Geriatric Dentistry: Before You Call 911

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Conflict of Interest Disclosure Statement

- The author reports no conflicts of interest associated with this course.

Introduction – Geriatric Dentistry

Geriatric Dentistry: Before You Call 911 will provide an overview of some of the essential steps that need to be considered for safe handling of older adults and medically complex patients. The course covers from their entrance to their exit after treatment and the follow-up steps after the treatment has been delivered.

Course Contents

Overview

Dental procedures for older adults are a reality on a daily basis. This course has been specifically designed to provide a platform for dental professionals who appreciate the changing demographics of older adults in the United States, especially those with complex medical conditions. The scope of geriatric dentistry includes the provision of appropriate dental care for the older adult patient taking into consideration the patient's overall medical and dental status, in order to improve their quality of life.

Learning Objectives

Upon completion of this course, the dental professional should be able to:

- Discuss geriatric dentistry in general.
- Impact of COVID-19 on Geriatric patients.
- Fundamental Elements needed to prevent transmission of Infectious agents in dental settings
- Types of PPE used
- How to safely put on PPE
- Consider the physical characteristics and medical history of the older adult patient during the initial assessment.
- Describe common medical emergencies and management protocols.
- Recognize the value of communication between dental and medical teams.

Glossary

ADA – American Dental Association

ASA – Aspirin

allergic reactions – Condition in which the immune system reacts abnormally to a foreign substance.

Alzheimer's disease – Progressive mental deterioration that can occur in middle or old age, due to generalized degeneration of the neurons.

antibiotic prophylaxis – The prescription of an antibiotic prior to certain types of dental procedures for the prevention of infection for individuals who have a medical history that warrants such coverage.

apraxia – Inability to perform particular motor purposive actions, as a result of brain damage.[1]

arthritis – Painful inflammation and stiffness of the joints.

asthmatic attack – Sudden worsening of breathing caused by the tightening of muscles around airways.

baby boomers – People born during the demographic post–World War II period (between the years 1946 and 1964).

CAB – Circulation, airway, breathing

cardiac arrest – Sudden, sometimes temporary, cessation of heart function.

cirrhosis – Disease of the liver marked by degeneration of cells, inflammation, and fibrous thickening of tissue.[2]

congestive heart failure – Inability of the heart to keep up with the demands on it, with failure of the heart to pump blood with normal efficiency.

COVID-19 - The SARS-CoV-2 virus is the infectious disease known as coronavirus disease (COVID-19). The virus typically causes mild to moderate respiratory illness in most

infected individuals, and it is spread through coughing, sneezing, speaking, singing, or breathing through an infected individual.

CPR – Cardio-pulmonary resuscitation.

diabetes mellitus – Chronic disease associated with abnormally high levels of glucose in the blood.

eczema – Patches of skin become rough and inflamed, with blisters that cause itching and bleeding.[3]

edentulous – Lacking teeth; toothless.

EMS – Emergency medical services.

etiologies – Cause, set of causes, or manner of causation of a disease or condition.

gait – Individual's manner of walking.

gingival recession – Exposure of the roots of the teeth caused by a loss of gum tissue.

Hodgkin's lymphoma – Cancer of the lymphatic system.[4]

hypercapnia – Excessive carbon dioxide in the bloodstream, typically caused by inadequate respiration.

hypertension – Abnormally high blood pressure (Persistently at or above 140/90 mmHg).[5]

hypoglycemia – Deficiency of glucose in the bloodstream.

INR (International Normalized Ratio) – The prothrombin time (PT) and its derived measures of prothrombin ratio (PR) and INR are measures of the extrinsic pathway of coagulation. (Normal range is between 2-3 for those on anticoagulant therapy).[6]

keratinization – Process in which the cytoplasm of the outermost cells of the mammalian epidermis is replaced by keratin.

O_2 – Oxygen.

orthostatic hypotension – Decrease in systolic blood pressure of 20 mm Hg or a decrease in diastolic blood pressure of 10 mm Hg within three minutes of standing when compared with blood pressure from the sitting or supine position.[7]

osteoporosis – Condition in which the bones become brittle and fragile from loss of tissue.

Parkinson's disease – Chronic nervous disease characterized by a fine, slowly spreading tremor, muscular weakness and rigidity, and a peculiar gait.

periodontium – Specialized tissues that both surround and support the teeth, comprised of cementum, periodontal ligament and alveolar bone.

PPE – Personal Protective Equipment

prosthesis – An artificial device that replaces a missing body part. (i.e., partial or full dentures, dental implants etc.)[8]

psoriasis – Skin disease marked by red, itchy, scaly patches.[9]

renal failure – Condition in which the kidneys lose the ability to remove waste and balance fluids.

stroke – Damage to the brain from interruption of its blood supply.

syncope – Temporary loss of consciousness caused by a fall in blood pressure.

vitals – Clinical measurements, specifically pulse rate, temperature, respiration rate, and blood pressure that indicate the state of a patient's essential body functions.

WW I & II – World War 1 and 2.

xerostomia – Condition in which the mouth is unusually dry.[10]

911 – In North America including Canada, the 911 system was designed to provide a universal, easy-to-remember number for people to reach police, fire or emergency medical assistance from any phone in any location, without having to look up specific phone numbers.

Introduction

Aging is a normal physiological process that every living organism has to go through and is considered to be inevitable in the cycle of life. A large segment of the American population born between 1946 and 1964, also known as the '**Baby Boomers**,' will soon comprise the largest and the fastest growing segment of society. Some of the members of this generation were witness to events such as the Korean War, the Vietnam War, the Moon Landing and other defining moments in U.S. history.

These Baby Boomers were born after World War II with many being highly educated, resourceful and place a high value on their own medical health. In addition, they are also motivated to keep their natural teeth, thus are in continuous need for specialty dentists and dental hygienists with additional training and experience in providing care for the elderly.[11]

Also referred to as the 'Aging Tsunami,' those over 65 years of age currently comprise approximately 15.2% of the U.S. population today.[12] As per the most recent assessment, they will comprise up to 17% of the total population or approximately 1.6 billion people by the year 2050.[12] Furthermore, persons aged 80 years and older also represent the fastest-growing age group in this country.[13] This wave of retirees is also expected to be associated with an increasing number of complicated medical histories including dental problems and increased consumption of multiple medications, thus having a direct and major impact on the country's healthcare system. They not only require special care protocols but also a multi-disciplinary approach to their total care and well-being.

Geriatric Dentistry

Gerontology, often known as geriatrics or clinical gerontology, is the study of the physical and psychological changes that occur as people age. As part of an interdisciplinary team alongside other healthcare professionals,[14] Geriatric dentistry, also known as Gerodontology or Gerodontics, is the delivery of dental care to older adults involving the diagnosis, prevention, and treatment of problems associated with normal aging and age-related diseases. It was originally defined as "that portion of the pre-doctoral dental curriculum that deals with special knowledge, attitudes and technical skills required in the provision of oral health care to older adults."[15] It's commonly considered to be a part of 'Special Care Dentistry' by the Commission on Dental Accreditation. The Special Care Dentistry Association (SCDA) formed the American Society of Geriatric Dentistry (ASGD) in 1965 and later the SCDA Council of Geriatric Dentistry in 2013.[15]

Facts and Figures

Geriatric dentistry is a crucial part of the health maintenance mechanism for the elderly and medically compromised individuals. In the USA, there will be 74 million persons over the age of 65 by 2030, up from 56 million in 2020. Scientific research also indicates that by 2030, over 22 million senior citizens in the United States will require expert geriatrician care.[65] On average, people above the age of 65 years are expected to report one or more chronic medical conditions that require consideration before initiating any dental treatment.[15] The U.S. Surgeon General's Report stated that older adults suffer from a "silent epidemic of profound and consequential dental problems".[16] As per one estimate, a typical dental practice could expect to see about four to five elderly patients on any given day of operation.[17]

Correspondingly, in a statement released by the US Department of Health and Human Services (DHHS), it is projected there will be a need for more than 6,000 dental practitioners with specialized training in geriatric dentistry by the year 2020.[18,19]

According to a 2018 American Dental Association survey, 86% of Americans believe that dental health is highly essential to their overall health. Both the **American Dental Association (ADA)** and **American Dental Education Association (ADEA)** have created clinical guides for oral health professionals after realizing the complex needs for dental services among geriatric populations. These clinical guides will help professionals to better evaluate and diagnose dental problems, link oral health to chronic conditions, and provide treatment to improve older adults'

quality of life.[64,65] All health professions must work together to develop interprofessional education on geriatric oral health.

Impact of COVID-19 on Geriatric Patients
Severe acute respiratory syndrome Coronavirus infection (COVID-19) is brought on by the RNA virus coronavirus 2 (SARS-CoV-2). The COVID-19 pandemic and its effects on society's most vulnerable groups were seen by the entire world. Since its widespread spread began in December 2019, COVID-19 has killed 6,390,401 people worldwide and caused over 572,239,451 confirmed cases, paralyzing the whole humanity.[68] Because COVID-19 spreads by airborne droplets and direct human touch, it has a wide-ranging impact.

Older persons are more prone to developing nosocomial infections since they frequently have many comorbid diseases. As a result of their health, they may frequently need dental care at hospitals or special care facilities, and going to the dentist only when there is pain or discomfort exposes older people to an elevated risk of infection brought on by protracted appointments or the use of rotary tools. As a result, it's critical to take extra care to reduce the possibility of infecting them with the virus.

While it is important to stop the spread of the new coronavirus (2019nCoV), it is also vital for oral healthcare professionals to focus on the unique requirements of adult patients who are ageing, by implementing specific guidelines and effective infection control methods timely.

The problem in geriatric dentistry care nowadays is preventing older persons from getting nosocomial infections which they are susceptible to due to underlying coexisting diseases. According to the literature, dental professionals should use a few extra precautions to protect themselves from infection.

Strategies in the dental office to help older adults during COVID 19 pandemic era include:

- To prevent the spread of COVID-19, patients might choose to get their initial dental visit via tele dentistry.
- Pre-check triaging of the patients may be a useful screening technique.
- By advising doctors or prescribing RT-PCR tests and chest CT scans for questionable patients, you can keep them from attending dental clinics.
- Strict and effective infection control methods are particularly advised for dental emergency practices.
- The dentist can treat elderly persons while adhering to all infection control protocols and measures, depending on the urgency of the case.

Fundamental Elements Needed to Prevent Transmission of Infectious Agents in Dental Settings: (CDC Infection Control Guidelines)

Any environment where dental healthcare is provided must prioritize infection prevention. The task of creating documented infection prevention policies and procedures based on evidence-based rules, regulations, or standards should fall under the purview of at least one individual who has received training in infection prevention—the infection prevention coordinator. Policies and procedures should be adapted to the dental context and regularly (e.g., annually) reevaluated in accordance with any applicable state or federal regulations. The CDC also recommends that all dental facilities establish policies and procedures for the early identification and management of potentially infected individuals at the first points of patient contact.

1. Create and manage programs for occupational health and infection prevention.

2. Educate and teach all dental healthcare staff on infection prevention practices appropriate to their jobs or tasks (DHCP)

3. The most recent CDC advice on vaccines, testing, and follow-up is available.

4. Establish a regular review process for the infection prevention program, which includes assessing DHCP's compliance with infection prevention guidelines.[69]

Standard Precautions consist of:

- Hand washing.
- Putting on personal safety gear (e.g., gloves, masks, eyewear).
- Proper breathing and coughing technique. Sharps safety (engineering and work practice controls).
- Use of aseptic approach for safe injection (i.e., aseptic technique for parenteral medications).
- Sterile instruments and devices.
- Clean and disinfected environmental surfaces
- Practice hand hygiene when:
  1. Hands are obviously dirty.
  2. Following barehanded contact with tools, materials, equipment, and other items that could be contaminated by blood, saliva, or respiratory secretions.
  3. Hands are obviously dirty.
  4. Before putting on gloves and once more right after taking them off.

PPE

Personal protection equipment, in particular medical masks, is being used frequently by people all over the world. But PPE encompasses far more than just medical masks. It comprises gear worn by front-line healthcare providers and other crucial personnel, such as gowns, goggles, gloves, and face shields. To reduce exposure to infectious illnesses, particularly COVID-19, adequate use of PPE with quality assurance is essential.[72] PPE with a guarantee of quality is still in high demand. UNICEF still plays a significant part in the distribution and purchase of PPE. In fact, as part of the COVID-19 response, UNICEF has sent more than 653.4 million PPE pieces to 140 countries since the pandemic started. Personal protective equipment (PPE) supply is still necessary for three reasons:

1. Defending healthcare workers from COVID-19.
2. Ensuring the continuation of vital healthcare services.
3. Being ready and responding.

According to CDC guidelines, Healthcare personnel should use the following PPE:

- **Face mask** - An N95 respirator or a respirator approved under standards used in other countries that are like NIOSH-approved N95 filtering facepiece respirators Or A well-fitting facemask (e.g., selection of a facemask with a nose wire to help the facemask conform to the face).

Face Mask

- **Eye protection** - Put on eye protection (i.e., goggles or a face shield that covers the front and sides of the face)

- **Gloves** - Put on clean, non-sterile gloves upon entry into the patient room or care area which are required to be changed if they become torn or heavily contaminated.

- **Gowns** - Put on a clean isolation gown upon entry into the patient room or area which is to be changed if it becomes soiled.[73]

Initial Assessment

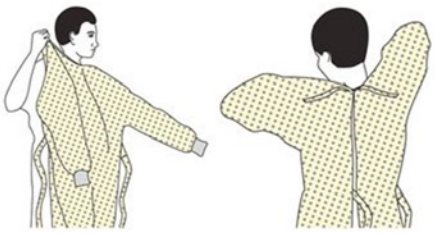
As quoted by Louis Pasteur, "where observation is concerned, chance favors only the prepared mind."20 We are expecting participation from every member of the dental team with best possible intentions. Even some of the minor details can potentially be helpful in making vital changes in treatment options. The earliest assessment of the patient starts as soon as they walk into the dental clinic. The front desk personnel are the primary visual help for the entire dental team. They are the first point of contact with all new and re-visiting patients. Besides providing necessary guidance to the patient and their family in scheduling and insurance coverage, they must be trained in evaluating the patient as soon they step inside the clinic. Anything unusual should be brought to the attention of the dental staff for consideration and update in the patient's medical record for future reference. The front desk personnel are not expected to provide diagnosis or judge an individual in any capacity;

SEQUENCE FOR PUTTING ON PERSONAL PROTECTIVE EQUIPMENT (PPE)

The type of PPE used will vary based on the level of precautions required, such as standard and contact, droplet or airborne infection isolation precautions. The procedure for putting on and removing PPE should be tailored to the specific type of PPE.

1. GOWN

- Fully cover torso from neck to knees, arms to end of wrists, and wrap around the back
- Fasten in back of neck and waist



2. MASK OR RESPIRATOR

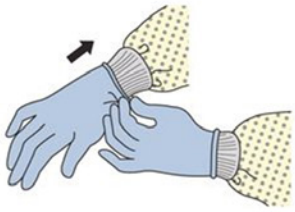
- Secure ties or elastic bands at middle of head and neck
- Fit flexible band to nose bridge
- Fit snug to face and below chin
- Fit-check respirator

3. GOGGLES OR FACE SHIELD

- Place over face and eyes and adjust to fit

4. GOVES

- Extend to cover wrist of isolation gown



USE SAFE WORK PRACTICES TO PROTECT YOURSELF AND LIMIT THE SPREAD OF CONTAMINATION

- Keep hands away from face
- Limit surfaces touched
- Change gloves when torn or heavily contaminated
- Perform hand hygiene

Sequence For Putting On Personal Protective Equipment (PPE)[74]

however, a quick assessment can help the dental team consider any relevant factors in effective treatment planning. Some of the more easily observed physical characteristics the reception staff may observe but are not limited to include:

- **Gait**: How a patient walks can provide a trained mind with initial clues in identifying the overall well-being of the patient. In an article in the New York Times (2012), the author mentions an elderly person's gait appears to be an early indicator of cognitive impairment; including Alzheimer's disease.21 Their walking pattern can also mirror physical conditions such as arthritis, osteoporosis, Parkinson's disease, etc. and manifests differently in both males and females.
- **Dressing:** Apparel is no longer considered to be a solo reflection of an individual's financial stability. They act as part of non-verbal communication. Along with the monetary picture, the mode of dressing can also be indicators of an individual's mental or psychological status.24 In the case of the elderly patient an unkempt appearance can also prove to be a red-flag as this may be suggestive of cognitive decline or even abuse that definitely requires further investigation.[25]
- **Hair:** Hairstyles can suggest many finer details regarding the character and behavior of the elderly patient. Financial, social, physical health along with some medications can have direct or indirect impact on the patient's hair. Details as minute as unkempt hair or heavy dandruff can be sufficient to alert the team to the patient's level of stress, depression, nutritional deficiencies or even conditions like eczema and psoriasis.[23]
- **Nails:** Our body has a tendency for letting us know when something is not right, and our nails are no exception. Their shape, texture, color, and overall form can be sufficient in raising suspicions to the trained eye. In one study, the authors clearly indicated the co-relation between nail care in the elderly and underlining physical conditions.26 These conditions can range from fungal infections, chronic renal failure, liver cirrhosis, congestive heart failure, diabetes mellitus, and even Hodgkin's lymphoma that can contribute to early diagnosis.
- **Speech:** Slurred speech observed during interaction with family members or staff can provide insight on any history of stroke, apraxia22 or even side effects of medications.

Some of the other indicators may include skin tone and texture, color of the sclera and breathing pattern that can be crucial and should be explored by the dental team.

Physical Assessment

Treating elderly and medically compromised patients in a dental care setting have their own challenges that can potentially test any clinician to their limits, the physical symptoms present in elderly patients may include but not be limited to disability with motor function, balance, and other behavioral issues. For example, the greatest incidence of stroke is considered to be among **adults sixty years and older**, which further adds complexities to even simple dental procedures. Encountering more compromised elderly patients on a daily basis is never considered easy; however, with additional training the dental staff can improve their patient handling techniques and thus provide treatment to the best of their capacity, knowledge and clinical judgment.

The **American Society of Anesthesiologists (ASA)** Physical Status classification system was initially created in 1941 by the American Society of Anesthetists and as revised in 1961 by adding the sixth category. The purpose of the grading system was simply to assess the degree of a patient's "sickness" or "physical state" prior to providing any treatment (Table 1). Describing patients' preoperative physical status is used for record keeping, for communicating between colleagues, and to create a uniform system for statistical analysis.[27] Despite its widespread acceptance, significant misunderstandings and discrepancies have always occurred when calibration methods were tried with various medical practitioners. There has always been an intent to look and eventually propose an alternative classification system for medical

risk assessment that is based on medical complexities, anticipated complications and more over dental modifications.[53]

Table 1. ASA Physical Status Classification System.[27]

Classification	Description
ASA 1	Healthy patients
ASA 2	Mild to moderate systemic disease caused by the surgical condition or by other pathological processes, and medically well controlled
ASA 3	Severe disease process which limits activity but is not incapacitating
ASA 4	Severe incapacitating disease process that is a constant threat to life
ASA 5	Moribund patient not expected to survive 24 hours with or without an operation
ASA 6	Declared brain-dead patient whose organs are being removed for donor purposes

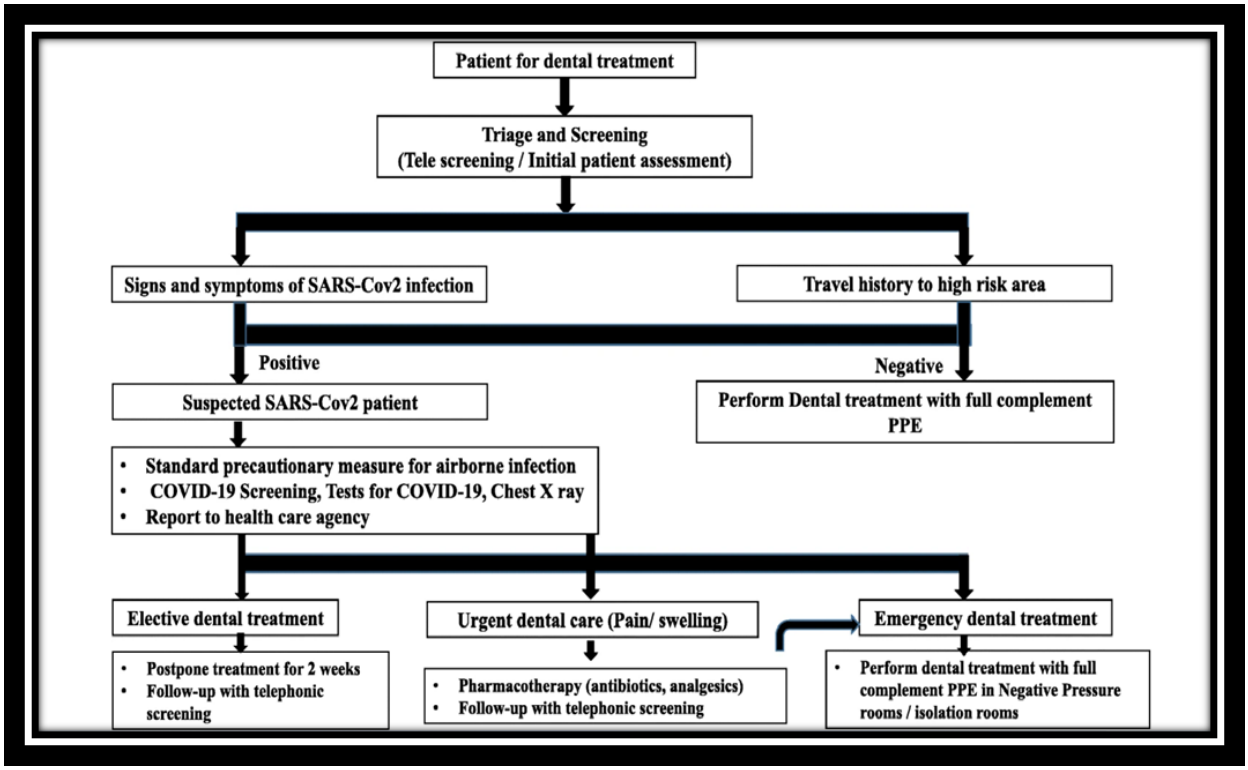
Taking a detailed medical history before starting any dental treatment is not only paramount but is a required 'standard of care.' Measuring the patient's vital signs, including blood pressure (B.P.), heart rate (H.R.), pulse, and respiratory rate (R.R.), should be a standard practice in all dental offices. The dental team should consider the physical characteristics of the patient before concentrating on their dental problems. A detailed medical history including medical diagnoses, an updated list of all medications along with past surgeries or hospitalizations give the clinician a fair chance to evaluate the given circumstances.[17] This history may also identify the need for the administration of a prophylactic antibiotic due to patient's orthopedic or cardiac status before proceeding intraorally.

The research suggests for efficient geriatric patient screening, diagnosis, and care against the COVID outbreak specific guidelines were set for managing the patients requiring dental treatment. Even before the patient comes, these stages are started via phone, text monitoring, or video calls. A decision-making algorithm for treatment of patients in dental clinics has been described in the flowchart below.

Some common medical conditions that may potentially be identified include:

1. **Alzheimer's Disease:** Alzheimer's disease is the most common type of dementia. It is a progressive disease that in its advanced stages has the tendency to destroy memory and other important mental functions. It's considered to be part of a group of brain disorders that result in the loss of intellectual and social skills. These variations can be severe enough to interfere with the patient's day-to-day life. The dental team has to be considerate and understand the severity of the condition before providing any instructions or discharging the patient from the clinic.[28] A higher incidence of COVID-19 infection in older dementia patients also carries a higher risk of COVID-19 infection-related mortality. Although accurate data of the mortality rates linked to Alzheimer's Disease are still lacking, patients with Alzheimer's Disease have a greater rate of hospitalization, access to emergency rooms, and mortality from COVID-19 infection than elderly individuals without Alzheimer's.[75]

2. **Arthritis:** Arthritis generally is defined as an inflammation of one or more of joints. The most common forms are osteoarthritis that impact cartilage and rheumatoid arthritis that is considered to be an auto-immune disorder. The chief symptoms are joint pain and stiffness, which typically worsen with age. The sitting posture in a dental chair can be painful for the patient and must be corrected accordingly. There are specific pillows available (Figure 1) to provide extra support for the patients and make them more comfortable during their dental appointments.[29]



Flowchart based algorithm for treating patients during COVID-19 pandemic.[80]

Figure 1.

3. **Congestive Heart Failure (CHF):** CHF, also known as "heart failure," occurs when heart muscles do not pump blood properly. Certain medical conditions, such as coronary artery disease and hypertension, gradually impact the heart's functionality to fill and pump efficiently. Every patient with a history of CHF should be made to relax during the whole appointment. Any change in posture or any procedure should be explained in advance so as to reduce moments of stress or even momentary panic.[30]

   There are substantial links between COVID-19 and Heart failure that go beyond pathophysiology. First and foremost, the COVID-19 pandemic affected hospitalization for heart failure (HF): a decline in HF hospital admission has been well documented, and this may have an effect on HF mortality. Second, people hospitalized for COVID-19 frequently have a history of heart failure (HF). Third, we've demonstrated the significant incidence of heart damage after COVID-19, which is frequently only detected through biomarker analysis. The prognosis can be drastically affected by HF, which may be a short- or long-term effect of COVID-19 inflammatory cardiomyopathy.[78]

4. **Diabetes Mellitus (DM II):** Type 2 diabetes is a chronic condition in which the way the body metabolizes blood glucose, is impaired. This is fairly important to both the dentist and dental hygienist as patients with uncontrolled DM-2 generally suffer with

acute oral infections, periodontal disease and delayed wound healing. It has been shown in the literature that dental teams have a fairly high likelihood of detecting Type 2 DM in undiagnosed cases during initial dental screening.[31,32]

A. Glycosylated Hemoglobin (Hb1Ac) is suggested to be less than 7%

B. Normal Blood Glucose level is considered to be 5-7 mmol/L

i. **Hypoglycemia** (Blood Glucose level < 3 mmol/L):

Signs/Symptoms: Cold, Clammy skin

Management:
- Oral carbohydrate or 50% dextrose (if pt. is conscious)
- Call 911 (if pt. is unconscious)

ii. **Hyperthyroidism** (Blood Glucose level > 15 mmol/L):

Signs/Symptoms: Warm, Dry Skin

Management:
- Hospitalize (if pt. is conscious)
- ABCs, Oxygen or Call 911 (if pt. is unconscious)

Whether people with diabetes are more prone to contract COVID-19 than the general population cannot be determined from the available data. Instead of having a higher probability of contracting the virus, the issue that diabetics confront is that they are more likely to have worse complications if they do. Additionally, the likelihood that someone will have such catastrophic COVID-19 consequences increases the more health disorders they have (for instance, diabetes and heart disease). Additionally, older individuals are more likely to experience problems from the virus.[79]

5. **Hypertension:** High blood pressure or Hypertension (HTN) is a common condition in which the force of the blood against arterial walls is high enough that it may eventually cause health problems. A large number of older adults suffer from some form of HTN taking into consideration that narrowing of the arterial walls may be part of the normal aging process.[33] The dental team's role in screening undiagnosed and undertreated hypertension is very important since this may lead to improved monitoring and treatment.[34] Measuring blood pressure should become part of routine practice in all dental offices, as this may also impact the total amount of epinephrine that can administrated to the individual.[58] Risks among elderly patients as reported by the American Academy of Cardiology suggest "in patients over the age of 60, isolated systolic hypertension is more common, and SBP is a better predictor of cardiovascular risk when compared to diastolic blood pressure (DBP)".[62] Morbidity and mortality from hypertension is expected to increase due to rapid growth of the geriatric population and the high prevalence of hypertension among this group.[62] Blood pressure guidelines in adults is based on average blood pressure taken in a healthcare setting and is categorized into 4 levels: normal, elevated, hypertension stage 1 and hypertension stage 2 (Table 2).[54]

Table 2. Categories of BP in Adults.*[54]

BP Category	SBP		DBP
Normal	<120 mm Hg	and	<80 mm Hg
Elevated	120-129 mm Hg	and	<80 mm Hg
Hypertension			
Stage 1	130-139 mm Hg	or	80-89 mm Hg
Stage 2	≥140 mm Hg	or	≥90 mm Hg

*Individuals with SBP and DBP in 2 categories should be designated to the higher BP category. BP indicates blood pressure (based on an average of ≥2 occasions, as detailed in DBP, diastolic blood pressure; and SBP systolic blood pressure.

6. **Osteoporosis:** Osteoporosis causes bones to become weak and brittle and with post-menopausal older women being at highest risk, osteoporosis-related fractures commonly occur in the hip, wrist or spine.[36] Osteoporosis can lead to bone loss in the jaw and most commonly tooth loss. Delta Dental, in its 2008 report, stated the dentist may be the first health professional to suspect osteoporosis and to refer the patient to their primary physician for further investigation.[37]

   Oral health professionals must also be careful not to place their patients at risk for Bisphosphonate-Related Osteonecrosis of the Jaw (BRONJ) as it potentially can occur following invasive surgeries such as tooth extractions and generalized periodontal surgery. The incidence of BRONJ or medication Related Osteoporosis of Jaw (MRONJ)is much higher in patients who are on or have received intravenous form of bisphosphonate as compared to oral forms for various bone-related conditions.[55] Since bisphosphonates have a half-life ranging up to 10 years,[38] even those no longer on this medication may still be at risk. A detailed medical history for any patient with a diagnosis of osteoporosis along with the dosage, duration and route of bisphosphonate intake should be discussed before proceeding with any surgical procedures.[39]

   Infection and the COVID-19 death rate have a strong positive correlation with vitamin D deficiency. The majority of the world's countries employ glucocorticoid medication to treat COVID-19 patients. Glucocorticoids may hasten bone loss in elderly patients receiving COVID-19 clinical treatment, increasing their risk of developing osteoporosis. The relationships and interactions between COVID-19, glucocorticoids, and osteoporosis should therefore be brought to the attention of clinicians and researchers (especially in elderly patients).[76]

7. **Parkinson's Disease (PD)**: PD is a progressive neurodegenerative disorder caused by loss of dopaminergic and non-dopaminergic neurons in the brain affecting movement, muscle control, and balance as well as several other non- motor functions. The use of even the simplest oral hygiene aids such as toothbrushes, toothpaste, and floss can be challenging for these patients and need be examined in detail. The oral hygiene devices and techniques (Figure 2) may require possible modification by the dentist or hygienist in order to make them more easily usable by the patient.[17,40]

Figure 2.

8. **Stroke:** A stroke is a kind of "brain attack" with the main reason being the death of brain cells due to shortage of blood and deprivation of essential oxygen. This directly impacts the parts of the body under the control of that area of brain that's affected. As a result, speech, stability or other muscle coordination may be lost. Also, these patients may have higher potential for bleeding issues after surgeries depending upon if the patient is on any blood thinners.[41,42]

   Previously, dental practitioners used to generally postpone dental treatment until 6-12 months after a stroke, based on the presumed risk of recurrent stroke. However, current literature suggests that stroke patients including patients with higher risks of bacteremia who undergo dental procedures within one month to six months after ischemic vascular event, were not at an increased risk of experiencing a second event.[56]

Signs/Symptoms:
- Severe headache, mostly affects one side of body
- Visions changes
- Speech impairment

Management:
Hospitalize/call 911

9. **Asthma:** As per current studies, older patients who are diagnosed with mild asthma can demonstrate the same level of breathing difficulties as any younger patient with severe asthma. According to the American Academy of Allergy, Asthma and Immunology, the senior age group represents the fastest growing segment in North America with more than two million cases above age 65 and older suffer from Asthma in some capacity.[59]

   Researchers have examined the connection between COVID-19 and asthma. The great majority of these investigations so far have not discovered an elevated risk of COVID-19 disease severity in asthmatics. Furthermore, there doesn't seem to be any evidence that asthma increases the likelihood of getting COVID-19 disease.[77]

   Signs/Symptoms:
   - Shortness of breath
   - Chest tightness or pain
   - Trouble sleeping caused by shortness of breath, coughing or wheezing

   Management:
   - Albuterol (Salbutamol) (2 puffs)
   - Epinephrine (0.3-0.5 mg IV)
   - Avoid ASA
   - Avoid NSAIDS in cases of persistent or active asthma

   The key for those who have asthma during this epidemic is to continue doing what you have been doing so far, taking your controlled medication as prescribed and notifying your healthcare practitioner of any new symptoms you may experience.

10. **Syncope:** The correlation of older adults and syncope is poorly understood. However, transient loss of consciousness and related falls can be regularly witnessed and is most frequently seen in dental clinics. Approximately, 3% of all visits to the emergency departments are due to syncope and older adults are especially vulnerable to these syncope related falls. It is commonly suggested that mechanisms such as dehydration, dental procedures related fear or stress or patients on hypertensive medications such as diuretics are more susceptible to syncope.[63]

    Signs/Symptoms:
    - Pupil dilation
    - Increased BP and pulse rate
    - Vertigo, weakness

    Management:
    - Oxygen administration
    - Patient should be made to rest in Trendelenburg Position (Figure 3) to increase oxygen flow to the brain

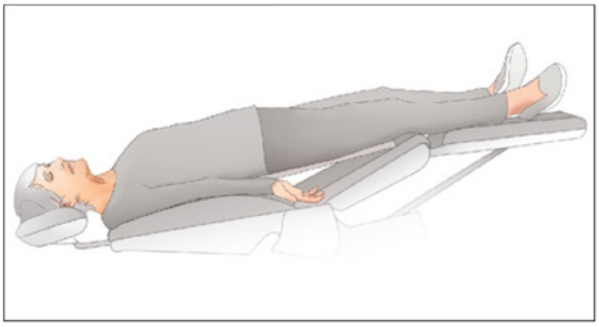


Figure 3.

Medical and Dental Records

Most important, if the patient has a medical diagnosis or is currently on any medications, it is highly recommended for the dental hygienist or even the treating dentist to contact the patient's primary physician or cardiologists to discuss drug regimens and plan optimal patient management before altering any medications. Also, it is suggested that updating medical records should include requesting latest copies of clinical test reports such as INR and patient's current and compete medical diagnoses list, along with other medications.[57] This requires active communication, building trust and frequent engagement with other healthcare

professionals such as physicians, nurses, aides, pharmacists and anyone involved in providing care for the elderly patient. Even a minor fluctuation in the dosage of a patient's current medication can hamper the outcome of the dental procedure. In order to have a better understanding of a patient's dental outcome, a direct conversation with the previous dentist can be beneficial in understanding the behavioral patterns and any modifications in the treatment approach. Of utmost importance is the maintenance of comprehensive and accurate medical and treatment records, as all practitioners are required by law to maintain these records in order to provide evidence of continuity of care as well these records may be subpoenaed in medico-legal or insurance fraud cases.[43]

For wheelchair bound patients, the wheelchair should be moved as close as possible to the dental chair44 for the dental staff to have full access to their dental equipment. In some cases where the patient cannot be transferred to the dental chair, special head and neck support systems (Figure 4) can be employed that will provide support for the patient's neck and head to minimize patient discomfort.

Figure 4.
Source: *Medicaleshop Inc*

The staff should also be trained in understanding the basic concepts of Safe Patient Handling (SPH) and be aware and accountable for providing appropriate assistance during the movement of patients.[45,46] For patients having difficulty standing up or have reduced weight bearing capacities, they should be assisted when moving from their wheelchair to the dental chair and then back to their wheelchair using patient transfer devices or other mechanical, devices. The determination to have either a one-person or two-person transfer should be made considering the staff training and the disability of the patient. Transfer Boards, Pivot Discs, Transfer belts (Figure 5), EZ lift (Figure 6) or Hoyer lifts (Figure 7) can be used by the staff in transferring the patient to or from the wheelchair.

Figure 5.
Source: *Vitality Medical*

Figure 6.
Source: *EZ Way, Inc.*

Figure 7.
Source: *EZ Way, Inc*

Oral Assessment

A patient's teeth can demonstrate the lifestyle of the patient and can perfectly reflect years of trauma from faulty toothbrushing, use of acidic and chemical agents or even eating habits. The appearance and structure of the teeth tends to change with time, and recognizing these patterns is the first step in the oral assessment of the elderly patient. We cannot predict what the oral symptoms will be as everyone is different. However, some of the more common features will be discussed. Often, there are some obvious changes in the thickness of the enamel and dentin, the presence of gingival recession leading to a higher incidence of root caries especially in teeth with crowns or bridges, and even reduced sensitivity to cold or hot. There may be noticeable signs of reduced keratinization, increased xerostomia or periodontal disease leading to loose teeth and subsequent tooth loss.[47] In cases of elderly patients with partial or complete edentulism, the alveolar ridges are most likely to be resorbed or knives edged and often have low success rates with both the fabrication and wearing of dental prostheses.

There are many other factors that can have direct or indirect impact on the oral health of the elderly. Physical and cognitive status, socioeconomic conditions, educational background, personal motivation levels, etc. are some of the aspects that need to be considered before offering extensive treatment options. It's advisable not to schedule elderly patients for dental appointments with multiple procedures planned during a single session.

The ability of elderly patients to handle complicated dental procedures tends to decline with time, particularly with diminishing health status.

The dental team must appreciate these limitations and understand that we still do not possess the '**Golden Key**' to solve all dental problems. Every elderly patient will present with a unique set of conditions that needs to be respected at all times. It is understandable it's easier said than done. However, to become a successful practice that includes the care of elderly patients, it is essential to identify areas of improvement, train the staff and search for innovative ways to provide effective and efficient treatment for the elderly.

Even scheduling a routine dental appointment can prove to be stressful for many older adults. Past experiences or stories shared by other people has the potential to leave a lasting negative impact on their memories. It can be a result of a painful procedure or a mild allergic reaction that can make it harder for them to accept the concept of painless dentistry or latest medical achievements. The next section is intended to shed light of some of the most common allergic reactions that take place in a dental clinic along with its preventive measures before the event can turn into a life threating condition.

Allergic Reactions

Most common signs and symptoms can range from but not limited to the following:[52,61]

- Localized redness
- Pruritis
- Edema
- Urticaria
- Conjunctivitis
- Rhinitis

In case of mild to moderate allergic reactions, administrating Antihistamines such as Diphenhydramine (Benadryl)-50 mg IM is highly recommended.

Potential triggers in dentistry may include:

A. Latex Allergy which is commonly seen in health care workers.
B. Aspirin or ASA hypersensitivity: This is also known as the Samter's Triad or ASA triad or Aspirin-Exacerbated Respirator Disease

(AERD).[60] It is a chronic condition comprising of asthma, sinus inflammation with recurring nasal polyps, and aspirin sensitivity. The treating dentists are recommended to avoid ASA and update the medical records for future references.

C. Local Anesthetic Content allergy
   - Amide or Ester or Both
   - Epinephrine or Levonordefrin
   - Metabisulfite (used as preservative in local anesthetic carpules)

Emergencies

A medical emergency can occur in any dental office, and managing it successfully requires advanced preparation of the entire dental staff. The dentist, with the guidance of Emergency Medical Systems (EMS) professionals, should develop a basic action plan that can be easily followed by all staff members. The main focus here is to manage the patient's condition until he or she recovers fully or until further help arrives. As per the latest guidelines from the American Heart Association (AHA), in cases of an emergency, EMS should be activated as soon as possible followed by hands-on **Cardio-Pulmonary Resuscitation (CPR)**, if required. The goal is to provide continuous oxygenation to the brain to minimize permanent damage. **Every clinical staff member** should have CPR training, and certification should be renewed every two years.[48]

Elderly patients, especially with complicated medical histories, are estimated to be more prone to emergencies in the waiting area as compared to a healthy adult individual. There can be some unexpected events including syncope, cardiac arrests, falls, allergic reactions, hypercapnia, asthmatic attacks, hypoglycemia etc. that require attention as soon as possible to prevent long-term complications.[49] Early recognition of signs of distress by the dental staff can be critical in providing time for the emergency team to arrive and initiate rescue protocols. Every professional who is a part of the dental team should be trained in dealing with mock emergency situations on a regular basis. Simulating emergency scenarios and preparing for unexpected events are great methods for improving not only staff readiness but also developing methodical approaches required during challenging circumstances. Clear and effective communication among the members is crucial during any given emergency.

In 2002, the ADA Council on Scientific Affairs published a report in the Journal of the American Dental Association (JADA) titled 'Office Emergencies and Emergency Kits,' in which they covered the topic in great detail and recommended the most essential drugs to be a part of every dental clinic's emergency kit to facilitate handling of common dental office emergencies. This critical list (Table 3) of medications remains the standard for all dental clinics.

Table 3. Emergency Kit Basics for Dental Practices.[50]

- ✓ Epinephrine 1:1,000 (injectable)
- ✓ Histamine-blocker (injectable)
- ✓ Oxygen with positive-pressure administration capability
- ✓ Nitroglycerin (sublingual tablet or aerosol spray; be aware of contraindications)
- ✓ Bronchodilator (asthma inhaler)
- ✓ Sugar (a quick source of glucose such as orange juice)
- ✓ Aspirin

Emergency kits can also include many more products such as airbags, blood pressure apparatus, blood sugar monitors, ammonia gas, etc. to handle other complicated situations.

Discharging the Patient

There are some precautionary steps that need to be followed even after completion of the dental procedure. At the completion of the appointment, regardless of its duration, the elderly patient should not be allowed to sit erect from a supine posture and walk straight out of the operatory. Taking into consideration

their medical diagnosis and medications, the elderly patient may have a higher tendency for **orthostatic hypotension** when moved from one posture to another in quick succession. This can lead to dizziness and a potential fall either inside or outside the clinic that could lead to serious injury and in rare circumstances even death. These ill-fated situations are avoidable, but unfortunately there have been innumerable cases registered against dental professionals for being negligent in providing care to the elderly resulting in physical injuries of all magnitudes.[51]

The best practice approach would be to change the patient's posture very slowly from supine to erect and continuously confirming the comfort levels of the patient. The patient in most cases will inform the clinician regarding any discomfort, but in cases where patients have cognitive decline or communication problems, their facial expressions should continuously be monitored to analyze any concerns. For body equilibrium to re-establish, they should be asked to sit at least for a couple of minutes before helping them to stand or shift. Any sudden or abrupt motion should be avoided in all circumstances.

As for post-operative instructions, they should preferably be given **both verbally and in writing**. The instructions regarding any potential swelling, post-operative bleeding, post anesthetic trauma or any other dental/medical emergency should be communicated in simple English. The contact number for the clinic during and after hours should be provided in a clear and readable form. It's advisable to have a staff member go through the instructions with the patient (and caregiver if present) to ensure they clearly comprehend the instructions.

Every elderly patient should be thoroughly evaluated before discharging them from the clinic. Their speech, balance and basic understanding of simple instructions should be carefully observed. Any deviation from the baseline vitals should immediately be brought to the attention of the dentist. The patient should be under constant supervision, and in some cases emergency contacts can be requested to pick up the patient after the appointment. These patients in most cases can be expected to have an uneventful recovery after operative or surgical procedures. In cases of severely frail patients, those on anti-coagulants or anti-platelet therapy or with histories of delayed healing may require a follow up call either the same evening or the next morning to check on their status. This is not only vital in ensuring the well-being of the patient but also goes a long way in securing the patient's confidence in the dental staff. All interactions with the patient, and if applicable, their caregivers, and family members as well as any observed changes should be documented in the patient's records for future reference.

Conclusion

With these changing demographics in the elderly population, it's hard for any dental practice to ignore this fastest growing segment of the American population. Older adult patients unlike younger, healthy adults may present with scenarios that challenge clinicians and necessitate closer scrutiny at every visit. There will be some challenging situations but eventually a fulfilling experience not only for the patient but also for every individual associated with them. It requires the entire dental team working together to practice the protocol they need to follow before they call 911 and make sure that the appointment is a success for every elderly patient.

Dental and oral healthcare professionals have several reasons to be concerned with COVID-19, including financial, moral, social, and professional issues. Applying specific coping techniques, such as patient management and infection control tactics, as well as utilizing new technology for virtual interaction with the patient, might allay these worries. It can support the maintenance and improvement of the oral and dental health systems' resilience.[67]

In general, it is excellent that so many dentists have accepted the challenge of combating COVID-19.

Course Test Preview

To receive Continuing Education credit for this course, you must complete the online test. Please go to: *www.dentalcare.com/en-us/ce-courses/ce586/test*

1. Baby boomers are considered to be born between what years?

A. 1946-1964
B. 1955-1985
C. 1980-1999
D. 2001-2010

2. What is the current estimation of the percentage of older adults in the American population today and what are the future projections for 2050?

A. 5%, 35%
B. 26%, 51%
C. 9%, 15%
D. 15%, 17%

3. Geriatric dentistry, or gerodontics, is generally considered to be a part of which division of dentistry?

A. Orthodontics
B. Endodontics
C. Special Care Dentistry
D. Community Dentistry

4. When should the physical evaluation of an elderly patient begin during a dental appointment?

A. Before the patient is being discharged from the clinic
B. As soon as they enter the clinic
C. After evaluation by the dental hygienist
D. After the dental procedures are being completed

5. What are the roles of the front desk staff?

A. Evaluate the physical characteristics of the elderly patient as soon they walk into the clinic
B. Help patients schedule appointments
C. Help patients with their insurance policies and coverage
D. All of the above.

6. Which age group is considered to have the greatest incidence of stroke among the elderly population?

A. 30
B. 45
C. 60
D. 75

7. CPR in medical/dental terminology stands for?

A. Cardio-Pulmonary Resuscitation
B. Creating Positive Relationships
C. Constant Prepayment Rate
D. Caffeine Produced Resistance

8. Which of the following members of the dental team are recommended to renew their CPR license every two years?

A. Dentist only
B. Dentist + Dental Hygienist
C. Dentist + Dental Hygienist + Dental Assistant
D. All clinical staff

9. What is the prescribed concentration of epinephrine in dental emergencies?

A. 1:100,000
B. 1:200,000
C. 1:1,000
D. 1:50,000

10. A sudden dip in the blood pressure of an elderly patient resulting in a sudden change in body posture is known as _____.

A.orthostatic hypotension
B. syncope
C. eczema
D. stroke

11. Post-operative instructions to any elderly patient should always be _____.

A. Verbal
B. Both written and verbal
C. Written
D. Not required

12. How does COVID-19 spread?

A. Coughs and sneezes from an infected person
B. Infected surfaces
C. Food
D. Both A and B

13. What kind of PPE is worn by front-line healthcare providers and other crucial personnel?

A. Masks
B. Gloves
C. Gowns
D. Goggles/Face shields
E. All of the above

14. To prevent the spread of COVID-19, what precaution is taken by dental setup to help the elderly?

A. Making an initial dental appointment through teledentistry.
B. Directly visiting the dental office.
C. Meeting the dentist outside the office.
D. Meeting the support staff.

15. Which of the following best describes COVID-19?

A. It is caused by bacteria.
B. It is a fake disease.
C. It is just like the flu.
D. It is caused by a virus

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Additional Resources

- No Additional Resources Available.

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