Dentistry and Dementia

MODULE 16

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Health Resources and Services Administration

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Outline

- Oral implications of systemic disease
- Antibiotic prophylaxis prior to dental care
- Oral impact of medications
- Preparation for entering the mouth
- Oral diseases common to older adults
- Assisting with oral hygiene
- Salivary Flow
- Periodontal Disease
- Denture Care for Persons Living with Dementia
- Early Intervention

Learning Objectives

By the end of this module, participants will be able to:

- Describe the impact that oral health can have on systemic health of persons living with dementia (PLwD);
- Describe the impact that oral health can have on the quality of life of persons living with dementia (PLwD);
- Describe medical complexities that may have an impact on the ability of PLwD to receive dental care;
- Identify clinically significant oral health changes often observed in PLwD and make appropriate referrals; and
- Discuss oral health care maintenance strategies with PLwD and their care partners.

Key Take-Home Messages

- Dental disease in persons living with dementia (PLwD) can cause challenging behaviors exacerbated by communication challenges.
- Members of the health care team should become familiar with common oral health concerns.
- Dental care for PLwD is complicated by the many challenges of the disease and comorbid conditions.
- Early intervention and thorough daily hygiene are essential components of care.

Case Report

- An 85-year-old person in the advanced stages of Alzheimer's disease developed new challenging behaviors
  - Biting and hitting care-providers
  - Biting cutlery
  - Weight loss
  - Biting his own hand
  - Spitting

(Inaba et al, 2011)

Case Report (continued)

- No improvement until dental examination despite repeated physical exams/medication
- Extraction of three carious teeth (under general anesthesia)
- Antisocial behaviors (hitting, biting, and spitting) ended.

(Inaba et al, 2011)

Quality of Life

Reported Difficulty	Dentulous (Natural teeth present in oral cavity)	Edentulous (Toothlessness)
Eating	29.1%	16.9%
Speaking	6.5%	16.4%
Smiling/ Laughing	4.0%	9.1%
Social Exchange	3.2%	3.6%
Toothache in past 6 months	17.7%	NA
Porter, 2015		

Quality of Life (continued)

Subjectively Reported Oral Problems	Dentulous	Edentulous
At least one problem	61.3%	50.9%
Loose or ill-fitting dentures	4.3%	4.3%
Dry Mouth	41.2%	40.0%
Social Exchange	3.2%	3.6%
Toothache in past 6 months	17.7%	NA
Broken Teeth	23.9%	NA
Sensitivity	15.4%	NA

Oral Health

- Oral health care takes place within the context of the whole body.
- Oral health affects systemic health, and systemic health affects oral health.
- Dental care needs to be holistic in approach.

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Impact of Systemic Disease on Oral Care - 1

Persons living with dementia may:

- Have one or more additional chronic diseases.
- Experience impaired access to regular dental assessment and care.
- No longer practice, or adequately practice, their own daily oral care.
- Be unable or fail to communicate symptoms of incipient oral disease.

Impact of Systemic Disease on Oral Care - 2

- Dental personnel often contact primary care teams, seeking medical clearance and/or guidance regarding dental care for PLwD who have, or are at risk for:
  - Aspiration pneumonia;
  - Diabetes mellitus;
  - Anticoagulation regimen;
  - History of irradiation of the head and neck;
  - History of administration of bisphosphonate;
  - Requiring antibiotic prophylaxis prior to dental care; or
  - Medications with adverse oral side effects.

Aspiration Pneumonia

- Mouth and pharynx are in the airway and are coated by excretions with 10^{12}-10^{14} microorganisms/cc.
- Oral cavity and throat become rapidly populated by organisms in the health care setting, many of which will be multi-drug resistant.
- Gram negative anaerobes populating the gums (gingiva) are the most common pathogens in facility-acquired pneumonia.
- Incidence of facility-acquired pneumonia can be reduced through a program of regular oral hygiene, including once-daily tooth- and denture-brushing and antimicrobial mouth rinse.

Diabetes and Oral Health

- Periodontitis, a chronic inflammatory bacterial infection of the tissues surrounding teeth, is highly prevalent in adults of advanced age, particularly those with inadequate daily oral care.
- The chronic inflammation of periodontitis, like other inflammatory processes, interferes with glycemic control.
- In turn, impaired glycemic control results in an exacerbated inflammatory response to the local factors responsible for periodontitis and gingivitis.
- Daily provision of oral hygiene—which may be beyond the ability of the PLwD, and which then becomes a care partner's responsibility—can interrupt this pernicious cycle.
- Diabetic PLwD who undergo extensive dental care (particularly oral surgery, e.g., extractions) are likely to miss one or more meals. They and their care partners may need to be counseled to adjust the insulin regimen on the day of care.

Anticoagulation

- The mouth is highly vascularized and prone to hemorrhage following mucosal trauma if coagulation is suppressed.
- It is extremely common to see anticoagulation regimens in PLwD (particularly multi-infarct dementia), as part of managing atrial fibrillation, deep venous thrombosis, and elevated stroke risk.
- In such persons, the risk of thrombosis due to a disruption in the anticoagulation regimen far outweighs the hemorrhagic risk of oral trauma.
- If international normalized ration (INR) is 4 or less, dental care does not require adjustment of anticoagulation regimen as long as it is augmented as necessary with local measures (e.g., limit number of extractions in a single sitting; gelatin sponge/primary closure)

Head and Neck Irradiation

- PLwD about to undergo treatment for squamous cell cancer of the mouth or oropharynx MUST have a pre-procedural dental assessment and extraction of teeth at elevated risk for caries BEFORE irradiation therapy commences.
- After treatment, intense dental follow-up for maintenance of the teeth is essential to prevent the subsequent need for extractions.

Bisphosphonates

- Intravenous administration of bisphosphonates (BP) for management of multiple myeloma or prevention of osteoporosis has been linked to a small (<5%) but definite risk for osteonecrosis following intraoral trauma.
- Prevention of osteonecrosis is far more successful than treatment, particularly for PLwD.
- Individuals scheduled for Intravenous (IV) BP treatment should undergo a dental assessment so necessary extractions and bone healing occur before administration of BP.

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Antibiotic Prophylaxis Prior to Dental Care? - The Issue

- As noted earlier, the oral cavity is highly vascular and densely populated with microorganisms.
- This predisposes to frequent transient bacteremias in adults with teeth.
- Thorough daily oral hygiene and regular dental care is vital to reducing the risk of serious infections, particularly in persons at elevated risk.

Antibiotic Prophylaxis Prior to Dental Care – The Guidance

- The risks of widespread prophylactic administration of broad spectrum antibiotics prior to dental care **far outweigh the benefits of coverage** in most cases.
- There are no compelling population-based data supporting the prophylactic administration of antibiotic prior to dental care for patients with other “devices.”

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Oral Impact of Medications

- Dry mouth (xerostomia) is a common medication side effect, reported for a broad range of agents.
- Typically results from changes in saliva's quantity or quality (e.g., electrolytic, antimicrobial, mucinous content)
- Saliva is a critically important exocrine fluid.
- Salivary modification, particularly its absence, can:
  - Accelerate tooth decay
  - Increase susceptibility to oral mucosal trauma/infection
  - Exacerbate predisposition to infectious pulmonary disease

Oral Assessment

- Two critical roles for care providers are to:
  - Assess the oral health status of PLwD and make appropriate referrals
  - Provide education for persons living with dementia and their care partners regarding oral health maintenance and strategies for supporting oral health
- To build the foundation for both, the steps for completing a quick but thorough assessment of oral health follow. The assessment begins outside the mouth with observation of the skin of the face, scalp, and neck for changes and observation and palpation of nodes.

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Preparation for Entering the Mouth

- Set up the following:
  - Light source
  - Disposable sterile mouth mirrors
    - Available at low cost
    - Tongue blades work but not as well
  - 2x2 gauze
  - Gloves

Oral Assessment: Skin of Face, Scalp, and Neck, Nodes of the Head and Neck

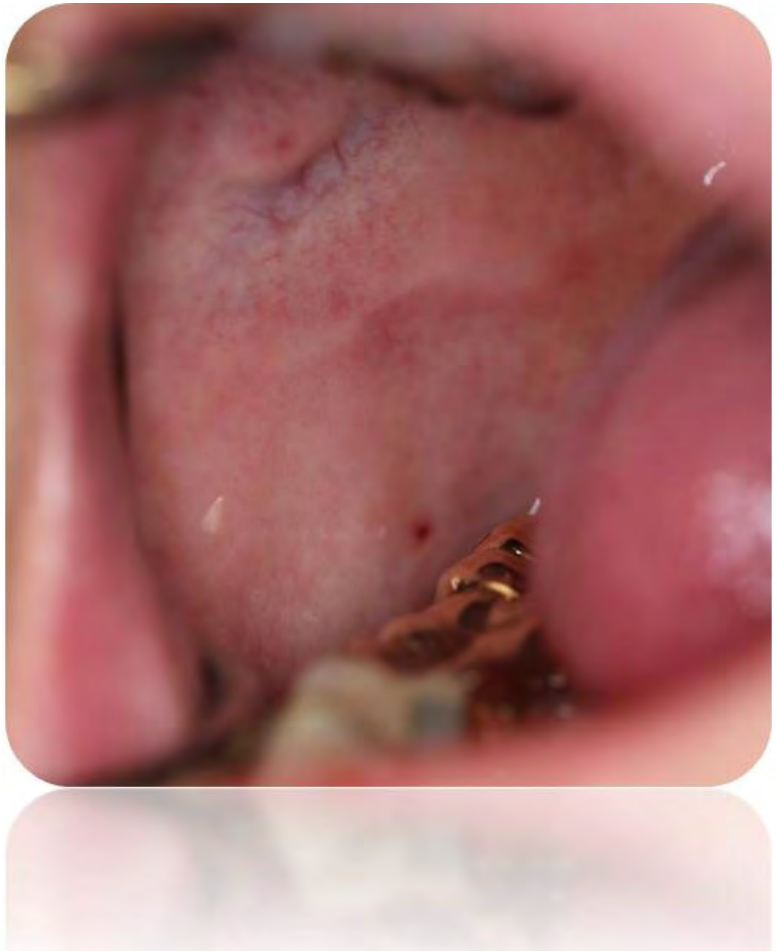
- Extra-oral examination
  - Observe first
  - Then palpate
- Assess or evaluate following:
  - Color
  - Contour
  - Consistency
  - Function
  - Symmetry
  - Texture

Oral Assessment: Lips and Labial Mucosa (Inside Lining of the Lips)

- Color
- Contour
- Consistency
- Function
- Symmetry
- Texture

Oral Assessment: Buccal (Cheek) Mucosa

- Color
- Contour
- Consistency
- Function
- Symmetry
- Texture



Oral Assessment Hard and Soft Palate Oropharynx

- Color
- Contour
- Consistency
- Function
- Symmetry
- Texture

Oral Assessment: Tongue

- Have person extend the tongue.
- Grasp with 2x2 gauze and stretch out for visualization
- Lateral border of the tongue is the most common site for oral cancer
- Take pictures and slides to document

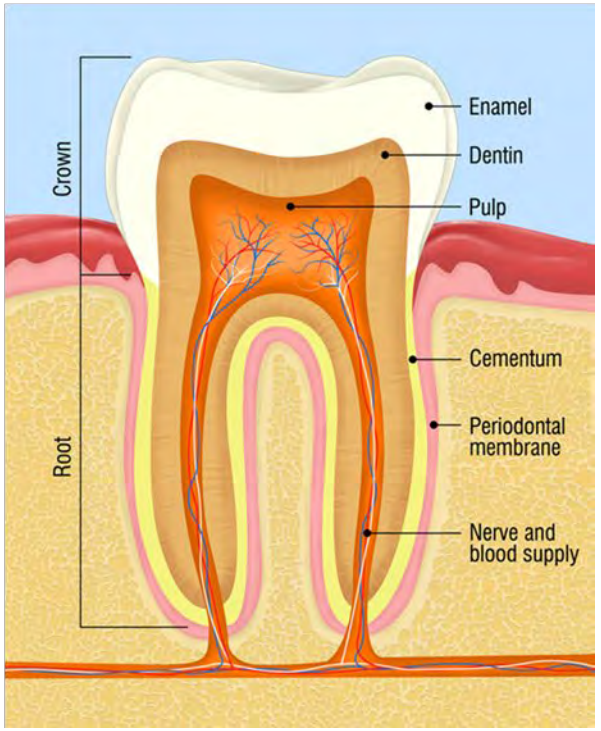
Oral Assessment: Floor of the Mouth

- The Second most common site for oral cancer

- **Color**
- **Contour**
- **Consistency**
- **Function**
- **Symmetry**
- **Texture**

Oral Assessment: Teeth and Supporting Structures

- Color
- Contour
- Consistency
- Function
- Symmetry
- Texture



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Oral Diseases Common to Older Adults

- Caries (tooth decay)
- Periodontal disease (diseases of the supporting structures for the teeth)
- Edentulism (loss of teeth)
- Oral Cancer

Caries

- Dental caries is a transmissible microbial disease that results in the dissolution of the calcified tooth structure of the crown or the root of the tooth, which can progress into the tooth, creating a cavitation that can be observed clinically or radiographically, and eventually into the dental pulp.

Caries Epidemiology

- Yearly incidence of new caries lesions in nursing home residents (Chalmers et al., 2005)
  - Coronal caries = 64.4%
  - Root caries = 48.5%
  - Significantly higher than community-dwelling older adults (Chalmers et al., 2002)
- 3 times the rate of caries compared with a similar cohort (Finland) (Syrjälä, et al., 2012)
- Mean number of teeth with caries (North Carolina) (Chen, et al., 2013) [4]
  - 6.0 (nursing home residents)
  - 5.5 (community-dwelling)
  - 5.3 (assisted living)
- Among PLwD subjects, 89% had at least one caries lesion (Denmark) (Ellefsen, et al., 2012)

Caries Location

- The surfaces of teeth, whether enamel on the crowns of teeth or exposed cementum on roots, undergo a constant dynamic mineral exchange with the oral environment.

Caries Development

Carries occur when the microorganisms in the plaque that colonizes the teeth metabolize carbohydrates and produce acids that demineralize the tooth structure to a greater degree than the calcium in saliva can re-mineralize the tooth.

Caries Risk is Increased in the Presence of:

- Undisturbed plaque (biofilm)
- Frequent exposure to fermentable carbohydrates (diet)
- Reduced salivary flow (host factor)
- Teeth with low fluoride exposure (host factor)
- Exposed roots
  (less densely mineralized
  tooth structure)

Caries Risk in Persons Living with Dementia

- Undisturbed plaque
  - Higher in persons with dementia (Foltyn, 2015)
- Frequent exposure to fermentable carbohydrates
  - Commonly available in long term care settings
  - May be used as “comfort”
- Reduced salivary flow is most commonly associated with medications
  - Mean number of drugs = 7.1 (Foltyn, 2015)
- Teeth with low fluoride exposure
  - Depends on community water fluoridation
  - May be supplemented by care partners/care providers
- Exposed roots

Plaque Biofilm Reduction

- Tooth brushing
  - Electric brushes and water flossing devices may help if tolerated
  - Collis-curve brush attempts to cover more surface area in less time
  - Adaptations to brushes may need to be made

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Assisting with Oral Hygiene

- Technique will vary depending on the ability of the person to cooperate
- Brushing: Stand behind the person living with dementia and either support the person's head with the non-dominant hand or rest it firmly on the shoulder on the side to be brushed to divert the attention of the person

Brushing

- Place a soft-bristled brush (manual or electric) at a 45 degree angle to the teeth with the bristles pointing into the gingival tissue and vibrate or create small circle. Then move to the next site.
- If this level of brushing is simply not allowed by the person living with dementia, aids like the Collis-Curve brush may help to cover more tooth surface with each attempt.

Cleaning Between the Teeth

- Although floss is the gold standard, anything that safely cleans between the teeth is encouraged.
  - Flossing is most easily accomplished from the front of the person living with dementia.
  - A flossing device will protect the care provider from risk of biting.
  - Many other devices for interproximal cleaning are commercially available and may be easier to manage than floss (e.g., water flossing device).

Fluoride

- Facilitates remineralization (reversal) of incipient caries lesions
- Renders tooth mineral more resistant to dissolution in bacterially-excreted acid
- Impairs bacterial metabolism of carbohydrate into acid
- Three major forms of topical fluoride available:
  - NaF: Sodium Fluoride
  - SnF_2: Tin Fluoride, which has the added benefit of suppressing periodontal pathogens
  - Silver diamine fluoride

Delivery of Fluoride

- Community water supplies
  - Available in some communities since 1949
- Over the counter dentifrice/mouthwash
  - Little evidence to support efficacy in high risk patients
  - Readily available
- Professionally-applied and –prescribed preparations (higher concentration gel, varnish)

Sources of Fluoride Effective for Reducing Caries Risk

- 1.1% neutral sodium fluoride dentifrice or gel
  - Prescription required
  - Recommended by the American Dental Association for use twice daily (Weyant et al., 2013)
- 2.26% fluoride varnish
  - Professionally applied
  - Recommended by the American Dental Association for application every 3-6 months (Weyant et al., 2013).
  - For persons at high risk for caries, recommended applications every 3 months (Young & Featherstone, 2013)
- 38% silver diamine fluoride (Rosenblatt, Stamford & Niederman, 2009)
  - Professionally applied 1-2 times/year

Case Presentation

- *The patient was a World War II veteran who had been a prisoner of war in the Philippines. He had been treated in a VA Dental Clinic for many years and maintained an intact dentition. Declining cognitive function led to residence in a nursing facility. When he came to dental appointments, his teeth were completely covered with plaque, and he began developing caries at an alarming rate.*
- *Efforts at encouraging the facility to provide more support for oral hygiene were unsuccessful. In response to the needs of this veteran, the staff at the dental clinic looked for a solution and decided to bring him into the clinic once a month, and an auxiliary staff member would brush his teeth and apply fluoride varnish.*
- *The strategy effectively decreased the rate of new caries for this veteran, and he maintained a functioning dentition until his death. As a result of this outcome, the clinic established a program to provide this service for veterans who could no longer maintain oral health. The tooth brushing does not require the skills of a dental professional, and the application of fluoride varnish is legal in many states in other health care settings.*

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Salivary Flow

- **Functions of saliva**
  - Maintenance of tooth integrity (ions for remineralization)
  - Initiation of digestion
  - Lubrication of tissues
  - Mastication and bolus formation
  - Buffering
  - Antibacterial, antiviral, antifungal activity
- **Causes of xerostomia or salivary hypofunction**
  - Medications
  - Autoimmune diseases
  - Radiation
  - Salivary gland infection, obstruction, tumor, excision
  - Fluid and electrolyte problems

Management of Xerostomia/Salivary Hypofunction

- As a complex bodily fluid that supports the health of the dentition and oral mucosa as well as initiating digestion, salivary ***stimulation***, when physiologically feasible, is the most effective management tool.
- Salivary replacement provides comfort in eating, speaking and swallowing.
- Protecting the teeth with effective oral hygiene measures and use of agents such as fluoride mitigates some of the increased risk associated with a dry mouth.

Salivary Stimulation

- Sugarless gum and candy
  - Sweetened with polyols (e.g., xylitol, sorbitol)
    - Replace fermentable carbohydrates with sweeteners of low cariogenicity
    - May have a direct anti-plaque effect
- Prescription sialagogues (drugs or substances that increases the flow rate of salavia)
  - Pilocarpine hydrochloride
    - Head and neck cancer/Sjogren's syndrome
    - 5-10 mg 3-4 times per day not to exceed 30 mg
    - Titrated to lowest effective dose
  - Cevimeline
    - Sjogren's syndrome
    - 30 mg tid (3 times daily)

Salivary Replacement

- Water
  - A cup with a lid filled with ice and water is convenient.
  - Sugared beverages greatly increase the risk of oral diseases; artificial sweeteners are less worrisome.
- Artificial saliva, mouthwashes
  - Several manufacturers market products for persons with salivary hypofunction.
  - The products may support speech, swallowing, and oral comfort by providing oral lubrication.
  - The products do not possess the disease-suppression or disease-reversal properties of natural saliva.

Diet

- Reduce *frequency* of intake of fermentable carbohydrates
- Replace with foods rich in proteins

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Periodontal Disease

- Diseases of the periodontium (supporting structures of the teeth) arise in response to pathogenic microorganisms in dental plaque.
- The initial soft tissue reaction to plaque is gingival inflammation with redness and bleeding (“gingivitis”). This can be resolved by thorough cleaning of tooth surfaces.
- A variable blend of host and microbial factors may trigger the release of destructive inflammatory factors that irreversibly destroy hard and soft tissues surrounding affected teeth (“periodontitis”).
- In the advanced stages of periodontitis disease, the teeth become mobile and may eventually be lost, impairing mastication.

Periodontal Disease (continued)

- Advanced periodontal disease is more common with advanced age because of the tissue loss over the life span.
- Diminished or absent oral self-care of PLwD places them at elevated risk for gingival and periodontal diseases (Zenthöfer, et al., 2014), and makes it imperative that daily oral hygiene is faithfully and effectively provided by care partners.

Oral Cancer

- Over 45,000 new cases per year in US, mostly in individuals age 50 and over; male preponderance
- Associated with tobacco/heavy alcohol use and human papilloma virus
- Most common sites: base and lateral border of the tongue and floor of the mouth
- Red and mixed red/white lesions far more concerning, mandating immediate evaluation by an oral health professional
- White lesions less likely malignant. Potential causes (e.g., trauma from fractured tooth, denture irritation, etc.) should be addressed and the lesion re-evaluated in 7-14 days. If it persists, referral for professional assessment should occur.
- Generally favorable prognosis when disease is localized; lymphatic or metastatic involvement substantially worsens morbidity and mortality

(NCI Statistics Fact Sheets)

Edentulousness--Toothlessness

- Thanks to fluoridated drinking water, fluoride-containing toothpaste, and increased access to dental care, less than 25% of Americans aged 75 and over experience toothlessness.
- Toothlessness is most prevalent in rural areas, southeastern states, and among people who are less educated, socio-demographically disadvantaged, or immigrants.
- Incidence is likely greater in PLwD due to impaired self-care and the likelihood for dental professionals to opt for extracting diseased teeth.

Toothlessness and Dentures

- Edentulousness is not clearly correlated with suboptimal nutritional intake.
- Dentures may ***anecdotally*** lead to improved dietary intake.
- Dentures restore the appearance of teeth and fill out the lips and lower face; improve the clarity of speech; and may result in an expanded range of foods' textures.
- Once teeth have been removed, the alveolar processes diminish in volume at a variable rate over the ensuing years.
- Use of dentures requires a level of tolerance, learning, and orofacial neuromuscular proprioception and control that PLwD may not adequately possess.

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Denture Care for Persons Living with Dementia

- Dentures, like teeth, are populated with adherent microbial colonies. Unlike teeth, dentures support yeast colonies.
- Brush dentures at least daily.
- Leave dentures out of the mouth part of each day.
- Store dentures in clean water or denture soaking solution.
- For safety reasons, PLwD should not have access to dentures stored in soaking solution.

Dentures in Congregate Settings

- Every denture is individually fabricated to fit one person's mouth, but to the untrained eye, they look alike.
- For this reason, people who reside in or attend settings largely populated by persons of advanced age and those living with dementia should have labels placed on their dentures.
- Clear labeling will reduce the risk of losing dentures.

Oral Health and Adults with Intellectual Disability

- Adults with Down syndrome are at significantly increased risk for the development of dementia as they age and may have poor oral health practices.
- Craniofacial and dental anomalies are common features of many genetic diagnoses. These anomalies may lead to increased incidence and/or severity of dental caries and periodontal disease. Some adults with intellectual disability may not tolerate prosthetic replacement of teeth or dentures.
- Persons with intellectual disability may have a far longer history of poor diet and oral care than other adults; this must be factored in to the current dental and medical care plan.
- In addition to cognitive decline associated with dementia, adults with intellectual disability present with a cognitive disability that can impair attempts at dental examination and treatment.

Dental Treatment Options

- Factors to consider:
  - Early intervention
  - Access and finance
  - Quality of life
  - Challenging behaviors
  - Realistic expectations

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Early Intervention

- Dementia diminishes the capacity of PLwD for treatment decision-making, self-care, and impulse suppression over time.
- Identify PLwD's priorities and preferences as early as possible.
- Dental care requiring more patient cooperation, learning, and adaptation becomes increasingly challenging over time.
- Daily oral care behaviors should begin as soon as possible but do not guarantee that PLwD's tolerance and cooperation will be sustained.

Access and Finance

- Dental care can be prohibitively costly for a person or family on a fixed budget.
- Financial barriers may limit care options (e.g, prevention, extractions, and fillings).
- Most dental offices have limited capacity to accommodate persons in wheelchairs, adults with aversive behaviors or who require conscious sedation.
- PLwD may require dental care in the home, in a long-term care facility, or with anesthesia in a hospital setting.

Behavioral Issues in the Dental Setting

- PLwD may tolerate dental care in a typical office setting.
- PLwD may also react negatively to an unfamiliar setting.
- Dental personnel with advanced training may be able to manage PLwD through verbal and non-verbal techniques to facilitate routine dental care.
- Administration of low-dosage oral benzodiazepine may facilitate cooperation during dental care (in consultation with primary care team).
- Nitrous oxide administration may not be tolerated due to the apparatus placed over the nose.
- With persons living with dementia and intellectual disability, it is often helpful to have a staff or family member accompany them into the setting on the dental care visit.

Realistic Expectations

- Most prosthetic tooth replacements will require a greater commitment to technically challenging daily oral care for the lifetime of the prosthesis than does the natural dentition.
- The exception to the preceding generalization is removable dentures that replace all the teeth, and can be removed from the mouth for cleaning.
- If PLwD's reaction to receiving dental care is so severe that it requires sedation or general anesthesia, treatment must usually be limited to removal of all or at least diseased teeth and prophylaxis (cleaning).
- Care partners and family member should be educated about how to assist with the cleaning.

Quality of Life

- Pain from dental and oral disease can overwhelm all other conscious experience, represent a potentially life-threatening infection, disrupt oral intake, complicate management of other chronic disease conditions, and/or result in challenging behaviors.
- Untreated dental and oral disease can impede socialization.
- Reduction in number of teeth is correlated with a diminishing range of tolerable foods and reduced pleasure from eating for PLwD.

Evaluation

1. **Health professionals in addition to those in the dental field should acquire and maintain familiarity with the appearance of the normal** structures of the oral cavity of persons living with dementia
   a. In order to be able to discern the presence of something that is potentially abnormal
   b. Because access to dental care for such individuals is more likely to be compromised than access to medical or nursing care
   c. Because the mouth is a part of the body intimately associated with nutrition, respiration, communication, and socialization.
   d. All of the above

2. **Dental caries forms as a result of**
   a. Microorganisms adhering to tooth structure and metabolizing dietary carbohydrate into organic acids
   b. Decalcification of tooth structure by organic acids
   c. Remineralization by saliva of decalcified areas of tooth structure to a lesser degree than the decalcification progresses
   d. All of the above

Evaluation (continued)

3. **Toothlessness in a person living with dementia**
   a. Cannot be managed with dentures, because the cognitive impairment that accompanies dementing illness makes it impossible for the individual to accommodate to the prostheses
   b. Is less common today than it was during the twentieth century because the prevalence of total tooth loss at all ages has been steadily dropping in industrialized countries
   c. Is the most reasonable solution to nearly all dental conditions, because once the individual no longer has teeth, there is no longer a need for daily oral hygiene or periodic dental care
   d. Is an indication for full-mouth dental implants, because they can be placed in a single visit to the dentist, are readily affordable, and can't decay and therefore require no daily cleaning.

4. **Transient bacteremia of oral origin in a person living with dementia**
   a. Is a common occurrence due to the highly vascular nature of the oral cavity, the large number of microorganisms present, and the common occurrence of intraoral infections such as gingivitis and periodontitis due to compromised oral hygiene.
   b. Is generally not caused by dental care or oral surgery because of the sterile field and careful technique employed in dental offices
   c. May cause metastatic infection on cardiac valves scarred by endocarditis or replaced with implants, unless the patient has been preoperatively treated with ticlopidine to prevent bacteria from adhering to at-risk tissues
   d. Is a concern in all joint prostheses, regardless of how long the appliance has been in place.

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