- Promotes the importance and safety of dental care during pregnancy.
- Outlines that prevention, diagnosis, and treatment of oral diseases (including needed dental radiographs and use of local anesthesia) are highly beneficial and can be undertaken during pregnancy with no additional fetal or maternal risk when compared to the risk of not providing care.
- Suggests good oral health and control of oral disease protects a woman's health and quality of life, and has the potential to reduce the transmission of pathogenic bacteria from mothers to their children.

A summary of the Policy Brief is as follows:

- Preventive and restorative dental treatment during the perinatal period is safe and results in better health outcomes.
- Delaying necessary treatment can result in harm to the mother.
- Reducing system-level barriers to accessing oral health care is essential.

Included in body and appendices: Schedule of Fluoride Supplementation, Safe Medicines, Glossary of Terms, Pregnancy Referral Form, Caries Risk Assessment Form.

Douglass JM, LI Y, Tinanoff N. *Association of Mutans Streptococci between Caregivers and Their Children*. *Pediatric Dentistry* 2008, 30(5):375-387. http://www.aapd.org/searcharticles/article.asp?ARTICLE_ID=2269

Audience/Relevance: Primary care clinicians, dental professionals, and health care professionals.

The purposes of this literature review are to review the sources of mutans streptococci (MS) colonization in children, to assess the effect of MS levels of primary caregivers on children's MS colonization, and to evaluate studies examining interventions to reduce the transmission of MS from caregivers to their children. Forty-six studies were reviewed. Findings include:

- Strong evidence demonstrates that mothers are a primary source of MS colonization within their children. A few investigations showed other potential sources of children's MS colonization, notably fathers.
- The role of other factors influencing transmission, such as socioeconomic status and specific cultural or behavioral practices are unclear.
- There are at least 12 reports of microbiological interventions to reduce transmission of MS from caregivers to their children.

- Even though most studies found a reduction of MS in the children and two showed significant caries reduction, these studies generally lack consistent findings regarding caries reduction, have a small sample size and inadequate control groups, and lack blindness among investigators and subjects.
 - The efficacy of microbiological approaches on the caregivers to reduce caries risk in children still needs to be established through more rigorously designed clinical trials.
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Huebner CE, Milgrom P, Conrad D, Shuk Yin Lee R. *Providing Dental Care to Pregnant Patients: A Survey of Oregon General Dentists*. Journal of the American Dental Association, 2009; 140 (February): 211-222. <http://jada.ada.org/cgi/content/full/140/2/211?ck=nck>

Audience/Relevance: Primary care clinicians, dental professionals, and health care professionals.

A growing number of studies and reports indicate preventive, routine and emergency dental procedures can be provided safely to pregnant patients to alleviate dental problems and promote oral health of mothers and children. In 2006 and 2007 the authors surveyed 1,604 general dentists in Oregon about their attitudes, beliefs and practices regarding dental care for pregnant patients. They had a response rate of 55.2 percent. The survey found:

- Most respondents agreed that dental treatment should be part of prenatal care.
 - Two-thirds of respondents were interested in receiving continuing dental education (CDE) regarding the care of pregnant patients.
 - Comparisons of self-reported knowledge and practice with the aforementioned guidelines revealed several points of difference; the greatest regarded obtaining full-mouth radiographs, providing nitrous oxide, administering long-acting anesthetic injections and use of over-the-counter pain medications.
 - Beyond treatment, there is a need for pregnancy-specific preventive care and oral health education.
 - The dentists surveyed agreed counseling about periodontal disease and premature birth is important for the health of both mother and child.
 - Knowledgeable dentists should become key members of the prenatal health care team.
 - Educating health care professionals and their patients about the safety and advantages of dental treatment during pregnancy can benefit all women.
 - Low-income women are at greater risk of experiencing adverse pregnancy outcomes and untreated dental caries. Pregnancy may be the only time they have access to comprehensive health services.
 - Most pregnant patients were more likely to seek dental care if their physicians recommend it.
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Kumar J, Samuelson R. *Oral Health Care during Pregnancy: Recommendations for Oral Health Professionals*. New York State Dental Journal, November 2009: 29-33. <http://www.ncbi.nlm.nih.gov/pubmed/20069785>: Requires subscription.

Audience/Relevance: Primary care clinicians, dental professionals, and health care professionals.

This article provides information for oral health professionals when providing care to pregnant women. The authors shared that:

- Complex physiological changes during pregnancy can adversely affect oral health.
- Pregnancy by itself is not a reason to defer routine dental care and treatment for oral problems.
- Pregnancy is a good time to educate women about preventing dental caries in young children.
- Treatment of periodontal disease during pregnancy improves birth outcomes.
- Diagnosis and treatment, including needed dental X-rays, can be undertaken safely during the first trimester of pregnancy.
- Essential treatment can be provided throughout the remainder of the pregnancy – between the 14th and 20th weeks is considered ideal.
- The authors include a table describing the role of the oral health professional as well as a table of acceptable and unacceptable drugs for pregnant women.

Milgrom P, Sutherland M, Shirtcliff RM, Ludwig S, Smolen D. *Children's Tooth Decay in a Public Health Program to Encourage Low-Income Pregnant Women to Utilize Dental Care*. BMC Public Health 2010. <http://www.biomedcentral.com/1471-2458/10/76>

Audience/Relevance: Primary care clinicians, dental professionals, and health care professionals.

This study examines the implementation of a community-based public health program designed to provide a dental home for women covered under the Oregon Health Plan (Medicaid) in Klamath County, Oregon USA. The program's long-term goal is to promote preventive oral care for both mothers and their new infants. As part of the evaluation of the program, children in their second year of life in both Klamath and non-program counties were compared to determine if there was an accrual of benefits for the children of mothers in Klamath County. The authors concluded:

- Programs aimed at reducing disparities focusing solely on children may fail to enhance access or improve oral health.
- When low-income pregnant women and mothers with infants have regular dental visits, both mother and child experience benefits.
- Children of mothers assessed in this study are about one-and-a-half times more likely to be caries-free than children in the comparison counties.
- Benefits are due to anticipatory guidance received by the mother, and by preventing the transmission of oral bacteria from mother to child.
- Low-income children whose mothers have a regular source of dental care are more likely to have dental visits and to be healthier than children of mothers who do not have a regular source of dental care.

Morgan MA, Crall R, Goldenberg RL, Schulkin J. *Oral Health during Pregnancy*. Journal of Maternal-Fetal and Neonatal Medicine, September 2009; 22(9): 733–739. <http://informahealthcare.com/doi/abs/10.3109/14767050902926954>: Requires subscription.

Audience/Relevance: Primary care clinicians, the dental community and health care professionals.

This journal article looks at how obstetrician–gynecologists address oral health during pregnancy. To do this, questionnaires were mailed to obstetrician–gynecologists in March 2008. The response rate was 41%, with 351 respondents included in the final analysis. The results of the survey include:

- Most obstetrician–gynecologists agree that routine dental care during pregnancy is important, periodontal disease can have adverse effects on pregnancy outcomes, and treating periodontal disease positively affects pregnancy outcomes.
- The majority seldom ask pregnant patients whether they have recently seen a dentist, ask about current oral health, or provide information about oral care.
- Over one-third did not advise patients to see a dentist for routine prophylaxis, with 80% of these respondents indicating that they had not previously thought about it.
- Most respondents reported having patients who decline dental services because of pregnancy.
- Over half indicate lack of insurance as a substantial barrier to oral care.
- Obstetrician–gynecologists recognize the importance of good oral health during pregnancy but largely do not address it.
- Improved training in the importance of oral health, recognizing oral health problems, and knowledge of procedure safety during pregnancy may make doctors more comfortable with assessing oral health and more likely to address it with patients.

New York State Department of Health. *Oral Health Care during Pregnancy and Early Childhood, Practice Guidelines*. August 2006. <http://www.health.state.ny.us/publications/0824.pdf>

Audience/Relevance: Primary care clinicians, the dental community, and health care professionals.

To improve the oral health of pregnant women and young children, the New York State Department of Health convened an expert panel to develop recommendations for assisting health care professionals. Practice Guidelines were developed as a result of this panel and include information on:

- The effect of pregnancy on oral health.
- Professional dental care which is safe, effective, and recommended during pregnancy.
- The mechanism by which periodontal disease occurs and affects developing fetus.
- Connections between maternal oral health and early childhood caries.
- The role of medical care providers to assess, educate, and refer.
- Care of pregnant woman in dental offices – procedures, medication, etc.
- Normal physiology and timeline of pregnancy as related to dental procedures.
- Caries risk assessment tool.
- Patient education materials – healthy diet, fluoride supplementation schedule, anticipatory guidance and treatment schedule of children, and feeding practices.

Polyzos NP, Polyzos IP, Mauri D, Tzioras S, Tsappi M, Cortinovis I, Casazza G. *Effect of Periodontal Disease Treatment during Pregnancy on Preterm Birth Incidence: A Meta-analysis of Randomized Trials*. American Journal of Obstetrics & Gynecology, March 2009; (September 2008): 225-232
<http://www.ajog.org/article/PIIS0002937808010806/fulltext>

Audience/Relevance: Primary care clinicians, the dental community, and health care professionals.

This article contains the results of meta-analysis of randomized controlled trials to determine whether periodontal disease treatment with scaling and/or root planing during pregnancy reduces the incidence of preterm birth (PTB) or low birthweight (LBW) among infants. The findings of the authors suggest:

- Scaling and/or root planing during pregnancy significantly reduces the rate of preterm births and may reduce the rate of low birth rate infants.
- The Obstetrics and Periodontal Therapy study is the largest randomized trial to date and its results do not favor the use of periodontal disease treatment during pregnancy with scaling and root planning.
- Ongoing large randomized trials should be undertaken.
- A cautious approach should be taken before rejecting treatment of periodontal disease with scaling and/or root planing during pregnancy.

Silk H, Douglass AB, Douglass JM, Silk L. *Oral Health during Pregnancy*. American Family Physician, April 15, 2008; 77(8): 1139-1144. <http://www.aafp.org/afp/2008/0415/p1139.html>

Audience/Relevance: Primary care clinicians, the the dental community, and health care professionals.

The goal of this article is to increase communication and reduce unfounded fears among medical and dental clinicians to provide or make referrals for dental care during pregnancy. The authors offer guidelines substantiated by research, and list common issues, diagnoses, treatments, medications, and responses to acute conditions. The authors found that:

- One-quarter of women of reproductive age have dental caries, and pregnant women are at even higher risk of tooth decay and gum disease.
- Untreated dental caries can lead to oral abscess and facial cellulitis.

- During pregnancy women may be more motivated to make healthy changes.
 - Medical clinicians can potentially reduce the risks to mother and offspring through oral disease monitoring and prevention, diagnosis, early management, and dental referral.
 - Periodontitis is associated with several poor pregnancy outcomes. Early diagnosis and root scaling are recommended.
 - Hyperemesis gravidarum (nausea/vomiting) during pregnancy can cause enamel erosions. Management strategies to reduce oral acid exposure include dietary and lifestyle changes, along with the use of antiemetics, antacids, or both.
 - Xylitol and chlorhexidine, both safe during pregnancy and breastfeeding, are topical agents that lower maternal oral bacterial load and reduce transmission of bacteria to infants when used late in pregnancy and/or in the postpartum period.
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CARDIOVASCULAR DISEASE (HEART DISEASE AND STROKE) AND ORAL HEALTH

Associations between Periodontal Disease and Cardiovascular Disease. Research Review, December 2009. This report was supported by funding from Delta Dental Plans Association.

Audience/Relevance: Primary care clinicians, the dental community, health care professionals, and patients.

This report focuses on evidence published since the mid-2000s with respect to the association between periodontal disease (PD) and cardiovascular disease (CVD). It concluded that:

- PD may play a role in severe and often fatal cardiovascular events. Periodontitis is increasingly regarded as a risk factor for CVD.
 - Good periodontal health may become accepted as an important goal that could contribute to reducing the risk for cardiovascular events.
 - Most common forms of periodontal disease are conditions relatively easy to diagnose and treat.
 - Based on evidence, the expected outcome of periodontal treatment is improved periodontal health with negligible side effects.
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Bahekar A, Singh S, Sandeep S, Molnar J, Arora R. *The Prevalence and Incidence of Coronary Heart Disease is Significantly Increased in Periodontitis: A Meta-analysis*. American Heart Journal 2007; 154(5): 830-837. <http://www.ahjonline.com/article/S0002-8703%2807%2900541-8/abstract>: Requires subscription.

Audience/Relevance: Primary care clinicians, the dental community, and health care professionals.

Through a systematic review of the literature, the aim of this study is to evaluate whether periodontitis (PD) is associated with increased risk of coronary heart disease (CHD), as previous studies have shown conflicting results. The authors shared that:

- Analysis indicates that both the prevalence and incidence of coronary heart disease are significantly increased in patients with periodontal disease. Periodontal disease may be a risk factor for coronary heart disease.
 - Release of bacteria and proinflammatory mediators in the bloodstream, such as bacterial endotoxins and cytokines, cause the release of acute phase reactants (such as C-reactive protein) leading to increased inflammatory activity in the atherosclerotic lesions, and may represent the link between periodontal infection and coronary heart disease.
 - Individuals with PD have a 1.14 times higher risk of developing coronary heart disease than those in a control group.
 - There is a statistically significant positive correlation between PD and CHD.
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Demmer R, Desvarieux M. *Periodontal Infections and Cardiovascular Disease*. Journal of the American Dental Association 2006; 137: 14S-20S. http://www.adajournal.com/cgi/content/full/137/suppl_2/14S

Audience/Relevance: Primary care clinicians, the dental community, health care professionals, and policymakers.

This article provides a review of the science surrounding the association between heart disease and periodontal infections. Findings in the article include:

- An association exists between periodontal disease (PD) and cardiovascular disease (CVD), however it is not known whether this relationship is causal or coincidental.

- While most studies demonstrated positive associations between periodontal disease and CVD, not all studies are positive, and substantial variations in results were evident.
 - More recent studies have enhanced the specificity of infectious exposure definitions by measuring systemic antibodies to selected periodontal pathogens or by directly measuring and quantifying oral microbiota from subgingival dental plaque.
 - Results from these studies show a positive association between PD and CVD.
 - Ongoing observational and focused pilot intervention studies may inform the design of large-scale clinical intervention studies.
 - Recommending periodontal treatment for the prevention of atherosclerotic CVD is not warranted based on scientific evidence, and must be recommended on the basis its valuable benefits for the oral health of patients, recognizing that patients are not healthy without good oral health.
 - The emergence of periodontal infections as a potential risk factor for CVD is leading to a convergence in oral and medical care that can only benefit the patients and public health.
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Grau AJ, Becher H, Ziegler CM, Lichy C, Buggle F, Kaiser C, Lutz R, Bultmann S, Preusch, M, Dorfer C. *Periodontal Disease as a Risk Factor for Ischemic Stroke*. *Stroke* 2004; 35(2): 496-501.
<http://stroke.ahajournals.org/cgi/reprint/01.STR.0000110789.20526.9Dv1>

Audience/Relevance: Primary care clinicians, the dental community, health care professionals, and policymakers.

This study investigates whether periodontal disease, including periodontitis and gingivitis, is a risk factor for cerebral ischemia. The authors performed a case-control study with 303 patients examined within seven days following acute ischemic stroke or transient ischemic attack, 300 population controls, and 168 hospital controls with nonvascular and noninflammatory neurological diseases. The authors found:

- Men younger than 60 years who had severe periodontitis have a 4.3 times higher risk of experiencing stroke than patients in the same age group who had mild or no periodontitis.
 - Periodontal disease is significantly associated with cerebral ischemia.
 - Gingivitis and periodontitis are treatable and preventable conditions.
 - The identification of gingivitis and periodontitis as stroke risk factors requires further studies could have a major impact on stroke prevention.
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American Academy of Periodontology. *Gum Disease Links to Heart Disease and Stroke*. Retrieved October 31, 2010 from <http://www.perio.org/consumer/mbc.heart.htm>

Relevance/Audience: Primary care clinicians, the dental community, health care professionals, and lay audiences.

This website provides an overview of why oral health is important to the prevention of heart disease including:

- People with gum disease are almost twice as likely to suffer from coronary artery disease.
 - Existing theories that explain the link between periodontal disease and heart disease.
 - Periodontal disease can also worsen existing heart disease.
 - Patients at risk for endocarditis may require antibiotics prior to dental procedures.
 - Links are provided to other mouth and body connections including inflammation, osteoporosis, pregnancy problems, diabetes and respiratory diseases, and information about gum disease.
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Moffatt A. *Gumming up Your Heart: Better Dental Care Can Prevent Disease and Keep You Healthier From Head to Toe*. AARP Bulletin. http://healthandenergy.com/gumming_up_your_heart.htm

Audience/Relevance: Primary care clinicians, the dental community, health care professionals, and lay audiences.

This article explains the emerging link between periodontal disease (PD) and heart disease.

- Studies have found that people who have PD are nearly twice as likely to suffer from coronary artery disease as those who do not have PD.
 - Some researchers believe that the bacteria shed by chronic oral infections can spread through the bloodstream and contribute to disease in the heart and other parts of the body.
 - Chronic gum infections may trigger a chain of chemical events that causes inflammation throughout the body.
 - When plaque lining the arteries becomes inflamed, blood clots can form and lead to heart attack or stroke.
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Mustapha I, Debrey S, Oladubu M, Ugarte R. *Markers of Systemic Bacterial Exposure in Periodontal Disease and Cardiovascular Disease Risk: A Systemic Review and Meta-analysis*. Journal of Periodontology 2007; 78 (12): 2289-2302. <http://www.joponline.org/doi/abs/10.1902/jop.2007.070140>: Requires subscription.

Audience/Relevance: Primary care clinicians, the dental community, and health care professionals.

The purpose of this study is to review and analyze the association between periodontal disease (PD) with elevated systemic bacterial exposure and cardiovascular disease (CVD). Recent meta-analyses report a weak association between PD on clinical examination and cardiovascular disease CVD. For the study, PubMed, Cochrane Controlled Trials Register, EMBASE, and SCOPUS databases were searched for literature examining PD and CVD. Results include:

- Periodontal disease with elevated markers of systemic bacterial exposure is associated strongly with coronary heart disease compared to subjects without PD.
 - Periodontal patients whose bodies show evidence of a reaction to the bacteria associated with periodontitis may have an increase risk of developing cardiovascular disease.
 - Study participants who have increase bacterial exposure are more likely to develop coronary heart disease or plaque formation in the arteries.
 - A review of previously published literature that suggests the long-term effects of periodontitis may be what ultimately leads to cardiovascular disease.
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Patterson T. (2008, November 18). *Brush Your Teeth, Save Your Life?* Retrieved October 31, 2010 from <http://www.cnn.com/2008/HEALTH/conditions/11/18/dental.heart/index.html>

Audience/Relevance: Primary care clinicians, the dental community, health care professionals, and lay audiences.

This article provides a broad overview of current science about the link between periodontal disease and cardiovascular disease.

- Doctors have known for years that gum disease and heart disease are linked, but they do not agree on the reasons behind the connection.
 - C-reactive protein, which is produced by the body in response to inflammation, may be behind the link.
 - Scientists are also looking at mouth bacteria as another possible link between gum disease and heart disease.
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SENIORS AND ORAL HEALTH

Medications/Dry Mouth

Ciancio SG. *Medications' Impact on Oral Health*. Journal of the American Dental Association, 2004; 135 (10):1440-1448. <http://jada.ada.org/cgi/content/full/135/10/1440>

Audience/Relevance: Primary Care Clinicians, health care professionals, and the dental community.

This study reviewed the affects of over-the-counter and prescription drugs that were frequently used by many adults, particularly by those older than 65 years of age. The author reviewed studies that ranged from case reports to randomly controlled, doubleblinded studies. The majority of findings are based on case reports.

- A number of medications (prescription, over-the counter, vitamins and minerals, herbal preparations) affect oral health.
- As more drugs become available, medication-related oral side effects among their elderly patients will be encountered.
- Since many patients regularly take medications, both prescribed and nonprescribed, a thorough medical history needs to be taken by dentists so that they can be aware of medication-related problems and the impact of medications on diagnosis and treatment planning.
- Dentists should be aware of the potential oral tissue complications that medications create and develop appropriate treatment plans for their patients that consider the oral health impact of medication they take.
- The article provides useful tables including Categories of Drugs Associated with Xerostomia, Medications That Can Cause Dysgeusia, Angioedema-Associated Drugs, and Effects of Herbal Agents.

Guggenheimer J, Moore PA. *Xerostomia: Etiology, Recognition and Treatment*. Journal of the American Dental Association, 2003; 134 (January): 61-69. <http://jada.ada.org/cgi/content/full/134/1/61>

Audience/Relevance: Primary Care Clinicians, health care professionals, and the dental community.

Clinicians may encounter symptoms of xerostomia (dry mouth) among patients who take medications, have certain connective tissue or immunological disorders, or have been treated with radiation therapy. When xerostomia is the result of a reduction in salivary flow, significant oral complications can occur.

In this study the authors conducted an Index Medicus-generated review of clinical and scientific reports about xerostomia that have appeared in dental and medical literature over the past 20 years.

- Xerostomia often develops when the amount of saliva that bathes the oral mucous membranes is reduced, though symptoms occurred without a measurable reduction in salivary gland output.
- A number of commonly prescribed drugs with a variety of pharmacological activities are found to produce xerostomia as a side effect.
- Xerostomia often is associated with Sjögren's syndrome, a condition that involves dry mouth and dry eyes and that may be accompanied by rheumatoid arthritis or a related connective tissue disease.
- Xerostomia also is a frequent complication of radiation therapy.
- Xerostomia is an uncomfortable condition and a common oral complaint for which patients may seek relief from dental practitioners, along with other oral complications of xerostomia like candidiasis, difficulty with the use of dentures, and dental caries.
- Possible cause(s) need to be identified by clinicians and the patient should be provided with appropriate treatment.

- Remedies for xerostomia usually are palliative but offered some protection from the condition's more significant complications.
 - The article provides useful tables including Causes of Xerostomia, Drugs Associated with Xerostomia, and Management of Hyposalivation and Xerostomia.
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Nderfors T, Isaksson R, Mornstad H, Dahlof C. *Prevalence of Perceived Symptoms of Dry Mouth in an Adult Swedish Population - Relation to Age, Sex and Pharmacotherapy*. *Community Dentistry and Oral Epidemiology*, 1997; 25 (November 1996):211-216. <http://onlinelibrary.wiley.com/doi/10.1111/j.1600-0528.1997.tb00928.x/abstract>: Requires subscription.

Audience/Relevance: Primary care clinicians, health care professionals, and the dental community.

The aim of this study is to evaluate the prevalence of subjective perception of dry mouth in an adult population and to determine the prevalence of pharmacotherapy in this population. Using the Swedish national census register, 4,200 adults in a southern province were randomly selected. The sample was stratified according to age and sex, including 300 men and an equal number of women aged ten years apart, ranging from 20 to 80. A questionnaire was mailed to each individual. Questions included the subjective perception of dry mouth, as well as reports on their current diseases and continuing pharmacotherapy. 3313 (80.5%) evaluable questionnaires were returned. Conclusions drawn include:

- The estimated prevalence of xerostomia in the population is statistically significant: 21.3% for men and 27.3% for women.
 - In both medicated and non-medicated subjects, women tended to report a higher prevalence of xerostomia compared with men.
 - There is a strong association between xerostomia and increasing age and also between xerostomia and continuing pharmacotherapy. The average prevalence of dry mouth among medicated and non-medicated subjects is 32.1% and 16.9%, respectively.
 - There is also a strong association between xerostomia and the number of medications.
 - This epidemiological survey demonstrated that women, independent of age, do report a higher prevalence of xerostomia than men; the symptoms of dry mouth are strongly associated with age and pharmacotherapy.
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Pneumonia and Oral Health

Dejohn P. *Hospitals Save Millions on VAP With Oral Care Program*. *Hospital Materials Management*. 2006.

Audience/Relevance: Primary Care Clinicians, health care professionals, hospital administrators, and policy makers.

This article looks at Sherman Hospital's investigation into reducing infections brought on by Ventilator associated pneumonia (VAP). Sherman Hospital in Elgin, Illinois, estimated that each case of VAP costs \$53,000 to treat. In 2004, there were 41 cases, totaling about \$2.2 million in treatment costs. The investigation found:

- One way to reduce ventilator-associated infections is through better oral care.
- While swabs and other oral care products are available in critical-care rooms, there is a problem with compliance of oral care protocols.
- The hospital's new products committee, made up of clinicians and materials managers, reviewed available products that are easier to use. The committee settled on a 24-hour Q-Care kit that contains the Toothette line of swabs, a suction toothbrush, regular toothbrush, suction swab, and suction catheter.
- The price of the entire kit is \$33, and it contains everything needed to provide a patient's oral care for 24 hours. Kits are included in the room charge and not billed separately to the patient.

- The kit is placed in the room of anyone who is to be intubated. The Q-Care suction system is used every two hours, oral swabs and toothbrushes every 12 hours, and deep suctioning is done every six hours.
 - In fiscal year 2005 (May 2004 to May 2005) Sherman had 10 VAP cases, a decrease of 75.6% from the previous year.
 - Based on the avoided cost compared with before the Sage kits were used, the hospital estimated its savings at \$1.6 million.
 - The hospital spends \$47,000 annually on oral care, compared with \$18,000 before the switch.
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Scannapieco FA. *Pneumonia in Nonambulatory Patients*. Journal of the American Dental Association, 2006; 137:21S-25S. http://jada.ada.org/cgi/reprint/137/suppl_2/21S

Audience/Relevance: Primary care clinicians, health care professionals, the dental community, hospital administrators and policy makers.

To examine the relationship between poor oral health, the oral microflora and bacterial pneumonia, particularly in ventilator-associated pneumonia in institutionalized patients, the author of this study reviews laboratory studies, clinical trials, and review articles. Teeth or dentures have nonshedding surfaces on which oral biofilms (dental plaque) form that are susceptible to colonization by respiratory pathogens. Subsequent aspiration of respiratory pathogens shed from oral biofilms into the lower airway increases the risk of developing a lung infection. In addition, patients may aspirate inflammatory products from inflamed periodontal tissues into the lower airway, contributing to lung insult.

- A number of studies show that the mouth can be colonized by respiratory pathogens and serve as a reservoir for these organisms.
 - Other studies demonstrated that oral interventions aimed at controlling or reducing oral biofilms can reduce the risk of pneumonia in high-risk populations.
 - There is substantial evidence that shows improved oral hygiene may prevent pneumonia in vulnerable patients.
 - The institution of rigorous oral hygiene regimens for hospitalized patients and long-term care residents can reduce the risk of developing pneumonia.
 - There is considerable evidence to support the relationship between poor oral hygiene and bacterial pneumonia in special-care populations, including people in hospital and nursing home settings; however, these associations are documented only for nosocomial pneumonia.
 - Little evidence is available that supports that poor oral hygiene and periodontal disease increases the risk of developing community acquired pneumonia.
 - Practicing dentists should be aware of the risks to patients in institutional settings and become more involved in the care of hospitalized and nursing home populations. Preventive dental care can be crucial in the prevention of serious lung infections in these settings.
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Scannapieco FA, Bush RB, Paju S. *Associations between Periodontal Disease and Risk for Nosocomial Bacterial Pneumonia and Chronic Obstructive Pulmonary Disease*. A Systematic Review. Annals of Periodontology. 2003; 8 (1). <http://www.joonline.org/doi/abs/10.1902/annals.2003.8.1.54>: Requires subscription.

Audience/Relevance: Primary care clinicians, health care professionals, and the dental community.

This systematic review examines literature to determine if interventions that improve oral hygiene reduce the rate of pneumonia in high-risk populations. The search protocol used is MEDLINE, pre-MEDLINE, MEDLINE Daily Update, and the Cochrane Controlled Trials Register. Searches were performed for articles published in English from 1966 through March 2002. The inclusion criteria consisted of randomized controlled clinical trials (RCTs); longitudinal, cohort, and case-control studies were included. Study populations included patients with any form of

pneumonia or chronic obstructive pulmonary disease (COPD) and periodontal disease, as measured by assessments of gingival inflammation, probing depth, clinical attachment level, radiographic bone loss, or oral hygiene indices.

- A variety of oral interventions improving oral hygiene through mechanical and/or topical chemical disinfection or antibiotics reduces the incidence of nosocomial pneumonia by an average of 40%.
 - Several studies demonstrate a potential association between periodontal disease and COPD.
 - Oral colonization by respiratory pathogens, fostered by poor oral hygiene and periodontal diseases, appear to be associated with nosocomial pneumonia.
 - Additional large-scale RCTs to provide the medical community with further evidence to institute effective oral hygiene procedures in high-risk patients to prevent nosocomial pneumonia are warranted.
 - Results associating periodontal disease and COPD are preliminary; large-scale longitudinal and epidemiologic and RCTs were recommended.
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Taylor GW, Loesche WJ, Terpenning MS. *Impact of Oral Diseases on Systemic Health in the Elderly: Diabetes Mellitus and Aspiration Pneumonia*. Journal of Public Health Dentistry. 2000; 60 (4):313-320. <http://onlinelibrary.wiley.com/doi/10.1111/j.1752-7325.2000.tb03341.x/abstract>: Requires subscription.

Audience/Relevance: Primary care clinicians, health care professionals, and the dental community.

This paper presents data from the third National Health and Nutrition Examination Survey (NHANES III) describing the prevalence of dental caries and periodontal diseases in the older adult population. It then evaluates published reports and presented data from clinical and epidemiologic studies on relationships among oral health status, chronic oral infections (of which caries and periodontitis predominate), and certain systemic diseases, specifically focusing on type 2 diabetes and aspiration pneumonia.

- The NHANES III data demonstrates that dental caries and periodontal diseases occur with substantial frequency and represent a burden of unmet treatment need in older adults.
 - The review finds clinical and epidemiologic evidence to support considering periodontal infection a risk factor for poor glycemic control in type 2 diabetes; however, there is limited representation of older adults in reports of this relationship.
 - For aspiration pneumonia, several lines of evidence support oral health status as an important etiologic factor.
 - The authors suggest clinical studies designed specifically to evaluate the effects of treating periodontal infection on glycemic control and improving oral health status in reducing the risk of aspiration pneumonia are warranted.
 - There is evidence to support recommending oral care regimens in protocols for managing type 2 diabetes and preventing aspiration pneumonia.
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Seniors Oral Health/Health General

Kandelman D, Petersen PE, Ueda H. *Oral Health, General Health, and Quality of Life in Older People*. Special Care in Dentistry. 2008; 28 (6):224-36. <http://onlinelibrary.wiley.com/doi/10.1111/j.1754-4505.2008.00045.x/abstract>: Requires subscription.

Audience/Relevance: Primary care clinicians, health care professionals, and the dental community.

The purpose of this report is to review the interrelationship between poor oral health conditions of older people and general health. The impact of poor oral health on quality of life is analyzed, and the implications for public health intervention and oral health care are discussed.

- The available scientific evidence is particularly strong for a direct relationship between diabetes and periodontal disease.
 - The direct relationship between periodontal disease and cardiovascular disease is less convincing.
 - General and associated oral health conditions have a direct influence on elder people's quality of life and lifestyle.
 - The evidence on oral health/general health relationships is particularly important to the World Health Organization in its effort to strengthen integrated oral health promotion and disease prevention around the globe.
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Little JW, Falace DA, Miller CS, Rhodus NL. *Dental Management of the Medically Compromised Patient*. Sixth Edition ed. St. Louis: Mosby, Inc.; 2002.

Audience/Relevance: Primary care clinicians, health care professionals, and the dental community.

This book presents practical guidance that helps the clinician determine the severity and stability of common medical disorders. It provides concise, clinically focused coverage details the basic disease process for each condition, along with the incidence and prevalence, pathophysiology, signs and symptoms, laboratory findings, currently accepted medical therapies, and recommendations for specific dental management.

MacDonald DE. *Principles of Geriatric Dentistry and their Application to the Older Adult with Physical Disability*. Clinics of Geriatric Medicine, 2006;22:413-434. <http://www.geriatric.theclinics.com/article/S0749-0690%2805%2900099-6/abstract>: Requires subscription.

Audience/Relevance: Primary care clinicians, health care professionals, and the dental community.

The older adult living with a physical disability faces many daily challenges. Limited hand function or impaired cognition often has profound effects on activities of daily life including oral hygiene. This article explores age-related changes in dentition and common causes of pathology of the oral cavity with special emphasis on populations with impaired hand function or cognition. This article will also assist the treating physician as they relate to oral diagnosis and patient management.

Manski RJ, Moeller J, Schimmel J, et al. *Dental Care Coverage and Retirement*. Journal of Public Health Dentistry. 2009;1-12. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2864343/>

Audience/Relevance: Primary Care Clinicians, health care professionals, the dental community, and policy makers.

The purpose of this study is to examine the convergence of an aging population and a decreased availability of dental care coverage using data from the Health and Retirement Study. The authors calculate national estimates for the number of persons aged 51 years and older covered by dental insurance, along with their related characteristics, and groups them by labor force, retirement status, and source of coverage. They also estimate a multivariate model controlling for potentially confounding variables.

- Being in the labor force is a strong predictor of having dental coverage.
 - For older retired adults not in the labor force, the only source for dental coverage is either a postretirement health benefit or spousal coverage.
 - Dental care, generally not covered in Medicare, is an important factor in the decision to seek dental care.
 - In order to identify the best ways of improving oral health and access to care among older Americans, it is important to understand the relationship between retirement and dental coverage.
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Mulligan R, Vanderlinde MA. *Treating the Older Adult Dental Patient: What Are the Issues of Concern?* CDA Journal. 2009; 37(11):804-810.

http://www.cda.org/library/cda_member/pubs/journal/jour1109/mulligan.pdf

Audience/Relevance: Primary Care Clinicians, health care professionals, the dental community, and policy makers.

This article provides a geriatric treatment model, suggesting that an understanding of the psychosocial, behavioral, and medical presentations of older patients may prove to be instrumental in creating collaborative, successful dental/oral treatment plans between dentists and older patients.

- As the number of older adults increases, dental practitioners need to recognize and carefully modify care delivery based on age-related and age-associated changes, diseases, drugs, and individual determinants that characterize each geriatric patient.
- Preliminary evidence suggests that there is a need for a dental/oral diagnostic treatment planning process for the older patient in the context of medical illness, disability, psychosocial, and behavioral impoverishment.
- The authors suggest that dentists can maximize their efforts to treat the large aging population if they are prepared with facts about the myths and realities of aging, knowledgeable about the problems faced by older adults, and are cognizant of how to assess and treat oral health in older persons.
- More geriatric oral health models that integrate interdisciplinary health and non health-related activities into the dental consciousness need to be developed and tested so that timely, appropriate, and targeted interventions may be applied.

Seniors Oral Health and Nutrition

Kanehisa Y, Yoshida M, Taji T, Akagawa Y, Nakamura H. *Body Weight and Serum Albumin Change after Prosthodontic Treatment among Institutionalized Elderly in a Long-Term Care Geriatric Hospital.*

Community Dentistry and Oral Epidemiology. 2009; 37 (6):534-8.

<http://onlinelibrary.wiley.com/doi/10.1111/j.1600-0528.2009.00496.x/abstract>: Requires subscription.

Audience/Relevance: Primary Care Clinicians, health care professionals, and the dental community.

To evaluate the impact of denture treatment on the dependent elderly who have a high risk of protein-energy malnutrition, this study compares body weight as an indicator of nutritional status before and six months after prosthodontic treatment. This study was conducted in a long-term care geriatric hospital in Hiroshima, Japan. Body weight and serum albumin levels are examined at prosthesis insertion and six months after treatment.

- Six months after prosthodontic treatment, body weight changes were significantly different between users and non-users regardless of denture type and, in addition, serum albumin levels were significantly increased among individuals using partial denture in either or both jaws.
- Prosthodontic treatment may improve the nutritional status of institutionalized elderly.

Sheiham A, Steele J. *Does the Condition of the Mouth and Teeth Affect the Ability to Eat Certain Foods, Nutrient and Dietary Intake and Nutritional Status Amongst Older People?* *Public Health Nutrition.* 2007; 4 (03):797.

<http://journals.cambridge.org/action/displayFulltext?type=1&fid=626908&jid=&volumeld=&issuelid=03&aid=562708&bodyId=&membershipNumber=&societyETOCSession=>

Audience/Relevance: Primary care clinicians, health care professionals, the dental community, and policy makers.

The objective of this study is to assess how the dental statuses of older people affect their ability to eat common foods, their nutrient intake, and some nutrition-related blood analytes. It was conducted through a cross-sectional survey of people aged 65 years and older as part of nation-wide British National Diet and Nutrition Survey. Data from a questionnaire were linked to clinical data and data from four-day weighed dietary records. The survey included 753 free-living and 196 institution subjects who had a dental exam and were interviewed.

- About one in five dentate (with natural teeth) free-living people had difficulty eating raw carrots, apples, well-done steak or nuts. Foods such as nuts, apples and raw carrots could not be eaten easily by over half edentate (without natural teeth but with dentures) people in institutions.
 - In free-living, intakes of most nutrients and fruit and vegetables are significantly lower in edentate than dentate.
 - Perceived chewing ability increases with increasing number of teeth.
 - Daily intake of non-starch polysaccharides, protein, calcium, non-haem iron, niacin, vitamin C, and intrinsic and milk sugars are significantly lower in edentate.
 - Plasma ascorbate and retinol are significantly lower in the edentate than dentate. Plasma ascorbate is significantly related to the number of teeth and posterior contacting pairs of teeth.
 - The presence, number and distribution of natural teeth are related to the ability to eat certain foods, affecting nutrient intakes and two biochemical measures of nutritional status.
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OTHER ORAL HEALTH SYSTEMIC CONNECTIONS

General

Douglass AB, Douglass JM, Barr C, Eisenberg E, Goldblatt R, Ioannidou E, Peterson D. *Oral Health for the Family Physician*. (Monograph) FP Essentials, Edition No. 304, AAFP Home Study. Leawood, Kansas: American Academy of Family Physicians, September 2004.

Audience/Relevance: Primary care clinicians and health care professionals.

Because oral health is a category that falls between the purview of family physicians and other health professionals, the authors have written this monograph to provide guidance for the primary care clinician. The monograph provides a thorough discussion of many oral conditions along with useful photos to help identify these conditions. This American Academy of Family Physicians Home Study is a peer-reviewed continuing medical education (CME) program designed by family physicians to provide health professionals with high quality, cost-effective CME. Included in the program are learning objectives, pre- and post-test questions and answers. The monograph is divided into five sections covering the following:

- Clinical oral pathology and oral medicine (common white lesions, ulcerative lesions, benign oral masses malignant oral masses).
- Dental caries (epidemiology and etiology, role of well-child care in caries risk assessment and prevention, caries in young adults, caries in the elderly).
- Periodontal disease (diabetes mellitus, coronary disease, pregnancy).
- Dental emergencies and complications of dental care (dental pain, cellulites, dental trauma, extraction complications).
- Common intersections between medicine and dentistry (bacteremia and dental procedures, anticoagulation and dental procedures, selecting dental health care professionals).

Eisenberg E, Barasch A. *Oral Examination: Pointers for Spotting Local and Systemic Disease*. Consultant 1995; 35:1710-21.

Audience/Relevance: Primary Care Clinicians and health care professionals.

This article provides the reader with information about conducting an oral evaluation as a part of the physical examination. Early recognition of the oral findings that indicate systemic involvement of malignancy can markedly improve the prognosis for a patient. The authors provides the reader with a step-by-step approach to conducting the oral exam including:

- The equipment needed: a good light source, examination gloves, gauze, sponge, and tongue blade.
- A breakdown of the various points the provider should include in their examination: submandibular structure, tempromandibular joints, lips, intraoral, labial and buccal mucosa, palate, tongue, floor of the mouth, dentition and peridontium, and teeth.
- Two tables are included in the article, one describing differentiating among white lesions, and the other describing clinical distinctions between recurrent aphthous ulcers.

US Department of Health and Human Services. *Oral Health in America. A Report of the Surgeon General*. Rockville, MD: US Department of Health and Human Services, National Institute of Dental and Craniofacial Research, National Institutes of Health; 2000.

http://www.cda.org/page/Library/cda_member/pubs/journal/jour0900/report.html

Audience/Relevance: Primary Care Clinicians, health care professionals, the dental community, and policy makers.

The major message of this report is that oral health is essential to the general health and well-being of all Americans and could be achieved by all Americans.

- In spite of the safe and effective means of maintaining oral health that have benefited the majority of Americans, the report finds that many still experience needless pain and suffering, complications that devastate overall health and well-being, and financial and social costs that diminish the quality of life and burden American society.
 - Studies show that the "silent epidemic" of oral diseases is affecting the most vulnerable citizens – poor children, the elderly, and many members of racial and ethnic minority groups.
 - The report shows that oral health means more than healthy teeth. It also includes being free of chronic oral-facial pain conditions, oral and pharyngeal cancers, oral soft tissue lesions, birth defects such as cleft lip and palate, and scores of other diseases and disorders that affect the oral, dental, and craniofacial tissues.
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Adult

Dunn AS, Turpie AG. *Perioperative Management of Patients Receiving Oral Anticoagulants: A Systematic Review*. Archives of Internal Medicine. 2003; 163(8):901-8.

<http://archinte.ama-assn.org/cgi/reprint/163/8/901>

Audience/Relevance: Primary Care Clinicians, health care professionals, and the dental community.

Because the safety and efficacy of various management strategies for patients who needed to undergo surgery or invasive procedures and received subsequent oral anticoagulants (OACs) are unknown, the authors of this article did a systematic review and synthesis of the English-language literature examining the perioperative management and outcomes of patients receiving long-term OAC therapy. Thirty-one reports are identified. The reviewers find:

- Most patients can undergo dental procedures, arthrocentesis, cataract surgery, and diagnostic endoscopy without alteration of their regimen.
 - For other invasive and surgical procedures, oral anticoagulation needs to be withheld, and the decision whether to pursue an aggressive strategy of perioperative administration of intravenous heparin or subcutaneous low-molecular-weight heparin need to be individualized.
 - The literature examined is substantially limited in its ability to help choose an optimal strategy.
 - Further and more rigorous studies are needed to better inform this decision.
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Gonsalves WC, Chi AC, Neville BW. *Common Oral Lesions: Part I. Superficial Mucosal Lesions*. American Family Physician, Feb 15 2007;75 (4):501-507 (<http://www.aafp.org/afp/2007/0215/p501.html>) and *Common Oral Lesions: Part II. Masses and Neoplasia*. American Family Physician, Feb 15 2007; 75 (4):509-512. (<http://www.aafp.org/afp/2007/0215/p509.html>)

Audience/Relevance: Primary Care Clinicians and health care professionals.

Primary care clinicians regularly encounter oral health issues in practice. For recognition and diagnosis of common oral lesions, a thorough history and a complete oral examination is required. Knowledge of clinical characteristics such as size, location, surface morphology, color, pain, and duration are also helpful.

- Large-scale, population-based screening studies have identified the most common oral lesions as candidiasis, recurrent herpes labialis, recurrent aphthous stomatitis, mucocele, fibroma, mandibular and palatal tori, pyogenic granuloma, erythema migrans, hairy tongue, lichen planus, and leukoplakia.
 - Part I reviews superficial mucosal lesions: candidiasis, herpes labialis, aphthous stomatitis, erythema migrans, hairy tongue, and lichen planus.
 - Part II covers common oral lesions that may appear as masses or represent neoplastic change.
 - Primary care clinicians should be able to recognize these lesions and make appropriate referrals for biopsy and treatment.
 - Differentiating benign from worrisome lesions and providing appropriate counseling regarding risk factors (e.g., tobacco use) is central to achieving national oral health goals.
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Lockhart P, et al, *The Evidence Base for the Efficacy of Antibiotic Prophylaxis in Dental Practice*, Journal of the American Dental Association, 2007, 138:458-474. <http://www.adajournal.com/cgi/reprint/138/4/458>

Audience/Relevance: Primary care clinicians, health care professionals, and the dental community.

People with various medical conditions and devices are suggested candidates for receiving antibiotic prophylaxis before undergoing dental procedures. The authors of this study did a qualitative, systematic review to determine the level of evidence for this practice and whether antibiotic prophylaxis prevents distant site infections in these patients. They selected eight groups of patients with specific medical conditions and devices who often are given antibiotic prophylaxis before undergoing invasive dental procedures. Additionally, the authors thoroughly searched the literature for the years 1966 through 2005 for references indicating some level of support for this practice and graded each publication on the basis of level of evidence. The authors found:

- Formal recommendations in favor of antibiotic prophylaxis for only three of the eight medical conditions: native heart disease, prosthetic heart valves, and prosthetic joints.
 - No prospective randomized clinical trials and only one clinical study of antibiotic prophylaxis.
 - Only one systematic review and two case series provided weak, if any, support for antibiotic prophylaxis in patients with cardiac conditions.
 - Little or no evidence to support this practice or to demonstrate that it prevents distant site infections for any of these eight groups of patients.
 - No definitive, scientific basis exists for the use of prophylactic antibiotics before dental procedures for these eight groups of patients.
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Neville BW. *Oral and Maxillofacial Pathology*. Philadelphia: WB Saunders.

Audience/Relevance: Primary care clinicians, health care professionals, and the dental community.

This textbook deals with the nature, identification, and management of diseases affecting the oral and maxillofacial regions. The revised and updated content throughout this edition provides the latest information on the etiology, clinical features, histopathology, treatment, and prognosis of each disease entity. The textbook includes:

- Over 1,300 clinical photos and radiographs, most in full color, to facilitate identification and classification of lesions.
- Current concepts of pathogenesis and disease management to help the reader to understand the diseases that affect the oral and maxillofacial structures, formulate an accurate diagnosis, and institute proper treatment.
- Outlines at the beginning of each chapter to allow immediate access to specific topics.
- Chapters organized by body system or disease group.
- A comprehensive appendix of differential diagnosis among oral and maxillofacial disease processes.
- A bibliography divided by topic at the end of each chapter.

- Accomplished authors and contributors with a broad range of clinical and classroom teaching experiences to provide a well-balanced coverage of the entire subject.
 - Direct access to a complete range of full-color clinical images and patient radiographs that illustrate the differentiating characteristics of lesions in the oral and maxillofacial region.
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Reamy BV, Derby R, Bunt CW. *Common Tongue Conditions in Primary Care*. American Family Physician, 2010;81(5):627-634. <http://www.mdconsult.com/das/article/body/216303352-4/jorg=journal&source=&sp=N&sid=0/N/739314/1.html?issn=>: Requires subscription.

Audience/Relevance: Primary care clinicians and health care professionals.

Tongue conditions commonly seen in primary care are reviewed for the family physician in this article. Abnormalities of the tongue may be diagnostically and therapeutically challenging for physicians.

- A complete history, including onset and duration of symptoms, earlier symptoms, and tobacco and alcohol use, are needed for recognition of abnormalities and accurate diagnosis.
- Examination should include observation of tongue morphologic features and thorough evaluation for lymphadenopathy.

Specific clinical recommendations for practice are provided:

- Treatment of ulcerative lichen planus may include topical steroids, such as clobetasol or fluocinonide dental paste.
 - Biopsy and microscopic analysis should be considered for oral leukoplakia because these lesions have a tendency to become malignant, particularly in never-smokers.
 - The only treatments shown to decrease symptoms of burning tongue are alpha-lipoic acid, clonazepam, and cognitive behavior therapy.
 - Among infants with breast-feeding difficulties due to tongue-tie (ankyloglossia), frenulectomy is often effective.
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Wilson W et al. *Prevention of Infectious Endocarditis: Guidelines from the AHA*. Circulation 2007; 116:1736-54. <http://circ.ahajournals.org/cgi/content/full/116/15/1736>

Audience/Relevance: Primary care clinicians, health care professionals, and the dental community.

This statement provides an update to previously published (1997) recommendations by the American Heart Association (AHA) for the prevention of infective endocarditis. A writing group was appointed by the AHA based upon their expertise in prevention and treatment of infective endocarditis. The writing group reviewed input from national and international experts on infective endocarditis. The recommendations in this document reflect analyses of relevant literature, a MEDLINE database search from 1950 to 2006 for English-language papers, as well as a reference list of identified papers. The major changes in the updated recommendations include the following:

- Only an extremely small number of cases of infective endocarditis might be prevented by antibiotic prophylaxis for dental procedures, even if such prophylactic therapy were 100% effective.
- Infective endocarditis prophylaxis for dental procedures is reasonable only for patients with underlying cardiac conditions associated with the highest risk of adverse outcome from infective endocarditis.
- For patients with these underlying cardiac conditions, prophylaxis is reasonable for all dental procedures that involve manipulation of gingival tissue or the periapical region of teeth or perforation of the oral mucosa.
- Prophylaxis is not recommended based solely on an increased lifetime risk of acquisition of infective endocarditis.
- Administration of antibiotics solely to prevent endocarditis is not recommended for patients who undergo a genitourinary or gastrointestinal tract procedure.

- These changes are intended to more clearly define when infective endocarditis prophylaxis is or is not recommended, and to provide more uniform and consistent global recommendations.
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Acute Dental Problems

Andreasen JO, Andreasen FM, Bakland LK, Flores MT. *Traumatic Dental Injuries – A Manual*. Copenhagen: Munksgaard; 1999.

Audience/Relevance: Primary care clinicians, health care professionals, and the dental community.

This article reviews the epidemiology of traumatic dental injuries to primary and permanent teeth. A sampling of 487 Danish citizens was used. Thirty percent of the children had sustained injuries to primary teeth, 22 % had injured permanent teeth, and 46 % of the children had a history of traumatic injuries to primary and/or permanent teeth. The conclusions drawn included:

- Boys show more frequent injuries to permanent teeth compared to girls.
 - In the primary dentition only a slight sex difference is found.
 - Individuals showing traumatic injuries to primary teeth do not exhibit a significantly higher frequency of injuries in the permanent dentition compared to a group with no history of traumatic injuries to primary teeth.
 - The annual incidence of traumatic injuries is determined for the examined population.
 - Among boys, peak incidences occurred in the following age groups: two to four years, and nine to ten years.
 - In girls only one peak incidence is found, in the two to three years age group.
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Dickson, M. *Where There is no Dentist*. Hesperian Foundation, Palo Alto, 1983. ISBN # 0-942364-05-8
http://www.frostcpr.com/pdf/Where_There_Is_No_Dentist.pdf

Audience/Relevance: Primary care clinicians, health care professionals, and parents.

This provides information about what people can do for themselves and each other to care for their gums and teeth. The author suggests there is a strong need to ‘deprofessionalize’ dentistry—to provide ordinary people and community workers with more skills to prevent and cure problems in the mouth. The book consists of two parts. The first section discusses teaching and learning about preventive care. It begins by encouraging the health worker to examine herself and her family. The second section talks about diagnosing and treating common dental problems and is intended mainly for health workers who have helped organize people to meet their own needs. The author concludes:

- Even as the need for dental care is growing, there are still far too few dentists in poor countries. Most of those few work only in the cities, where they serve mostly those who can afford their expensive services.
- People in many countries cannot afford to pay for costly professional dental care. Even in rich countries, persons who do not have dental insurance often do not get the attention they need—or go into debt to get it.
- Two things can greatly reduce the cost of adequate dental care: popular education about dental health, and the training of primary health workers as dental health promoters. In addition, numbers of community dental technicians can be trained—in two to three months plus a period of apprenticeship—to care for up to 90% of the people who have problems with pain and infection.
- The simpler, more common dental problems should be the work of community dental technicians who are on the frontlines (the villages), with secondary help from dentists for more difficult problems.
- Studies have shown that dental technicians often can treat problems as well as or better than professional dentists.
- In some countries skilled dental technicians have managed to become the major providers of the most needed dental services.

- This book benefits village and neighborhood health workers who want to learn more about dental care as part of a complete community-based approach to health; school teachers, mothers, fathers, and anyone concerned with encouraging dental health in their children and their community; and those dentists and dental technicians who are looking for ways to share their skills in order for people to become more self-reliant at lower cost.
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Douglass AB and Douglass JM. *Common Dental Emergencies*. American Family Physician 2003; 67(3): 511-516. <http://www.aafp.org/afp/2003/0201/p511.html>

Audience/Relevance: Primary care clinicians and health care professionals.

This article addresses various aspects of dental emergencies. It provides basic information about dental anatomy including background on dental pain, carious, periodontal, and wisdom tooth origin, and information about dental trauma. The authors suggest:

- Most dental problems can be prevented with regular dental care and steps to minimize risks of oral trauma.
 - Dental caries, a bacterial disease of teeth characterized by destruction of enamel and dentine, is often the underlying cause of dental pain.
 - Dental caries and periodontal disease can be prevented by decreasing ingestion of sugar-containing food items and employing regular tooth brushing and appropriate fluoride use.
 - Regular dental examinations with early treatment of carious lesions can substantially reduce the risk of serious complications.
 - Most dental trauma occurs among children and can be reduced substantially through the use of appropriate mouthguards and face shields in organized sports.
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Newsome PR, Tran DC, Cooke MS. *The Role of the Mouthguard in the Prevention of Sports-Related Dental Injuries: A Review*. International Journal of Paediatric Dentistry, 2001; 11(6): 396-404. <http://onlinelibrary.wiley.com/doi/10.1046/j.0960-7439.2001.00304.x/abstract>: Requires subscription.

Audience/Relevance: Primary care clinicians, health care professionals, and the dental community.

This paper examines the literature dealing with oral-facial injuries received during participation in sport and the possibilities open to athletes for their prevention. The paper examines five different aspects of this topic: the risk of dental injury while playing sports, the role of the mouthguard in preventing injury, types of athletic mouthguard, implications for patients undergoing orthodontic treatment, and behavioural aspects of mouthguard wear. The authors concluded:

- Participation in a number of sports do carry a considerable risk of sustaining dental injury. This includes both contact sports as well as in sports that appear less obviously dangerous.
 - The majority of studies find the mouthguard to be the most effective way of preventing such injuries.
 - Custom-fabricated mouthguards afford the most protection. The pressure-laminated variety is particularly effective.
 - Athletes undergoing orthodontic treatment are potentially at greater risk of injury because of increased tooth mobility and the presence of orthodontic appliances.
 - While much progress has been made in this area, the profession can do much more to promote the greater use of mouthguards.
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Nguyen DH, Martin JT. *Common Dental Infections in the Primary Care Setting*. American Family Physician, Mar 15 2008; 77(6): 797-802. <http://www.aafp.org/afp/2008/0315/p797.html>

Audience/Relevance: Primary care clinicians, health care professionals, and the dental community.

Primary care clinicians commonly encounter patients with dental infections, such as dental caries and periodontal disease. This article provides advice for PCPs on various aspects of dental infection.

- Untreated caries may progress to pulpitis and, eventually, to necrosis of the pulp.
 - Use of fluoride is the most effective prevention measure for dental caries.
 - In irreversible pulpitis, the tooth dies and the patient may have a localized abscess that can spread to surrounding tissue.
 - Periodontal infections are caused by bacteria in the subgingival dental plaque.
 - Gingivitis can be controlled with good oral hygiene.
 - Periodontitis is characterized by a loss of supportive bone structure caused by chronic gingivitis; it is also associated with some systemic diseases. Localized periodontitis is treated with mechanical debridement and good oral hygiene, whereas generalized periodontitis requires adjunct antibiotic therapy.
 - Pericoronitis results when food particles become trapped under the gum of an impacted tooth. This condition can be controlled by removal of food debris and good oral hygiene.
 - Among patients whose dental infections are disseminated and have invaded the deeper oral spaces, antibiotic treatment should be initiated at the time of referral.
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