Oral Health Care and Treatment Strategies for Older Adults
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Older Adult Population

- Older adults make up one of the fastest growing segments of the American population
- The current accepted age to define an older adult is 65 years*
- In 2011, 41.4 million seniors were U.S. residents**
- 2040 this aging cohort is expected to reach 79.7 million**
- 1 in 5 Americans will be aged 65+ years in 2040**


The Older Adult Population

- US will have 25%-29% or higher elderly by 2050
- Europe, China and Canada similar
- Latam will be around 25% elderly

Older Adult Population in U.S.

- Close to 70 percent of older Americans do not have dental insurance
  By 2030, there will be 72+ MILLION older adults in the U.S.!!

MOSt won't have access to dental care, impacting overall health.

Changing Trends - Older Adult Population in U.S.

- Decline in edentulism in older adults 2000-2010
- More retained teeth with higher prevalence of root caries and untreated dental decay
- Greater awareness, better oral health leads to higher expectations for healthcare
- Increasing the need for change in traditional dental practice


Impacts of Aging on General Health

- Tooth loss can affect a patient’s:
  - Self esteem
  - Ability to communicate
  - Nutrition
  - Speech
  - Placing older adults population at increased risk of developing generalized dental disease
- No national programs to reduce the rate of dental decay in the older population*

*National report referred by HealthAmerica (2014)

Prevalence of Chronic Conditions in adults >65 years, 2009-2010

Out-of-Pocket Expenses on Healthcare

Dental Statistics of the U.S. Aging Population

- 92% have had decay
- 5% have no teeth (edentulous)
- 23% have untreated caries
- 90% have income less than or equal to the poverty level

The majority of restorative therapy needed by patients between now and 2030 will be in those over the age of 50 years

Contents

- Epidemiology and Prevalence
- Physiologic Changes in Aging Dentition
- Oral and Dental Diseases in Older Adults
- Relationship Between Periodontal Disease and other Systemic Conditions
- What is an Older Adult’s Dental Future?
- Prevention and Healthy Living
Dental Conditions Affecting Older Adults

Key Considerations
- Patterns of oral conditions differ across lifetime
  - Coronal caries - most common in adults
  - Root caries - most common in over 65-year-olds
  - Risk of periodontitis increases directly with age
  - Risk of oral cancer increases dramatically with age

- Important to be able to differentiate:
  - Changes due to years of normal use (such as tooth wear)
  - Changes associated with disease

Common Changes in Aging Dentition

- Tooth wear
  - Cumulative effects of abrasion, attrition and erosion over the years

- Exposed dentin
  - More yellowish teeth
  - Dentin hypersensitivity

Common Changes in Aging Dentition

- Brittle teeth
  - Chipping
  - Development of fissures and fractures

- Secondary dentin (blue arrows)
  - Smaller pulp chambers dentin is laid down resulting in greater width of dentin

Normal Aging - Salivary Glands

Salivary gland function
- Normal function unless impacted by:
  - Atrophy of salivary gland tissue
  - Medications
  - Specific systemic disorders (Diabetes Mellitus, Sjogren syndrome)

More than 400 medications reported to have dry mouth as a side effect, including:
- Antidepressants
- Antihypertensives
- Antihistamines
- Anticholinergics

Normal Aging - Masticatory System

- Masticatory function may be reduced even if teeth are retained
- The masticatory system could be impacted by reduction in masticatory muscle mass with age
- Preparation of food bolus for swallowing may be reduced
- Taste may be reduced resulting in loss of appetite

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Goals of Dentistry
- oral health
- function
- esthetics

Dental Diseases Treated
- oral cancer
- caries
- periodontitis

Oral Cancer in Older Adults
- Oral Cancer statistics in U.S.
  - Median age at diagnosis: 62 years
  - Traditional risk factors
    - Smoking
    - Alcohol consumption
  - Emerging risk factors (younger ages)
    - Human papillomavirus (HPV 16, HPV 18)
  - 40,000 new cases reported each year in U.S. resulting in 7,000 deaths

Oral Cancer in Older Adults
- Carcinoma in situ
  65 year old female who smoked one pack of cigarettes per day for 45 years
- Squamous Cell Carcinoma
  87 year old male history of heavy cigarette smoking

Dental Diseases Treated
- oral cancer
- caries
- periodontitis

Probiotic Therapy
- aka replacement therapy
- out competes resident flora
- most oral PB are produced with GI tract flora
- one PB is produced with 3 human oral bacteria
Probiotic Therapy

*Strep oralis*
- a naturally occurring oral bacteria
- inhibits periodontal pathogens by releasing hydrogen peroxide

*Strep uberis*
- a naturally occurring oral bacteria
- found only in healthy perio sites
- outcompetes perio pathogens

Probiotic Therapy

*Strep rattus*
- a mutagenized form of *strep mutans*
- does not produce lactic acid
- outcompetes the indigenous *strep mutans* (i.e. replacement therapy)

Dental Diseases Treated
- oral cancer
- caries
  - periodontitis

Periodontal Disease in Older Adults
- Prevalence of periodontal disease increases over time
- Loss of attachment continues
- Attachment loss appears/begins in new sites
- Key risk factors for periodontal disease
  - Smoking
  - Systemic conditions such as Diabetes Mellitus
  - Physical impairment
  - Presence of specific periodontal pathogens

National Health & Nutrition Examination Survey (NHANES)
- 46% of all adult Americans have periodontitis
- 64.7 million Americans > 30 yo have periodontitis
- 8.9% have severe periodontitis

National Health & Nutrition Examination Survey (NHANES)
- 46% of all adult Americans have periodontitis
- 64.7 million Americans > 30 yo have periodontitis
- 8.9% have severe periodontitis
- prevalence is higher in males than females
- prevalence is highest in Hispanics (63.5%)
- 59.1% in blacks; 50.0% Asian; 40.8% whites
- 2 X higher in low socio-economic groups


National Health & Nutrition Examination Survey (NHANES)
- 46% of adult Americans (64M) have periodontitis
- by comparison:
  24.6 million Americans have diabetes
  80 million Americans have heart disease
- prevalence may be associated with increasing life span while retaining more natural teeth
- 70.1% of Americans > 65yo have periodontitis


70.1% of Americans > 65 years old have periodontitis

Periodontitis in Relation to Systemic Conditions
- Diabetes Mellitus
- Cardiovascular disease
- Respiratory disease
- Other possible associations:
  - Arthritis
  - Dementia / Alzheimer's disease

Periodontitis and Chronic Disease - Diabetes Mellitus
- The most important systemic risk factor for periodontal disease is diabetes.
- A bi-directional relationship exists between the two conditions with emphasis towards diabetes modulating the periodontitis
- Evidence suggests that the presence of periodontitis can adversely affect metabolic (glycemic) control in patients with Diabetes Mellitus
- Prevalence of Diabetes Mellitus increases with age
Diabetes and Periodontitis

- Poorly controlled diabetes increases the risk of periodontitis
- Periodontitis can make glycemic control more difficult

Prevalence of Periodontitis

People with diabetes are 2-3 times more likely to suffer from Periodontitis

Diabetes Mellitus increases with age

Complications of Diabetes:

- Macrovascular (large blood vessel)
  1. Cardiovascular disease
  2. Stroke
- Microvascular (small blood vessel)
  3. Eye (retinopathy)
  4. Kidney (nephropathy)
  5. Nerve (neuropathy)
  6. Aggressive periodontitis

Periodontal Changes seen in a Diabetic Patient

Periodontitis in Relation to Systemic Conditions

- Diabetes Mellitus
- Cardiovascular disease
- Respiratory disease
- Other possible associations:
  - Arthritis
  - Dementia / Alzheimer's disease

Periodontitis and Chronic Disease – Cardio Vascular Disease (CVD)

A recent review by Bellstrom et al. (2012) provided 4 key conclusions:

- There is an association between periodontitis and CVD
- Relationship is not solely due to confounders (i.e. smoking, socioeconomic status)
- Periodontal therapy can trigger a short term inflammatory response followed by:
  - A progressive and consistent reduction of systemic inflammation
  - An improvement in endothelial function

Periodontitis in Relation to Systemic Conditions

- Diabetes Mellitus
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Periodontitis & Chronic Disease – Respiratory Disease

- Possible biological mechanisms
  - There may be direct aspiration of oral organisms into the bronchial tree and lungs (direct infection)
  - Enzymes in saliva of patients with periodontal disease may modify the mucosal surface of respiratory tract
  - Periodontal pathogens may reduce the enzymes limiting the neutralization effect of salivary mucins on respiratory pathogens
  - Cytokines and other inflammatory mediators could alter the cell surface receptors of the epithelial cells of the respiratory tract enhancing the colonization of pathogens

Periodontitis & Chronic Disease – Respiratory Disease

- Respiratory infections occur more often in hospitalized patients
- Association is strongest with patients on a ventilator where aspiration pneumonia tends to occur
- These individuals tend to neglect the oral hygiene practice. That increases the risk of aspiration of oral pathogens

Periodontitis in Relation to Systemic Conditions

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Periodontitis & Chronic Disease – Rheumatoid Arthritis

- In rheumatoid arthritis, the immune system mistakenly triggers inflammation with no viruses or bacteria to fight off
- Rheumatoid arthritis and periodontal disease are both inflammatory disease conditions
- Uncontrolled periodontal disease contributes to the difficulty of maintenance of rheumatoid arthritis (RA), with increased risk of periodontitis in subjects with RA

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Periodontitis & Chronic Diseases
Dementia, Alzheimer's Disease or Both

- Biologic plausibility supports:
  - Inflammatory mechanism - Mediators (IL-1, IL-6) from the periodontal tissues enter the bloodstream or are induced by the periodontal pathogens that enter the circulation
  - Oral disease and tooth loss early in life may be a risk factor to consider as a confounder for developing cognitive impairment later in life
  - The association of oral infection/inflammation with dementia is particularly important in the context of oral health care in older adults

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Dental Future in Older Adults
Elements of prediction should include:

- Age
- Number of missing teeth
- Existing restorations
- Oral hygiene status
- Medical status
- Medications
- Cognitive status
- Social situation

Should Missing Teeth be Replaced?

- First manage the acute condition (pain, infection) health
- Consider the patient's needs:
  - Impact on function
  - Replacement for functional or social reason
- Consider patient's wants:
  - Desire for tooth replacement for aesthetic reasons
  - Ability to manage prosthetic replacement of teeth

Are Retained Teeth More at Risk?

- Older adults of today retain more of their teeth
- Retained teeth are considered as "at risk teeth"
- Increasing need to manage older dentate patients and their potential loss of teeth
- Dry mouth due to polypharmacy elevates the risk to retained teeth
- Inability to maintain personal oral hygiene
Risks to Retained Teeth

- Caries
- Periodontal disease
- Other factors affecting tooth loss
  - Endodontic treatment
  - Vertical root fracture
  - Resection due to benign or malignant tumors
  - Iatrogenic dental causes

Edentate Older Adults

- Dentures are still prevalent
- Issues with retention and cleaning
- There is a move to implant supported solutions
- Adopt many of the issues of dentate individuals

Denture/Partial denture care
- Psychological issues
- Difficult insertion and removal
- Food impaction
- Fungal infection

Preventive Health Behaviors

- Behaviors linked to level of independence
  - measure with Activities of Daily Living (ADL)
    - Dressing
    - Eating
    - Ambulating
    - Toileting
    - Personal hygiene
  - ADL's measure the functional state of individuals

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ADLs and Oral Hygiene

- Two ADLs related to oral health and wellness
  - Ability to perform personal hygiene
  - Ability to eat
- Assessment of these ADLs helps dental professionals to determine:
  - Level of independence
  - Degree of oral function
  - Need for assistance

Preventive Measures

- Regardless of age
  - Promote preventive options
  - Discuss all options for care
  - Introduce/prescribe appropriate products
- Have a conversation about:
  - Basic oral care needs
  - Other wants or desires (e.g., whiter teeth, beautiful smile)
- Include a trusted family member, friend or one with power of attorney in consultation when appropriate
Treatment Planning for Prevention

- The economic divide
- What is the cost/benefit ratio for prevention?
- Increase prevention visits
- Minimize future restorative/prosthodontic/surgical care
- Invest in prevention tools
  - Oral hygiene aids
- Power devices
- Chemotherapeutic agents
- Accessibility and cost of transportation for professional preventive care

The Older Adult Population: Defined by Level of Dependency And Lifestyle

<table>
<thead>
<tr>
<th>Population</th>
<th>Healthy - low Dependency</th>
<th>Pre-Dementia</th>
<th>Depression</th>
<th>Severely High Dependency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Oral Needs</td>
<td>Cosmetic ++</td>
<td>Preventive +</td>
<td>Therapeutics +</td>
<td>Palliative Care ++</td>
</tr>
<tr>
<td>Specific Problems</td>
<td>Maximal Health</td>
<td>Poly-pharmacy</td>
<td>High Risk dentition</td>
<td>+ Difficulty with oral hygiene care</td>
</tr>
<tr>
<td>Preventive Solution</td>
<td>Anti-bacterial TP.WM</td>
<td>Anti-bacterial WM</td>
<td>Alkaline</td>
<td>High fluoride for dry mouth</td>
</tr>
</tbody>
</table>

Seattle Care Pathway

- In 2013, a group of experts met in Seattle, Washington to define a care pathway for oral care in older patients
- The group reviewed the existing scientific evidence and through a series of workshops defined:
  - that older patients should be reviewed from age 65 years
  - an appropriate preventive and treatment modalities for this group
- The key elements in the care pathway are indeed to be a useful tool in managing and planning care for older adults

Seattle Care Pathway - No Dependency - Healthy

Features:
- Fit, robust individuals
- Exercise regularly
- Interested in health and beauty
- Wish to enhance the appearance of their dentition
- Regular dental visits
- Extensively restored dentition that are functioning well

Seattle Care Pathway - Pre-Dependency

Features:
- Chronic systemic condition with potential impact on oral health
- Chronic condition is not impacting on oral health
- The co-morbidity symptoms are well controlled
- Taking prescription medications causing dry mouth
- Recent missing teeth
- Initial problems with dental restorations, dentures etc...
Seattle Care Pathway
Pre-Dependency

Pathway Recommendations:
- Advice should be given that the systemic condition may impact oral health
- Place on a more frequent recall visit interval
- An oral healthcare plan including both professional and self-care elements should be developed
- Any restorative treatment plan should consider long-term viability and dependency on maintenance
- For patients with partial dentures the use of high-fluoride treatment is suggested
- For patients with periodontal disease the use of an antibacterial toothpaste and mouthwash is suggested

Seattle Care Pathway
Dependent

Pathway Recommendations:
- Risk of experiencing a significant decrease in oral health and quality of life
- Access to dental services is crucial
- Family members or carers should be contacted to ensure good oral hygiene provision
- A high-fluoride toothpaste for dry mouth, a suitable toothbrush and, if needed, an acidulated phosphate fluoride (APF) mouthwash is suggested
- More frequent recall visits for professional cleaning and fluoride varnish application
- Treatment planning should focus on teeth of strategic importance, repairing rather than replacing to ensure maintenance

Seattle Care Pathway
High Dependency

Pathway Recommendations:
- Decrease in oral health will likely result in a decrease in quality of life
- Best treated by a specialist in special care dentistry
- May involve extractions, sealants and high fluoride therapy in a home care setting which may limit what can be achieved
- Carers should be shown how to undertake oral hygiene procedures, chlorhexidine mouthwash is suggested if optimal brushing is not possible

Seattle Care Pathway
Dependent

Features:
- Chronic systemic condition that is currently impacting oral health
- Requires carer support in getting access to dental services or maintaining oral health
- Demand/Need for dentist to visit patient at home or at the care facility
- On multiple medications to manage systemic conditions
- Well-maintained natural dentition with numerous new coronal carious lesions
- Increase in attachment loss that seems to be associated with gingival recession
- Dry mouth identified on examination

Oxidation is a Natural Process in an Oxygen Rich Environment

Examples of Oxidation
Oxidation

- Oxidative stress is caused by an imbalance between ROS activity & total antioxidant capacity
- Oxidative stress incites an inflammatory response and plays a role in many chronic inflammatory diseases
- Nicotine, alcohol, H2O2, and many materials used in dentistry increase free radical activity

Free Radical Pathway

Conclusion

- Oral health is a vital component of overall wellness and quality of life
- Level of optimal wellness varies across individual lifetime
- Attaining optimal oral wellness is an essential health goal for older adults
- Older adults engage in lifelong habits that increase their risk for oral and systemic disease
- Caries and periodontal disease are still the most common oral disease seen in older adults

Conclusion

- Preventive strategies
  - Stop both the initiation and progression of oral diseases
  - Minimize adverse health consequences
- Preventive interventions help to improve
  - Oral comfort, function and acceptable esthetics
- Effective preventive measures promote
  - Positive health behaviors, minimize disease risk and improve patient safety