The Graying of America:
An Overview of Geriatric Dentistry

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• Medical conditions?
• Metabolic rate?
• Functional reserve?
• Activities of daily living?
• Instrumental activities of daily living?
• Mental status?
• Support systems?
• Social networks?

What is Aging?
• Irreversible process
• Begins or accelerates at maturity
• Results in increasing rate of deviations from ideal state
• … or decreasing return to the ideal state

Increasing Life Expectancy
• Until recently, there has been only one proven method of significantly increasing life expectancy
• Animal models only
  – mice/rats
  – chimpanzees
Experimental mice live 33% longer

Increasing Life Expectancy Through Caloric Restriction

- Severe caloric restriction
  - 50% of normal calories starting in adolescence
  - not dependent on ratio of fats, proteins, carbohydrates
- Increases life expectancy 33%

Increasing Life Expectancy Through Gene Therapy

- Worm - Caenorhabditis elegans
- Life extended more than 6 times by lowering the activity of a single gene.

Aging and Genetics

- Hayflick phenomenon
  - human cells will divide less than 100 times outside the body
- Inverse correlation between the number of cell divisions and the age of the person from which the cells were taken
- Suggests that aging is
  - active process
  - genetically determined

Telomere Theory

- Telomere is the end (cap) of chromosomes
- Repeating DNA strings → TTAGGG
- The chromosome loses some base pairs form end at each division.
- When the Telomere is short enough, the cell stops dividing.
- There is an evolutionary advantage
  - don't waste resources after age of procreation
  - built-in death plan
Telomere Theory

- Telomerase is an enzyme that can reverse the telomere shortening. It is present in human cells and can prolong cell life.
- 1997 - Geron Corporation produced human telomere reverse transcriptase (hTRT)
- hTRT fuses groups of telomere base pairs to chromosome
  - causes increased telomere length
  - causes cells to live much longer

Telomere Theory

- Normal cells of the same age stop dividing
- Cells treated to produce active telomerase continue to divide

Telomere Theory

The telomere is the biologic clock
The Graying of America

**Baby-Boom Generation to Accelerate Elderly and Oldest Old Growth**

The elderly population grew rapidly throughout the country's history. From 1950 to 1980, the elderly increased 10-fold, while the population under age 65 was only 2.3 times larger. Between 1980 and 1990, the elderly grew by 30 percent, compared to 65 percent for persons under age 65.

During the period 1990 to 2010, the elderly growth rate will be lower than during any 20-year period since 1950 to 1970. However, the rapid growth rate of the elderly population's growth rate, an elderly population explosion between 2010 and 2030 is inevitable as the Baby-Boom generation reaches age 65. About 1 in 3 U.S. citizens will be elderly by 2030. The elderly population is expected to increase from 37 million in 1990 to 70 million by 2030, then will reach 90 million in only 6 years (2030).

The oldest old, 9.1 million persons in 2004, represent 14 percent of the total population. By 2020, the size of the population age 85 and over is projected to double to 7 million. The oldest old will equal double the number of persons who are 65 to 74. The Baby-Boom cohort reach the oldest ages. Under the "high-" projection series, the oldest old cohort number as many as 17 million in 2050 (See Sources and Quality of Data). Given the oldest old cohort have severe health conditions, the rapid growth of the population group has many implications for individuals, families, and governments.

**Total number of persons age 65 or older, by age group, 1900 to 2050, in millions**

Note: Data for the years 2005 to 2050 are middle-series projections of the population.

References: 
- See Sources and Quality of Data.
Survival Curves

*Ultimate Curve*
US - 1840
US - 1940
US - 1980
Italy - 1930
Mexico - 1930
India - 1930

Survival in a Natural Environment
Survival in a Natural Environment

Death is caused by extrinsic factors
- predators
- environmental hardships
- infections

Why has life expectancy increased?

- Improved nutrition
- Primary prevention of childhood diseases (immunizations- 1890's)
- Antibiotics (1940's)

Survival in a Protected Environment
Survival in a Protected Environment

Death is caused by biologic decay leading to
- Heart disease
- Cancer
- Chronic illness
  - diabetes
  - Liver disease
  - Lung disease

Health Care Costs Related to the Aging Population

<table>
<thead>
<tr>
<th>% of population &gt; 65</th>
<th>12%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Days of hospital care</td>
<td>29% of total hospital days</td>
</tr>
<tr>
<td>Cost of health care</td>
<td>30% of total costs</td>
</tr>
<tr>
<td>Physician visits</td>
<td>1.5 times the national average</td>
</tr>
</tbody>
</table>

The Surgeon General’s Report On Oral Health

![Figure 4.13](image)

The percentage of people without any teeth has declined among adults over the past 20 years.

Health History

- Past Illnesses
  - 14 years old - appendectomy
  - 35 years old - fracture femur
  - 58 years old - AODM
  - 61 years old - hysterectomy
  - 63 years old - hepatitis in hospital for 4 months
  - 73 years old - Pneumonia
  - 75 years old - Myocardial Infarction
  - 76 years old - placement of pacemaker
  - 86 years old - CHF (congestive heart failure) - in hospital for 2 months

- Medications
  - Digoxin - .2mg tid
  - Haldol - 200mg HS
  - Insulin - NPH (intermediate acting), before breakfast and dinner
  - Lasix - 30mg bid

The Surgeon General’s Report On Oral Health

<table>
<thead>
<tr>
<th>Table 4.1</th>
<th>Five states with highest and lowest percentages of edentulous persons aged 65 and older</th>
</tr>
</thead>
<tbody>
<tr>
<td>States with Highest Percentage</td>
<td>States with Lowest Percentage</td>
</tr>
<tr>
<td>State</td>
<td>Percentage</td>
</tr>
<tr>
<td>West Virginia</td>
<td>42.9</td>
</tr>
<tr>
<td>Kentucky</td>
<td>46.0</td>
</tr>
<tr>
<td>Louisiana</td>
<td>43.0</td>
</tr>
<tr>
<td>Arkansas</td>
<td>39.2</td>
</tr>
<tr>
<td>Maine</td>
<td>37.8</td>
</tr>
</tbody>
</table>

Oral Health and Dementia
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Altered Mental Abilities
The 3 D’s

- Delirium – disturbance of awareness
- Depression – disturbance of mood
- Dementia – disturbance of memory

Delirium

- Disturbance of awareness
  - Sudden change in behavior or mental status
  - Sudden severe confusion
  - Usually caused by infections, metabolic imbalances, effects of medications
  - See changes in alertness, sleep patterns, short term memory, disorganized thinking, emotional or personality changes
Depression

- Disturbance of mood
  - Major depressive disorder = depressed (sad) mood/loss of interest for at least two weeks, and at least 5 of the following:
  - Tearful or sad feelings, weight change (usually decreased), trouble sleeping, psychomotor agitation or retardation, fatigue or loss of energy, feelings of worthlessness or guilt, loss of ability to concentrate, indecisiveness

Dementia

- Disturbance of memory
  - Memory impairment with:
    - Aphasia—language impairment affecting the production or comprehension of speech.
    - Apraxia—loss of ability to carry out movements such as writing, gait, and complex tasks.
    - Agnosia—loss of ability to recognize objects or persons.
    - “Executive function” Loss—loss of ability to plan ahead, foresee consequences, etc.

Memory Impairment

[Graph showing percentage of persons age 65 or older with moderate or severe memory impairment, by age group and sex, 1998]
Memory Impairment

- Are common
- Can be normal
- Can represent dementia
  - Affects ability to carry out functions of daily living
  - May be progressive
  - May be curable

Dementia

- Deterioration of mental facilities, such as memory, concentration, and judgment, resulting from an organic disease or disorder of the brain - often accompanied by emotional disturbance and personality changes

Levels of dementia

- Mild
  - Repeat themselves and not know it
  - Struggle to find words
  - Problems with intellectual tasks
Levels of dementia

- **Moderate**
  - Struggle to name common objects
  - Difficulty recognizing relatives or friends
  - Cant learn new things

- **Severe**
  - Cant complete simple tasks
  - Need helps with ADLs
  - Cant walk or even sit.
Causes of dementia

- Neurodegenerative diseases
  - Alzheimer's
  - Parkinson's
  - Huntington's diseases
  - Lewy-body dementia
- Potentially treatable conditions
  - Multi-infarct dementia (vascular dementia)
  - Brain tumors
  - Brain infections
- Conditions that mimic dementia
  - Metabolic & medical conditions, depression

Alzheimer’s Disease: Prevalence

- Prevalence
  - Total population: 1-2%
  - >65 = 5-10%
  - >80 = 20-30%
- Survival after diagnosis
  - 4-8 years

Alzheimer’s Disease: neuron death
Neurofibrillary tangles and senile plaques

Progression of Alzheimer’s Disease

Alzheimer’s Disease: signs and symptoms

- Disturbances in memory, attention, and orientation
- Changes in personality
- Language difficulties
- Impairments in gait and movement.
Alzheimer’s Disease: diagnosis

- Signs and symptoms
- Complete medical work-up
- Rule out other causes of signs and symptoms
- Autopsy
- CT, MRI, PET brain scans

Alzheimer’s Disease: Treatment

- No cure
- Medications can help maintain mental function
  - Regulation of neuro-transmitters
    - Donepezil (Aricept®), Rivastigmine (Exelon®), and Galantamine (Razadyne®) Memantine (Namenda®)
    - Effects not long lasting
- Manage behavior symptoms
- Slowing, delaying or preventing AD
  - Antioxidants, immunization therapy, cognitive training, and physical activity
1. **Cholinesterase (KOH-luh-NES-ter-aye) inhibitors** prevent the breakdown of acetylcholine (a-SEE-il-KOH-leen), a chemical messenger important for learning and memory.

   **These drugs:**
   - Support communication among nerve cells by keeping acetylcholine levels high.
   - On average, delay worsening of symptoms for 6 to 12 months for about half the people who take them. Some experts believe a small percentage of people may benefit more dramatically.

   **Three cholinesterase inhibitors are commonly prescribed:**
   - Donepezil (Aricept), approved to treat all stages of Alzheimer’s disease.
   - Rivastigmine (Exelon), approved to treat mild to moderate Alzheimer’s.
   - Galantamine ( Razadyne), approved to treat mild to moderate Alzheimer’s.

2. **Memantine (Namenda)** works by regulating the activity of glutamate, a different messenger chemical involved in learning and memory.

   **Memantine:**
   - Is currently the only drug of its type approved to treat Alzheimer’s.
   - Temporarily delays worsening of symptoms for some people. Many experts consider its degree of benefit is similar to the cholinesterase inhibitors.

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### FDA-Approved Treatments for Alzheimer’s

<table>
<thead>
<tr>
<th>Generic</th>
<th>Brand</th>
<th>Approved For</th>
<th>Side Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Donepezil</td>
<td>Exeo</td>
<td>All stages</td>
<td>Nausea, vomiting, loss of appetite and increased frequency of bowel movements.</td>
</tr>
<tr>
<td>Galantamine</td>
<td>Razadyne</td>
<td>Mild to moderate</td>
<td>Nausea, vomiting, loss of appetite and increased frequency of bowel movements.</td>
</tr>
<tr>
<td>Memantine</td>
<td>Namenda</td>
<td>Moderate to severe</td>
<td>Headache, constipation, confusion and dizziness.</td>
</tr>
<tr>
<td>Rivastigmine</td>
<td>Exelon</td>
<td>Mild to moderate</td>
<td>Nausea, vomiting, loss of appetite and increased frequency of bowel movements.</td>
</tr>
<tr>
<td>Tacrine</td>
<td>Cognex</td>
<td>Mild to moderate</td>
<td>Possible liver damage, nausea, and vomiting.</td>
</tr>
</tbody>
</table>
Alzheimer’s Disease: dental conditions

- Difficulty maintaining oral hygiene
- Decreased salivary flow
- Increase in plaque related dental diseases – caries, periodontitis

Alzheimer’s Disease: dental treatment

- Early stages
  - Involve caregivers in prevention
  - Slow introduction to new environment
  - Speak slowly and to the individual
  - Anticipate later functional decline
  - Consider short acting benzodiazepines
- Later stages
  - Palliative care – Tx pain and infection
  - May require anesthesia for treatment
Other neurodegenerative causes of dementia

- Parkinson's
  - Progressive muscular problems – rigidity, coordination difficulties
  - Tx – drugs (Anticholinergics, Levodopa, Dopamine agonists)
  - Deep brain stimulation

- Huntington's diseases
  - General progressive neurological deterioration

Lewy-body dementia
- Progressive dementia
- Abnormal structures – Lewy Bodies in various parts of the brain
- Only 10-15 of neurons die, others don't work
- 2nd most common cause of neurodegenerative progressive dementia in elderly individuals
Vascular (Multi-Infarct) Dementia

• Previously called multi-infarct dementia
• Any dementia resulting from cerebral blood vessel disease
• Multi-infarct Dementias can be caused by series of “mini-strokes” or transient ischemic attacks (TIAs)
• Distinguished from Alzheimer’s by stair-step decline.

Conditions that mimic dementia

• Metabolic & medical conditions
  - Brain tumors
  - Brain infections
  - Alcoholism
  - Oxygen deficit due to lung disease
• Depression
• Medication side effects
  - Medications prescribed by dentists can be additive
The Mini-Mental Status Exam

<table>
<thead>
<tr>
<th>Category</th>
<th>Possible Points</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orientation to time</td>
<td>3</td>
<td>From broad to most narrow. Orientation to time has been correlated with future decline.</td>
</tr>
<tr>
<td>Orientation to place</td>
<td>4</td>
<td>From broad to most narrow. This is sometimes extended down to street and sometimes to floor.</td>
</tr>
<tr>
<td>Registration</td>
<td>3</td>
<td>Repetitive named prompts</td>
</tr>
<tr>
<td>Attention and calculation</td>
<td>5</td>
<td>Serial events or serial &quot;word&quot; backwards. It has been suggested that serial events may be more appropriate in a population where English is not the first language.</td>
</tr>
<tr>
<td>Recall</td>
<td>3</td>
<td>Repetitive recall</td>
</tr>
<tr>
<td>Language</td>
<td>2</td>
<td>Name a person and a watch</td>
</tr>
<tr>
<td>Repetition</td>
<td>1</td>
<td>Spelling back a phrase</td>
</tr>
<tr>
<td>Complex commands</td>
<td>6</td>
<td>Verbal. Can involve drawing figures shown.</td>
</tr>
</tbody>
</table>

Communications and Dementia

- Approach slowly from the front
- Touch lightly on shoulder or wrist
- Establish eye contact
- Use simple sentences
- Speak in a calm friendly voice
- Give one instruction at a time
- Do a little at a time

Oral Health and Dementia
Abuse and Neglect in People with Disabilities

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De-institutionalization

- Institutional population decreased >70% in last 40 years
- People with disabilities living in the community has increased 5-6 times the rate of population growth
- One in 5 people has a significant disability (deficit in one or more ADL)

People with disabilities are extraordinarily vulnerable

- There are 5 million crimes against people with developmental disabilities each year in the U.S. compared with 8,000 hate crimes, 1 million incidents of elder abuse, and 1 million incidents of spousal abuse
- More than 70 percent of women with developmental disabilities are sexually assaulted in their lifetime.
People with disabilities are extraordinarily vulnerable

- Thirty-nine percent to 68 percent of girls and 16 percent to 30 percent of boys with intellectual disabilities will be sexually abused before age of 18.
- The rate of robbery against persons with intellectual disabilities is 12.8 times higher than against the general population.
- Offenders are often caregivers providing services related to the disability.

People with disabilities are extraordinarily vulnerable

- Offenders often seek out persons with disabilities because they are considered to be vulnerable and unable to seek help or report the crime.
- Forty-four percent of violent crime in the general population is reported nationally compared with 4.3 percent of violent crime reported against people with disabilities.

People with disabilities are extraordinarily vulnerable because

- Their physical and mental impairments are apparent and thus perceived as “easy targets” who are unable to defend themselves.
- Their multiple service needs require them to access many different service delivery systems and thus expose them to many different types of providers.
- Their limited problem-solving capacity leaves them vulnerable to persuasion by others and less cognizant of warning signs of dangerous persons or places.
People with disabilities are extraordinarily vulnerable because

- Training on safety and sexuality is often lacking.
- They often believe that if they report abuse, no one will believe them.
- They are often segregated and very dependent on their caregivers.
- Residential care providers often hire unskilled care staff at minimum wage and experience a high attrition rate.

The dental environment can be seen as intrusive and scary

- Lots of equipment
- Lights in the eyes
- Things in the mouth
- Vulnerable positioning
- Consider an individual with a history of abuse and limited understanding of what the dental team is trying to do

Do you know how to recognize the signs of elder or dependent adult abuse?

You can help stop the abuse of older and dependent adults by being aware of signs that abuse may be occurring. Each year more than 275,000 Californians become victims of elder or dependent adult abuse. Unfortunately, more than two-thirds of cases are family members. Learning these common signs can help you spot abuse in your own family or community.

Physical Abuse
- Bruises that are inconsistent with explanations
- Bruises, scratches or other injuries
- Inappropriate use of a physical restraint or medication

Neglect
- Poor hygiene, dirty or torn clothes or lack of appropriate shelter
- Medical conditions that go untreated
- Malnourished or dehydrated
Definition of dependent adult abuse

- either physical, neglect or financial abuse, abandonment, isolation, abduction, or other treatment with resulting physical harm or pain or mental suffering or the deprivation by a care custodian of goods or services that are necessary to avoid physical harm or mental suffering.

CA Welfare and Institutions Code Section 15600.07

Definition of dependent adult neglect

- the negligent failure of any person having the care or custody of an elder or a dependent adult to exercise that degree of care that a reasonable person in a like position would exercise or the negligent failure of an elder or dependent adult to exercise that degree of self care that a reasonable person in a like position would exercise
Recognizing Abuse or Neglect

Figure 1. Oral neglect may indicate general neglect or abuse.

Figure 2. Oral trauma, such as this fractured tooth, may be a sign of abuse.

Recognizing Abuse or Neglect

Figure 1. Evidence of dental trauma may be a sign of abuse.

Recognizing Abuse or Neglect

Reporting dependent adult abuse

- Dental professionals are mandated reporters:
  - required to report suspected abuse or neglect
  - can be found guilty of a crime for not reporting
“Any mandated reporter who, in his or her professional capacity, or within the scope of his or her employment, has observed or has knowledge of an incident that reasonably appears to be physical abuse, abandonment, abduction, isolation, financial abuse, or neglect, or is told by an elder or dependent adult that he or she has experienced behavior, including an act or omission, constituting physical abuse, abandonment, abduction, isolation, financial abuse, or neglect, or reasonably suspects that abuse, shall report the known or suspected instance of abuse by telephone immediately or as soon as practicably possible, and by written report sent within two working days.”
Figures 2 and 3. Photos from the California Attorney General’s Safe senior Campaign.
Used with permission by the California Attorney General’s Office.
Informed Consent for Adults with Cognitive Impairments

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What is Informed Consent

- A decision made by or for a patient about health care after being informed about the proposed procedures, risks, benefits, and alternatives to the proposed treatment.

82 YO Male
Hearing impairment
Difficulty concentrating
Memory impairment
85 YO Female
Alzheimers dementia
Lives in nursing home
No available relatives

25 YO Male
Down Syndrome
Lives in group home
Works in sheltered workshop
37 YO Female with multiple medical problems and abnormalities including mental retardation, hearing loss.

32 YO Male with Down Syndrome, mild mental retardation. Lives in his own apartment, works in a fast food restaurant.

What are the Informed Consent Issues?

- Can they understand the procedure, risks, benefits, and alternatives?
- Can they make a decision based on the above information?

Note: The patient’s primary physician is able to make a legal determination about the patient’s capacity to consent.
Who can give consent?

Patient
- If over the age of 18 (except for certain emancipated minors)
- Adults are their own legal guardians except when they have been declared incompetent by a court of law
- Must understand procedure, risks, benefits, alternatives
- Must be able to make a decision about this information

Who can give consent?

Parent
- Child is under 18 except for emancipated minors

Who can give consent?

Advance Health Care Directive
- Is a legal document set up prior to individual developing cognitive impairment
- Allows person to:
  - appoint a health care agent in power-of-attorney who can act when individual loses decision making capability
  - state instructions for future health care decisions.
Who can give consent?

**2 uninvolved physicians/dentists**
- For emergency procedures

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Who can give consent?

**Legal Guardian**
- Someone declared by a court of law to be the guardian of the person (not the estate)

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Who can give consent?

**Public Guardian**
- Works for the city/county government
- Has legal authority to provide consent for health care after a review of the facts
Who can give consent?

**Regional Center Director**
- Has legal authority to provide consent for health care after a review of the facts for people who are registered with the Regional Center
- Consent can be arranged with Case Manager/Service Coordinator

Who can give consent?

**Judge**
- Can issue a court order for health care services after a review of the facts
- Can grant permanent or temporary guardianship

Who can give consent?

**Next of kin**
- Might not be the legal guardian
- Theory (used by hospitals)
  - If anyone would bring law suit it would be next of kin
Who can give consent?

- Patient (understand procedure, risks, benefits?)
- Parent (under 18, except emancipated minors)
- Prior Power-Of-Attorney
- 2 uninvolved physicians/dentists (emergency)
- Legal guardian
- Public guardian
- Regional Center Director
- Judge (court order)
- Next of kin

How can a dental professional obtain consent?

- Discuss procedure with patient/guardian/public guardian/judge and have that individual sign consent form
- Work with social worker/case manager from agency/hospital
- Work directly with /public guardian/court to get consent forms signed