JAMA Insights

Dental Caries in Adults

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Dental caries (tooth decay or cavities) refers to demineralization of teeth, which occurs after bacteria metabolize dietary carbohydrates into acid.[1] More than 90% of US adults experience caries and 26% have untreated caries.[2]

Although absolute risk data are unavailable for risk and protective factors, dental plaque (a biofilm of oral bacteria) is associated with caries development.[3] *Streptococcus mutans* and lactobacilli in plaque metabolize dietary carbohydrates into acid, which demineralizes the enamel and causes caries. Other risk factors include consumption of sucrose-containing carbohydrates (eg, sugar-sweetened beverages), poor oral hygiene, xerostomia (including from medications such as anticholinergics and antihistamines), and substance use.[3] Fluoride exposure from community water fluoridation and toothpaste strengthens tooth enamel and is inversely associated with development of caries.[3] Caries disproportionately affects individuals at risk of poor access to dental care, including low-income individuals and those in racially and ethnically minoritized groups.[4]

Supplemental content

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Progressive caries can extend to the tooth's pulp, which can cause an abscess or cellulitis. Infection that spreads to major fascial spaces of the head and neck can cause airway compromise, vision loss, central nervous system involvement, or sepsis. Most commonly caused by odontogenic infection (originating from the teeth or periodontium), Ludwig's angina is a rare, life-threatening compromise of the airway due to neck infection.[5,6] Based on a nationally representative cross-sectional study, approximately 6000 individuals in the US annually presented to the emergency department with Ludwig's angina from 2006 to 2014.[5] Caries are also associated with oral pain[6] and tooth loss.[2]

Having caries is associated with exacerbation of medical conditions such as diabetes, obesity, iron deficiency anemia, and depression.[7] In the dental cohort (n = 6351) of the Atherosclerosis Risk in Communities study, a prospective cohort study of individuals aged 45 to 64 years with at least 1 carious tooth, incident all-cause mortality was observed in 46% (534/1171) of individuals with caries and 40% (2051/5180) of those without caries (adjusted hazard ratio, 1.13 [95% CI, 1.01-1.26]) at 21-year follow-up.[8] However, it is unclear if caries causes these adverse effects; patients with caries may have shared risk factors, such as social vulnerability or smoking, that may affect these outcomes.

Clinical Presentation

Approximately 40% of people with untreated caries have pain.[6] Pain (toothache) generally arises after caries spread deeper into the tooth, causing pulpal infection and inflammation. In individuals with caries without tooth pain, percussion of the affected tooth with a gloved finger or tongue depressor may elicit pain if inflammation extends to the adjacent periapical tissues. Advanced caries extending to the pulp are more likely to cause pain and present clinically as a cavity (loss of tooth enamel and exposure of underlying dentin).

Intraoral visualization during examination can be improved by manipulating the lips and corner of the mouth and using a good light source. Carious lesions are a different color than the rest of the tooth (generally chalky white initially, brown/black for advanced lesions). Advanced caries may present with erythema or fluctuance of the adjacent soft tissue, sinus tract formation, and swelling.

Management of Caries in the Medical Setting

Per American Dental Association (ADA) clinical practice guidelines, moderate and advanced caries require treatment by a dentist; any carious tooth that causes spontaneous pain requires removal of the infected pulp inside the tooth (root canal) or tooth extraction. However, medical clinicians can provide the treatments below in conjunction with referring all patients with caries to a dentist for definitive care.

Combining nonsteroidal anti-inflammatory drugs with acetaminophen is effective to treat dental pain.[9] According to ADA pain guidelines, opioids are only indicated if nonsteroidal anti-inflammatory drugs and acetaminophen (paracetamol) are contraindicated or if pain control is inadequate despite their use.

Per ADA antibiotic guidelines, individuals unlikely to see a dentist imminently and presenting with localized abscess, swelling, or systemic spread should be treated with antibiotics in tandem with dental referral. Oral amoxicillin, or, if allergic, azithromycin, clindamycin, or cephalexin, are first-line therapies. Patients with abnormal vital signs or swelling that compromises the airway or optic tract should be immediately transferred to the emergency department.

For individuals with incidentally identified caries, medical clinicians can apply 38% silver diamine fluoride or fluoride varnish. Silver diamine fluoride arrests caries and can prevent progression of disease while a patient awaits dental care. Fluoride varnish can also slow progression of caries. Online training is available for both minimally invasive treatments, which may be reimbursed by insurance.

Management of Caries in the Dental Setting

A formal diagnosis of caries requires assessment from a dentist and radiographic examination. Dentists obtain radiographs to evaluate the caries' extent and surfaces not seen clinically (eg, between the teeth). Depending on extent, caries are categorized by the ADA as initial, moderate, or advanced or extensive. For caries that do not extend to the dental pulp, treatment usually involves a restoration (filling) or a full-coverage crown; crowns are indicated if caries compromise the tooth's structural integrity. The American Academy of Endodontics guidelines help identify caries extending into the pulp, which require either root canal or an extraction.

Dental coverage for adults through Medicaid varies by state. Thirty-nine states currently provide dental coverage to adult Medicaid beneficiaries; however, fewer than 1 in 3 dentists accepts Medicaid. Traditional Medicare plans do not cover dental care and coverage in Medicare Advantage plans varies. Dental schools and federally qualified health centers typically have the lowest out-of-pocket costs

Table. Clinical Recommendations for Preventing Dental Caries in Adults[a]

Clinical recommendation	Outcome evaluated	Result	Quality of evidence[b]
Medical clinician-administered, in primary care setting			
Oral examination at wellness visits		Insufficient evidence in adults[2]	
Topical fluoride by primary care clinicians	Prevention of dental caries	Insufficient evidence in adults[2]	
Silver diamine fluoride	Primary prevention of dental caries	May prevent coronal caries but uncertain[10]	Very low
		Likely prevents root caries; mean difference, −0.79 caries (95% CI, −1.40 to −0.17)[10]	Moderate
Dental clinician-administered, in dental setting			
Dental checkup frequency (oral examination, dental cleaning, oral health education)	Dental caries	Little to no difference between risk-based and 6-mo recall intervals; mean difference in number of caries, 0.15 higher (from 0.77 lower to 1.08 higher)[10]	High
Dental radiographs	Detection of early tooth decay	Missed early signs of caries (relatively high proportion of false-negative results); sensitivity, 0.47 (95% CI, 0.40 to 0.53) and specificity, 0.88 (95% CI, 0.84 to 0.92) for detecting enamel caries[10]	Low

[a] See the eTable in the Supplement for a full version of the Table.

[b] Cochrane and the US Preventive Services Task Force use GRADE certainty of evidence.

for individuals without dental insurance and also accept Medicaid. Dental hygiene schools provide low-cost or Medicaid-covered preventive dental care (eg, cleanings). Many rural areas have limited resources to improve access to dental care.

Prevention

In 2023, the US Preventive Services Task Force found insufficient evidence for routine screening of adults for oral health conditions, including dental caries, by primary care clinicians.[2] The **Table**[2,10] summarizes patient- and clinician-administered preventive recommendations and associated evidence for brushing, flossing, and other interventions (see the eTable in the Supplement for a full version of the Table, including patient prevention recommendations). The American Academy of Family Physicians provides oral health resources and patient education materials and the Community Preventive Services Task Force outlines community-level preventive measures, including community water fluoridation.

Medical clinicians should encourage regular teeth brushing and flossing. For individuals at high risk of caries, clinicians can prescribe toothpaste with higher levels of fluoride (5000 ppm) (Table). They can also identify risk factors for caries and provide counseling (eg, nutritional counseling to reduce high sugar intake). Clinicians should encourage patients to undergo routine dental care; the interval between checkups (ie, dental examination, cleaning) can often be extended beyond 6 months for patients at lower risk without detriment to oral health (Table).

Conclusions

Dental caries are common in adults and should be treated by dental clinicians. Medical clinicians can treat incidentally identified caries with fluoride varnish and silver diamine fluoride and treat acute caries with pain medications and antibiotics (if appropriate). Medical clinicians can also facilitate preventive care, including dietary counseling, promoting routine dental care, and prescribing high-fluoride toothpaste in individuals at high risk of developing caries.

ARTICLE INFORMATION

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Note: Source references are available through embedded hyperlinks in the article text online.

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