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Writing Workshop II

### **Oral Pathology of Common Disease found in Geriatric Patients**

“Being certain that they and I

But lived where motley is worn:

All changed, changed utterly:

A terrible beauty is born.”

- Yeats, 1916

As a student that is new to the clinical experience at New York University College of Dentistry, I'm aware of all of the things that may be encountered while on the clinical floor and general information. All patient care should be the same and equal but arguably most clinicians are probably most scared of treating pediatric and geriatric patients. Although comparable to pediatric, geriatric patients tend to be average sized people in most cases that are a lot more fragile than they would like to think. After living more than half of the estimated lifespan, bones become brittle, skin becomes thinner and chances for disease grow exponentially.

The study of gerontology is geared toward those patients that require special care and treatment. The oral cavity is a reflection of what's going on in the body. As one can imagine, the health of the mouth is the first thing to go if particular care is not taken. The pathology of some of the common diseases that progress with age or are prevalent in the elderly can be directed to the mouth for some answers. The gateway to your body is the mouth and it is a diverse

environment. The oral flora consists of around 700 species of bacteria that are ever-changing and keeping health care providers busy (Aas, 2005).

According to the National Council on Aging, an estimated 80% of adults over the age of 65 have at least one chronic disease (National Council on Age, 2017).

The diseases include but are not limited to hypertension, high cholesterol, chronic kidney disease, Alzheimer's and dementia as well as depression. Diet and lifestyle changes are good for controlling and eliminating the risk of getting these diseases but what about the patients who live a completely healthy lifestyles but are predisposed to these diseases early on. Genetics play a large role in some of these diseases if not all. I would like to expand and look at other diseases that can be reflected in the oral cavity of an elderly patient.

These particular diseases all have an effect on how a patient can be treated and if they can be treated at all. I will be looking at their specific pathologies and morphologies as it pertains to the oral cavity.

Although I am not an elderly patient, I treat them. On a more personal level, I know them and eventually will be one. If there is something that can be identified early on to prevent common diseases via the oral cavity flora I would love for detection of these forms to become common practice. I'm sure, as I go along more questions will form. But, similar to my quote, a beautiful mouth is motely and can cause complications elsewhere.

“Good men, the last wave by, crying how bright  
Their frail deeds might have danced in a green bay,  
Rage, rage against the dying of the light.

Wild men who caught and sang the sun in flight,  
And learn, too late, they grieved it on its way,  
Do not go gentle into that good night.

Grave men, near death, who see with blinding sight  
Blind eyes could blaze like meteors and be gay,  
Rage, rage against the dying of the light.

Age"

-Dylan Thomas

Getting older means gaining wisdom and knowledge but it also, unfortunately, means heightened risks of diseases and disorders. Some diseases progress quickly and others can be controlled well enough to be almost undetected. Either way, loved ones will tell you to fight for life or, "rage, rage against the dying of the light, age."

Some of the diseases are genetically inherited and others are not. How does treatment change for patients with common geriatric diseases and what does their oral environment consist of pathologically?

Alzheimer's disease and dementia are two diseases that are often grouped together that are found in geriatric patients. Alzheimer's disease causes memory loss progressively over time and decrease of mental functionality. It can't be cured but, can be managed and treated if caught early. Alzheimer's classified as a degenerative brain disease. Dementia also causes memory loss but affects daily mental tasks generally and can be caused by arteriosclerosis, which means it can be prevented with lifestyle changes. Alzheimer's is a type of dementia, a neurocognitive disorder.

As the sixth leading killer in elderly people, Alzheimer's leaves an estimated 5million people suffering the majority being over 65. When diagnosing

the disease lab results will indicate neuritic plaques and neurofibrillary tangles in the brain in addition to synaptic loss. Patients experiencing the disease are either genetically predisposed, female, older in age or have experienced brain trauma. (Ribeiro, 2012)

As the disease progresses, the ability to do daily life activities diminish including basic oral health care causing disease in the oral cavity. Majority of patients have caregivers that may not be able to complete oral hygiene instructions completely.

The plaques present consist of the protein beta-amyloid. The research done previously is indicative that there is a connection between periodontitis and the disease, which is the progression of dental disease causing bone loss and cognitive impairment producing beta-amyloid. Meaning the presence of disease in the oral cavity can alter the relationship that is causing the maturation of Alzheimer's disease. (Gil-Montoya, 2017)

Some of the same bacteria found in the mouth are found in the brains of Alzheimer's patients. Spirochetes are twisted bacteria that are primarily found in the disease as they have the ability to penetrate and latch on to cells. They specifically target nerve tissue and influence the environment of inflammation seen in AD as well as forming the previously mentioned lab indicators. (Mutalik, 2017)

“ I often say now I don't have any choice whether I have Parkinson's, but surrounding that non-choice is a million other choices that I can make... The moment I understood this- that my Parkinson's was the one thing I wasn't going to change- I started looking at the thing I could change, like the way research is funded.”

-Michael J. Fox

Parkinson's Disease also affects many geriatric patients as a multisystem neurological disorder. There are a few types of nerve cells that predisposed to the disorder. There are a total of 5 stages of Parkinson's Disease used by physicians currently. The Hoehn and Yahr Scale defines the disease's progression. The early phase, which is considered mild, is confined to stages one and two. The first two stages of mild symptoms consist of unilateral movement and then bilateral movement by stage two. These symptoms include but are not limited to, tremors, clumsiness, effects of facial expression and blinking, and speech. Mid Stage of Parkinson's or stage 3 advances to moderate with loss of balance and alterations in movement affecting involuntary movements in addition to the other symptoms. Once the disease has completely advanced it is labeled as severe in stages four and five. At this point the disease becomes debilitating, affecting the patient's ability to walk/stand without assistance and in the last stage hallucinations and delusions occur (Downward, 2017).

Patients with Parkinson's will experience progression at different rates and may have all symptoms at once or may develop some of the early phase symptoms later in disease progression.

The formation of Lewy bodies and neurites are the initiators of the disease. Lewy bodies are a collection of abnormal proteins formed in nerve cells and Lewy neuritis is atypical neuritis that has alpha-synuclein filaments like Lewy bodies.

Early stages include the medulla oblongata and olfactory bulb. mid-stages is where it begins to affect the midbrain and forebrain causing pathological

changes. In advance stages, the disease has taken on a mind of its own infiltrating the neocortex (Braak, 2004).

Patients can live anywhere from 10 to 20 years with Parkinson's disease but it can be disheartening to watch someone deteriorate. Their health progressively gets worse and at different rates.

The quality of life also diminishes with the person itself. At some point, the patient will become completely co-dependent when partaking in daily life activities.

Orally patient's health will deteriorate. It was found that patients with Parkinson's disease had a higher incidence of caries, periodontal disease and will have significantly fewer teeth than their counterparts without the disease. The increase of caries can be directly related to the reduction in salivary flow (Persson, 2009).

Alterations in the ability to brush their teeth properly occurs, and to my surprise with the disease come cravings. Parkinson's patients crave sweets, which also generally changes their oral flora and the risk of caries is heightened. Once diagnosed many patient's oral health becomes minor in terms of the progression of the disease. The bacteria present can also aid in the progression of the disease but that has not yet been researched (Schwarz, 2006).

Medications that are marketed to treat some of the symptoms are carbidopa and levodopa. These two medications work together to bring dopamine to the brain and prevent it from breaking down before getting the brain (Coon, 2012). Glossodynia or burning mouth syndrome has also been linked to

Parkinson's specifically related to the unregulated levels of dopamine when taking these medications.

Discontinuing the medication worsened Parkinson's symptoms but relieved the burning mouth syndrome. My thoughts are that is medication taken to relieve symptoms are causing one issue it could be a specific ingredient or it could be the presence of a specific bacteria present in the oral flora creating an adverse reaction

Parkinson's directly affects the way of life and general oral hygiene. But, what triggers the abnormalities to occur? We know how it happens but not what causes it. As said by Fox, once you have the disease you can't do anything but research.

"We can't avoid age. However, we can avoid some aging. Continue to do things. Be active. Life is fantastic in the way it adjusts to demands; if you use your muscles and mind, they stay there much longer."  
-Charles H. Townes

Another part of the aging process includes loss of muscle mass and shrinkage of muscle size. As we get older, some people become less active causing the water found in tendons to decrease. Generally speaking, a decrease in bone density is seen as early as 30 years old, occurring faster in women particularly after menopause. Sarcopenia is a gradual loss of muscle in density and strength causing slower reactions (Villa-Forte, 2018).

Like all other cells, muscles and bone cells are consistently forming and breaking. Osteoblasts are used for forming bone cells while osteoclasts are used from resorption. The cells are regulated by other hormones and vitamins.

When thinking of changes in muscles and bones in geriatric patients the diseases that are common is osteoporosis. Both of these diseases are progressively fatal.

Osteoporosis affects over 200 million people and is the disease directly related to loss of bone mass with the United States having one of the highest diagnoses (Trace, 2014). Without a fracture osteoporosis is asymptomatic but weight gain, stress and bodily functions that would cause growth are all causative factors.

Race, sex, and lifestyle all affect bone mass throughout a lifetime. As mentioned, 30 is the peak age before a decrease in mass is noticed. But in most cases, Black people have higher muscle density than that of Whites and Asians (Bolster, 2018). To monitor bone loss, dual-energy x-ray absorptiometry is used, and patients over 65 are typically screened in addition to blood tests for active hormones and vitamin d levels. For patients experiencing bone loss, or trying to prevent a recommended to increase calcium and vitamin d.

Periodontitis is the bone loss in the periodontium of the mouth and is connected to osteoporosis. Gingivitis progresses into periodontitis when oral bacteria go undisturbed and bone loss occurs progressively in the presence of the bad bacteria.

Research has shown a small connection between the two types of bone loss through x-rays taken through the body. X-rays of the mandibular bone showed a decrease in bone density in women over 50. Researchers were able to



draw the conclusion that once having osteoporosis, loss of the periodontal bone will occur simultaneously with other factors. (Hildebolt, 2014).

Osteoporosis is directly connected to age while the periodontal bone loss is associated with the disease. Which forms a new question of if the oral cavity the cause of progression or just the part of the body affected by the geriatric disease?

On the other hand, Amyotrophic lateral sclerosis or ALS is a degenerative neurological disease not affecting the bone but the muscles but the neurons that control them. Although it isn't common as a disease, ALS /Lou Gehrig's disease occurs at any age primarily once a senior and genetically related.

ALS can cause muscles cramps, weakness, twitching of muscles in the face and limbs, and digestive issues such as chewing and swallowing. Simple tasks become more difficult as the disease progresses.

Diagnosis is based on symptoms of the patient and via eliminated other diseases with an MRI and using electromyography to detect neuron activity of muscle fibers. The cause of ALS isn't known yet and there are only medications that are used to reduce progress and minimize damage.

It is clear that this disease will cause a significant decrease in both general and oral health, as the person will eventually lose all ability to function similar to other neurological diseases mentioned.

"Many people assume the diseases that kill us are pre-programmed into our genes. High blood pressure by 55, heart attacks at 60, maybe cancer at 70, and so on... But for the most of the leading causes of death, our genes usually account for only 10-20% of the risk."

-Michael Greger

A disease that we are all unfortunately aware of is cancer. Cancer has fought our family, friends, and members in our communities with some fights ending fatality. Cancer has, unfortunately, become like a common cold for adults after a certain age and one of the leading causes of death. Breast cancer, colorectal, prostate, pancreatic, and lung cancers all largely affect our geriatric community.

Throughout life, our cells go through phases with us with each cell having a lifespan of about 120 days before cell death and a new cell is created. During mitosis, the cells make copies of themselves, but in this process, errors can occur and when recognized the cell goes into cell death or apoptosis. The cell goes through checkpoints during replication to make sure there aren't any mutations during the G1/S and G2 phases using proteins.

Two of the proteins that were stressed during my semesters taking cancer biology, cell biology and gene expression and control were p21 and p53 (Podust, 1995). Both of these proteins are key factors in either promoting or inhibiting apoptosis in conjunction with other proteins. P53 is also known as the guardian of the genome because it stabilizes and mediates tumor suppression (Efeyan, 2007).

One of the most common cancers, breast cancer can be divided. It can be divided into the common carcinoma that affects connective tissue or the less common, sarcoma that derives from epithelial cells of the lobules and ducts. BRCA genes are a set of genes that are directly correlated with cancer in

women, specifically breast and ovarian cancer. This gene can be inherited from either parent. DNA damage of the gene that can't be repaired is what results in cancer. By the age of 80 at least 72% BRCA1 and 69% of women who inherit BRCA2 will develop breast cancer.

To many peoples surprise, it is the same BRCA mutation that causes some cancers in men. BRCA2 is more likely to cause prostate cancer in men, as well as breast cancer. Men and women alike with both BRCA genes are at an increased risk of having pancreatic cancer as well (Tai, 2007).

A type of cancer that is common in people that have a long history of using tobacco is lung cancer. Lung cancer often is seen in patients that are in their sixties and seventies. Also divided by type, there is small cell and non-small cell lung cancer. Small cell is the more aggressive of the two typically spreads to the bones, liver, and brain causing the patient to live typically around a year after diagnosis. Non-small cells account for less than 15% of lung cancers it can be adenocarcinoma, squamous cell carcinoma or large cell carcinoma. P53 has also associated with lung cancer with EGFR and KRAS gene (GHR, 2018).

Not as common but most closely correlated to oral health is oral cancer or cancer of the head and neck. Some of the major risk factors for oral cancer are lifestyle based similar to lung cancer. But, somewhat more recently a connection has been drawn between the ISG15 gene and oral tumorigenesis (Sumino, 2013).

Cancer is a disease caused by a genetic mutation of cells causing expression or inhibition of specific genes but it can be influenced by lifestyle if

present. In terms of how this may affect the geriatric community is are the side effects of treatment, not so much cancer itself. Chemotherapy and radiation therapy are the two primary options for cancer treatment. Radiation therapy is a little more specific than chemotherapy, but both can destroy healthy cells as well.

Some of the side effects are difficulty swallowing, swelling, and nausea/vomiting. Swelling directly can affect the oral cavity inflammation can potential cause gingivitis. Although nausea and vomiting does not occur frequently, the acid erodes the enamel surface.

I originally thought that oral health would have an effect on the majority of geriatric diseases but my mind is changing. It seems like the majority of diseases affect the oral cavity or the patient's inability to follow oral hygiene practices is limited

“Happiness doesn’t come from being rich, nor merely from being successful in your career, nor by self-indulgence. One step towards happiness is to make yourself healthy and strong while you are a boy so that you can be useful and so you can enjoy life when you are a man.”  
-Robert Baden-Powell

Some diseases that the geriatric community may face are not brought on genetically but many years of bad lifestyle choices. Some of the choices made are years of smoking, drinking alcohol, not being active and poor eating habits.

These diseases include chronic obstructive pulmonary disease and heart disease. COPD is a group of lung diseases, which can include chronic bronchitis and or emphysema. While heart disease is a little broader including vessels, clots, and structural problems. Both diseases can end fatally.

COPD is the result of long-term exposure to toxic agents in cigarette smoke causing obstruction of airflow and inflammation in the lungs. Chronic bronchitis is when the lungs form large amounts of mucus while emphysema causes obliteration of the lung tissue.

Pathologically, in the airways, there are changes that occur in disease. Within the proximal airways that tend to be larger in size than the peripheral airways, there is an increased number of macrophages and T lymphocytes, as the diseases progress neutrophils will increase, the bronchial gland becomes enlarged creating large amounts of mucus. In the peripheral airways, there are also increased numbers of T lymphocytes and macrophages as well as B lymphocytes and fibroblasts. These type of cells increase inflammatory response creating a different pattern. Cigarette smoke specifically activates the inflammatory response causing fibroblasts to get activated making errors in cell repair (MacNee, 2006).

In terms of emphysema specifically, there is an imbalance that causes the destruction of alveolar wall cells resulting from the release of proteases.

Patients with COPD experience systemic inflammation and skeletal muscle waste limiting their ability to participate in activities. These patients are also at risk for the other disease mentioned, cardiovascular disease. Some other systemic features linked are anemia, osteoporosis, depression, and anxiety.

Heart disease and cardiovascular disease are two terms that are used interchangeably. These two terms are generalizations to refer to the cause,

atherosclerosis, which is the buildup of fatty plaques. When the plaque ruptures it then allows blood clots to form which limits blood flow.

Although smoking and poor diet are risk factors for heart disease, family history does play a large role as well. Many complications can occur with heart disease such as heart failure, stroke, and/or cardiac arrest. Heart defects also fall under heart disease, but cannot be cured or prevented.

For many years the relationship between heart disease and the oral health has been connected. There is some research that suggests heart disease is not indicative of oral health disease but the mediators are the actual direct cause of periodontal disease. Mediators like poor diet and tobacco are those that were pointed out (Joshipura, 1996). But, in terms of COPD, my logic would tell me there has to be a direct correlation with periodontal disease. The patient most likely had periodontal disease prior to COPD because of years of smoking but the inflammation of the disease in conjunction with the medication that most likely has dental implications is the perfect cocktail for the disease. Researchers believe that oral infection may be the cause of the progression of COPD (Prasanna, 2011).

Looking at patients with COPD over an extended period can be a determining factor in which came first, periodontal disease or COPD. Patients with COPD and heart disease are not to be treated as the average patient. The amount that can be done in one visit and how it can be done differs greatly. Home care becomes a priority for these patients in addition to changes in lifestyle. But poor lifestyle is what got them here in most cases so how do I

encourage my patients, especially an older patient who may be ok with losing all of their remaining teeth?

“The fear of death never left me; I couldn't get used to the thought; I would still sometimes shake and weep with terror. By contrast, the fact of existence here and now sometimes took on a glorious splendor.”  
— Simone de Beauvoir, *Memoirs of a Dutiful Daughter*

In COPD, patients experience exacerbation of symptoms and function of their lungs making is continuously one of the leading causes of death worldwide. Some of these symptoms cause the patient to rely on long-term oxygen therapy (Garcia, 2003).

Majority of patients living with COPD have a comorbid disease so lifestyle change is necessary to extend their lifespan. The issues that I've found in my research, is that patients don't necessarily understand the disease. It seems like they are told these things need to change because of this disease. They are told to change and put on a bunch of medication. A lot of patients obviously don't adhere to the changes and additions of medication causing reoccurring hospital visits (George, 2005).

Besides smokers, I found that people like cooks, laborers consistently exposed to dust, smoke and or fumes are also susceptible to COPD. For these type of people, they may not have much of a choice if exposure is apart of their job. Do you tell them they need to quit their job if they are still working or that they shouldn't cook for their families any longer?

There is an emphasis placed on oral hygiene in patients with COPD because bacteria can travel to their lungs if periodontal disease is an issue. The medications they are placed on also potentially cause dry mouth and candidiasis,

which puts the patient at risk for caries amongst other things. While being treated patients also should not be place laying down because of difficulty breathing and the cavitron is not it be used. The cavitron does reduce bacteria for patients with periodontal disease causes more harm than good in patients with COPD (Delvin, 2014).

Home oral hygiene will play a large role in minimizing bad bacteria in the oral flora. Education for these patients is key to making these life changes.

For the patient that has COPD and osteoporosis the chances of bone fracture are heightened immensely. Kyphosis can cause a vertebral compression fracture in patients with osteoporosis. Kyphosis is the rounding of one's spine creating a "hunchback". This is common in most women and causes a loss in height and impairs lung function. So if you develop kyphosis after having COPD it creates a larger issue. The fractures caused by the osteoporosis will also decrease the mobility of the patient.

Patients that have a vitamin D deficiency also play a role in contributing to osteoporosis in COPD patients. It is common for COPD patients to be deficient in the vitamin, which plays a role in bone cell regulation. Majority of these patients have poor lifestyle habits, which attribute to the deficiency such as, bad eating habits, smoking and lack of sun exposure. Smoking accelerates skin aging, which prohibits the absorption of vitamin D naturally and circulation.

Lack of vitamin D due to diet and lifestyle can cause and progress osteoporosis as well as periodontal disease. Changes are needed early on with



these patients to prevent other diseases and even death. This starts with educating your patient.

“Age has no reality except in the physical world. The essence of a human being is resistant to the passage of time. Our inner lives are eternal, which is to say that our spirits remain as youthful and vigorous as when we were in full bloom. Think of love as a state of grace, not the means to anything, but the alpha and omega. An end in itself.”

— Gabriel García Márquez, *Love in the Time of Cholera*

Getting older causes health generally to deteriorate. Things will change both physically and socially. The health of those around us will begin to change and their lifestyle choices will begin to affect them as well.

Geriatric patients face their spouses, siblings and friends potentially passing away in addition to their own health issues as life is declining. This can become something very hard to cope with for some people. Death becomes normal with age but doesn't make it easier to deal with.

Geriatric depression is both a mental and emotional disorder that is considered subsyndromal symptomatic. Subsyndromal symptomatic depression is not as severe as what typically can be described as depression but still can ultimately result in suicide. Depression can be genetically related but is normally caused by low brain chemicals and or life events.

Besides getting older, there are many other adjustments the geriatric community has to make. They have to live on fixed incomes and transition into retirement all while finding activities that will keep them busy. Some are forced into retirement before they are ready because of inability to keep up with technology and the workload or just are simply pushed out by younger superiors.

Depression can cause them to have more ailments, moments of sadness, isolation, and issues with sleep in addition to many other problems. Some of the physical pain experienced in geriatric depression can be unrelated to any pre-existing conditions.

Medication, lifestyle, and people around are the best treatments for depression. For the elderly in particular, art therapy and psychotherapy have proven to be a helping with depression (Krans, 2017).

SSD often goes underdiagnosed and untreated because it is seen as less important than many other life-threatening diseases. Yet, depression affects one in three people over the age of 75 and with the patient being well aware that their health is not excellent. All healthcare professionals should perform screenings for depression, especially while treating an elderly patient that may not have a family (VanItallie, 2005).

Depression also affects the general hygiene of geriatric patients, as daily activities become a burden. The dental professional or those directly associated typically will be the first to notice because they see the patient most frequent unless the patient has an illness that requires consistent monitoring. Depressed patients typically do not perform daily oral hygiene practices. Lack of oral hygiene as we know is the primary cause behind rampant caries and periodontal disease in addition to a poor diet (Friedlander,2003).

Many of the disorders and diseases I've researched this summer all have some level of preventative measure that can be taken. But, aging is one thing no

one can avoid. We are destined to get old but not necessarily sick. More than ever not I know education is really an essential part of all aspects of life.

I've talked to quite a few geriatric patients, and you'd be surprised the things they never knew. We also live in the time of the internet and research. With information at your fingertips, there isn't a reason to grow up uneducated. But, for those who are already in the aging process, it's never too late to learn.

I've talked to 5 dynamic people over the age of 60 this summer. All from different walks of life and different ailments. After picking their brains now I'm left with the question of how can I help? And I think the answer will be simple... education.

I could work out daily, eat close to perfect and never partake in smoking or drinking yet, if I have poor oral hygiene I will most likely form some type of disease intraorally. As the mucosa is semipermeable my body would have direct contact to all sorts of bacteria making me more susceptible to disease in the long wrong. But developing the proper oral hygiene practice could save my life. May it be changing my tooth brushing method, allowing more time to brush all surfaces, flossing frequently or introducing fluoride as a preventative measure; all of these will promote the healthy life of any given patient. Patient education is the answer to solving majority of diseases.

If I give someone a visual or show them an example saying, "if you do this, this will happen." Most patients make take it into account and at least think about changing some habits.

As a health care provider I also have to be encouraging without being pushy and overbearing. Lifestyle changes take time and who am I to limit a patient as to when the change should occur. All I can do is inform and share data.

“Learning is the beginning of wealth. Learning is the beginning of health. Learning is the beginning of spirituality. Searching and learning is where the miracle process all begins. “

-Jim Rohn

Patient 1: Male, 62

This patient has an extensive medical history. He has atrial fibrillation and had a defibrillator placed a few years ago. In addition to a-fib, he also has high blood pressure and high cholesterol. The patient is well aware of all of his conditions and maintains a poor diet and frequent sugary drinks. Mentally the patient is also suffering from depression but is not being clinically treated because he thinks it makes him weak. His depression stems from the recent loss of his mother and a bad car accident following a few months after. The car accident left him with neurological issues, joint and back pain that also is not being managed.

Two years ago the patient began making oral health a priority but it was too late and his visit resulted in a half mouth extraction. The patient now wears a complete maxillary denture.

I'm aware that fluoride was not particularly popular in toothpaste and mouth rinses during the time of the patient's childhood. He brushed but the importance of flossing and other oral hygiene practices were not of importance in the household. His first

dental appointment that he can remember was at the age of 14. By the age of 14, the entire permanent dentition has fully erupted. This is also the age where pubescent hormonal gingivitis is prevalent. Most likely as his health generally declined his gingivitis progressed to periodontitis. The thing that pushed him to go to the dentist was his wife and her complaints regarding his breath.

Patient 2: Female, 70

My next patient has been living with lupus for the last 40 years in addition to heart disease, arthritis, fibromyalgia, high blood pressure and high cholesterol. All of her diseases have left her unable to work and properly care for herself especially in the event of a lupus crisis.

Although the patient has a considerable medical history she is well aware of the need to take care of herself. At the age of 70, the patient has maintained nearly her entire dentition. Of the teeth that are missing, none are anterior teeth.

She grew up in a household with 8 siblings but hygiene was strongly enforced. Fluoride wasn't popular but they went to the dentist and brushed daily. This patient does not have the best diet, frequently drinks Pepsi and has a major sweet tooth. But, education in terms of oral hygiene most likely attributed to the maintenance of her teeth.

Patient 3: Female, 59

This patient has been a smoker for over 30 years. At the age of 50, she was diagnosed with type II diabetes. Once diagnosed the patient made the effort to

watch her diet and made effort to exercise. After her diagnosis, it was then found that the patient had sciatic which limited the amount of exercise the patient was able to partake in.

The patient says she loves to eat Lay's potato chips and Bazooka Bubblegum but had to make an adjustment of her consumption of both.

She recently had a full maxillary extraction. She started with a partial denture but the teeth that were used as the post had a poor diagnosis. The partial denture lasted 1 year before the patient was experiencing class III mobility. Smoking attributed to the progression of severe periodontitis. Instead of opting for another partial denture the patient opted for the extraction and denture.

Prior to getting her first set of dentures the patient had extreme dental fear and did not have a great oral hygiene regimen. All of the dental work done to her was never explained and in her eyes painful. Now the patient results in sedation and extractions.

“There is no end to education. It is not that you read a book, pass an examination, and finish with education. The whole of life, from the moment you are born to the moment you die, is a process of learning.”

-Jiddu Krishnamurti

Patient 4: Female, 83

This patient presents as an immigrant from China with an in-home caretaker during the day. She has high blood pressure, osteoporosis, vitamin deficiencies, and anxiety. Her diet is high in starch. Because of the language

barrier, it was hard to communicate with both her and the caregiver. But, it seems the patient was not willing to add any more steps to her daily activities. She brushes once a day. The patient was already placed on periodontal maintenance because of the bone loss she has already experienced but she currently maintains nearly half of her dentition.

Half of geriatric patients rely on caretakers to do daily activities. Majority of them are all not willing to change the way they do things at this point in their lives. For medical care providers, it seems like introducing new practices would be hard but the approach just would need to be unique. In a clinical setting, it could feel like a lecture and overwhelming. The first step to educating geriatric patients is keeping the similar faces around to allow the patient to become comfortable and to build trust. By gaining the patient's trust they are more likely to listen to you. Just like small children you need to introduce things step by step with minimal explanation.

After researching a lot of geriatric diseases a lot of them directly affect the oral cavity. If not the disease, then it is the medication to treat the disease or side effects.

Although there are nursing homes and visiting nurse services, the turnover rate is extremely high. A lot of patients are not lucky enough to see the same faces daily or experience someone who actually cares. For those who are independent, they spend a lot of their time alone.

A lot of senior centers provide activities but it would be nice if they held health fairs. Health fairs are simple and it allows for professions to speak directly to the patient in a less formal setting and it also is an open space to meet other people in their age group in the same circumstances. Tooth brushing techniques could be discussed; oral health aids for those who want to maintain their independence and aids for caregivers as well.

Prior to doing my research, I thought this would be an easy cause and effect scenario. Every case is unique and requires its own specific treatment plan. There isn't a cure all for this topic.

I thought I would be able to narrow geriatric diseases down to one oral bacterium out of over 700. The mouth and the body are directly connected. In most cases, a disease in the oral cavity is directly correlated to a systemic disease but there isn't a way to prohibit them. There is no pill to prevent against aging. Some diseases mentioned can be prevented by living a healthy lifestyle, but aren't completely avoidable. One side effect of most medications are dry mouth, this creates an environment for bacteria to flourish and patients aren't aware they have dry mouth.

Only thing I can say across the board for all of my patients above 65 with some sort of disease that directly affects the oral cavity such as osteoporosis, fluoride or MI paste would be a necessary treatment at all dental visits. I truly believe strengthening the enamel and maintaining a moist environment is key. I believe that is how my patient with lupus managed to maintain her teeth. She



frequently drinks water and uses lozenges as well as keeping up with dental appointments. Prevention and treatment start with education.

Having a van for the elderly like there are for young children would be the perfect start. No student is too old and I'm sure the patients would be happy someone cared enough to teach.

As clinicians our goals should be to be as gentle and sensitive to not only geriatric patients but all patients. Although a lot of the procedures we perform are not the most comfortable we should take time to be the best. Working with other care providers while treating a patient is also a necessity to insure optimal care. We can do something like take weekly painting classes that allow us to work on our dexterity and take a break from our didactic course work.

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