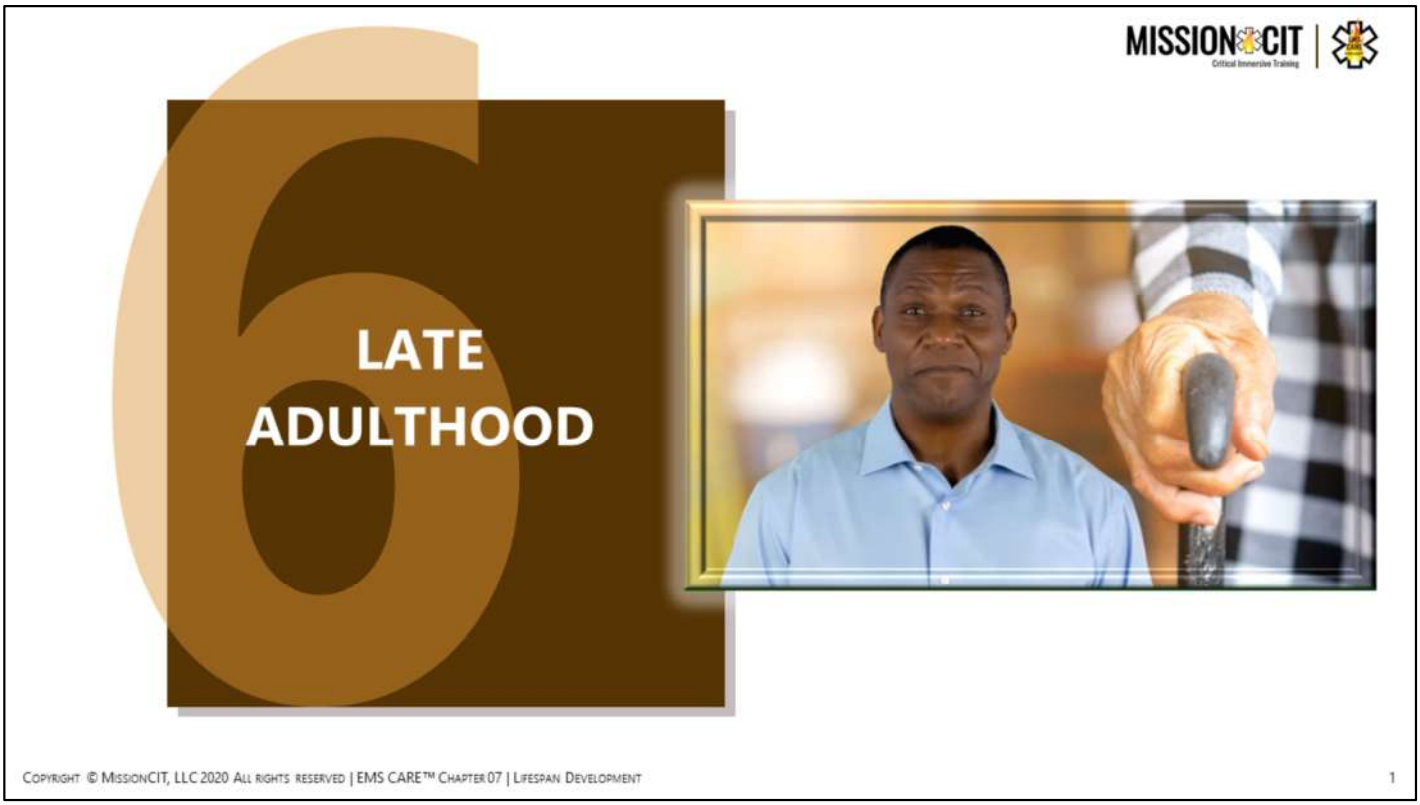
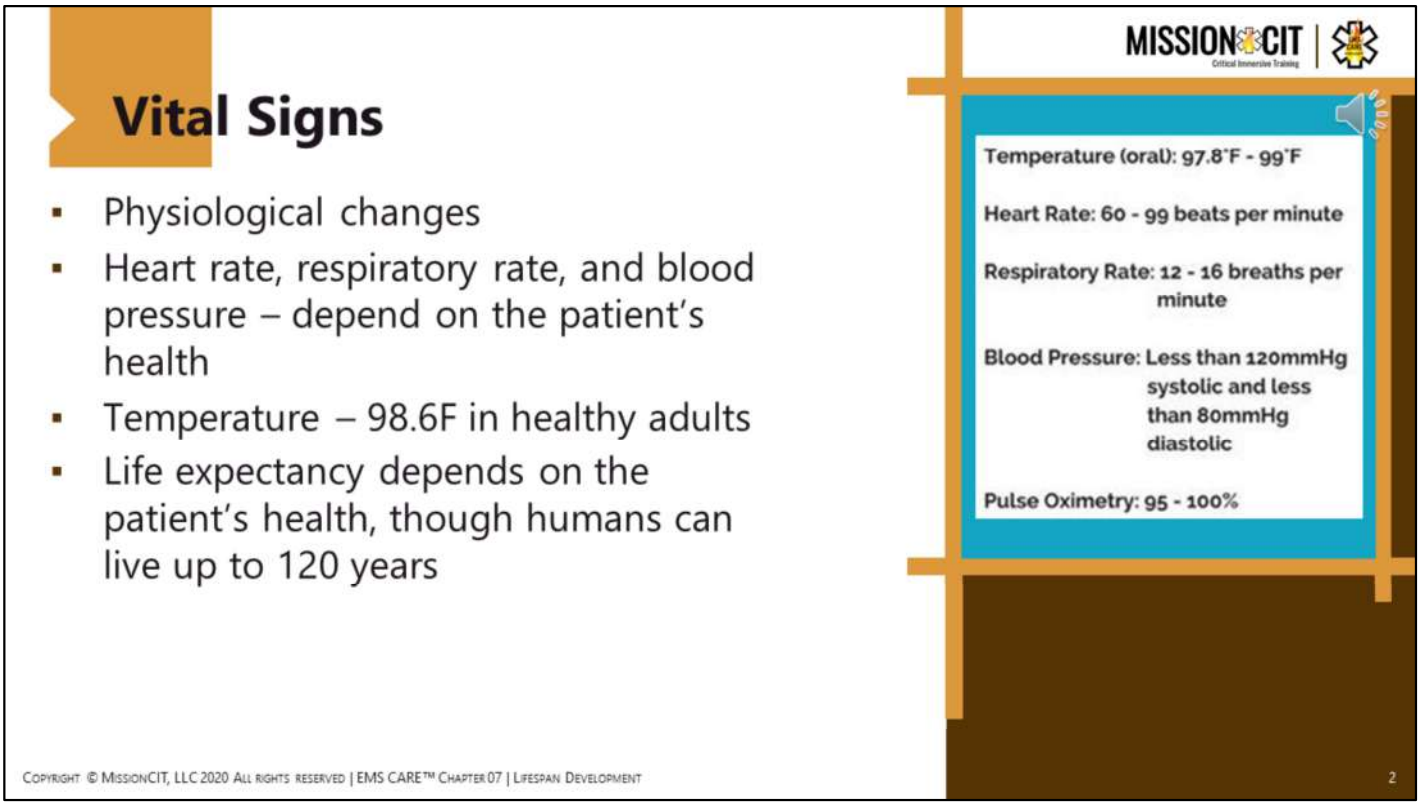


Thank you, Missah!

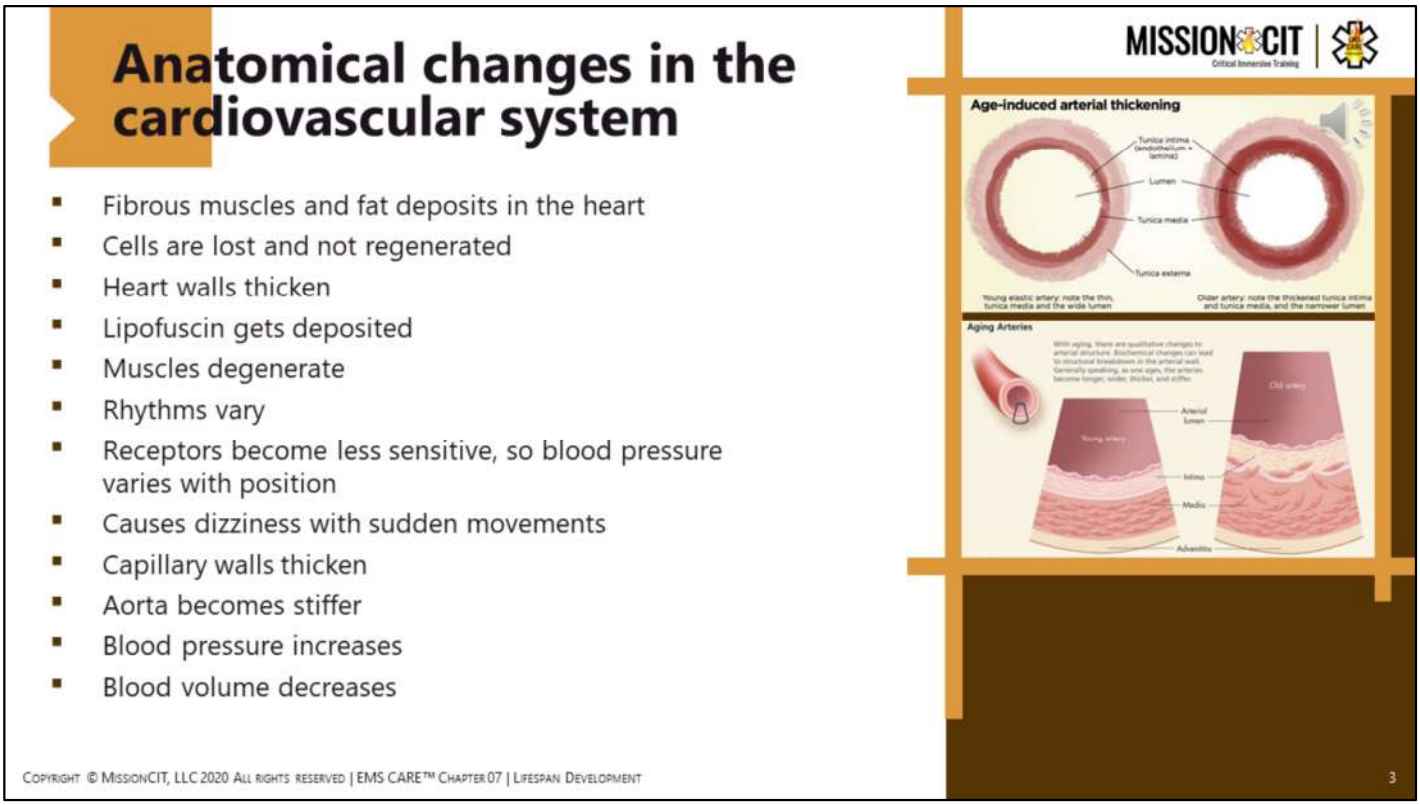
In this last lesson, we will talk about late adulthood which is 61 years and older. This phase of life is often characterized by many health problems and it eventually leads to the death of a person, thereby culminating in the lifespan of an individual.

Let's jump in and see the many challenges that you're likely to encounter in this phase.



Many physiological changes happen during this period and health can deteriorate rapidly. The heart rate, respiratory rate, and blood pressure depend on the patient's physical health and status. The temperature alone will remain at 98.6 degrees Fahrenheit in healthy adults.

Though the human life span is 120 years, expectancy tends to be a lot lesser, depending on the patient's health.



The cardiovascular system consists of the heart, blood, and blood vessels. Let's see how age affects each of these.

The first is the heart, where a natural pacemaker mechanism monitors the heartbeat and keeps it at the required levels. Over the years, some pathways of this pacemaker tend to develop fibrous muscles and fat deposits, and some cells are lost and not regenerated. All these cause a degeneration of the system and leads to a slower heart rate.

Another possible change is that the heart walls thicken, so the amount of blood that the heart can hold reduces.

Further, an aging pigment called lipofuscin gets deposited in the heart, the muscle cells tend to degenerate quickly, the valves become thicker and stiffer, so less blood flows through it, and the rhythms tend to vary due to the presence of heart diseases. Such changes can lead to conditions like atrial fibrillation and a heart murmur.

Besides the heart, there are many changes to the blood vessels and the overall conduction system as well.

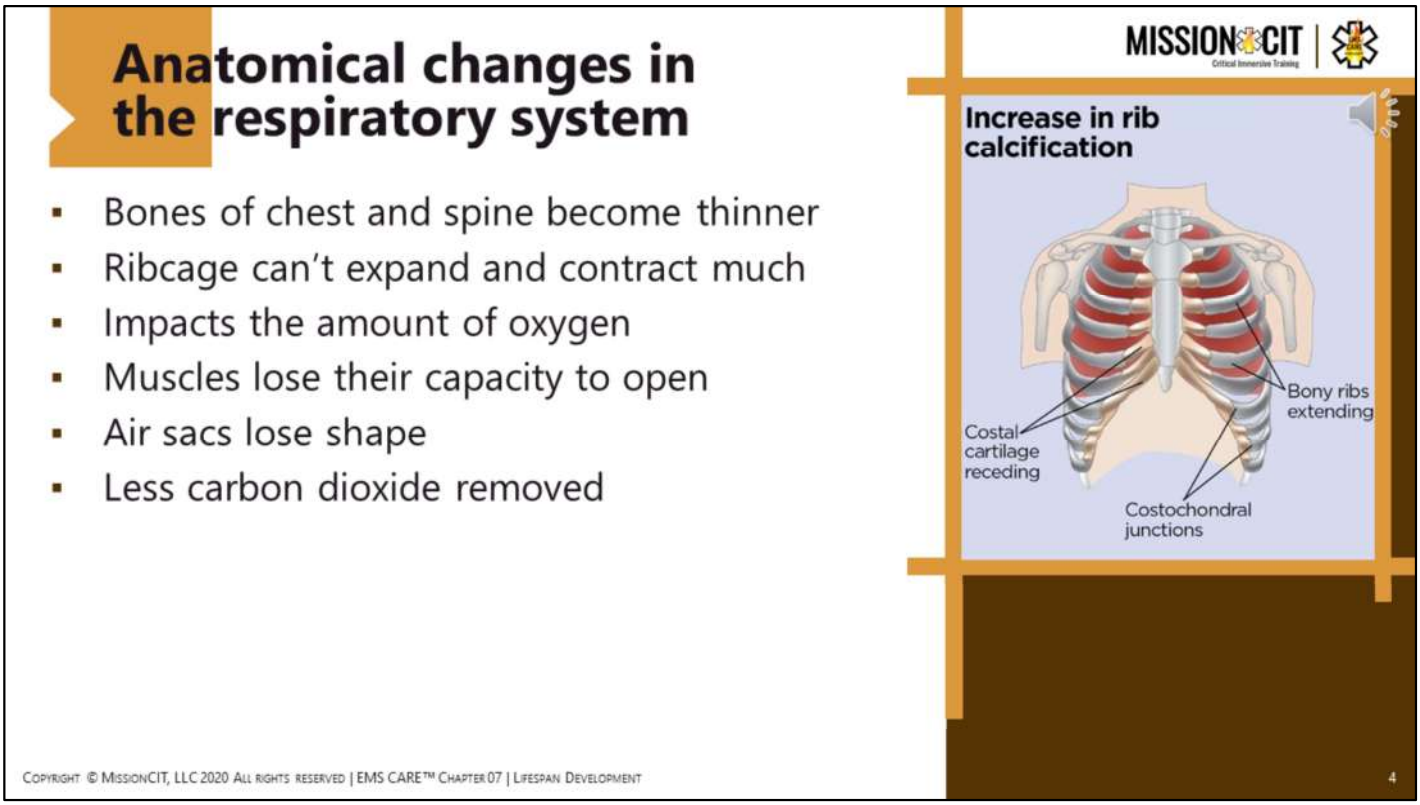
The cardiovascular system contains receptors called baroreceptors that monitor the blood pressure of an individual and ensures that the same is maintained when a person changes position, from sitting to standing. With aging, these receptors become less sensitive, so the blood pressure varies when the position of a senior changes. This can lead to dizziness with

sudden movement changes.

Other than this, the capillary walls thicken and the main artery from the heart called the aorta becomes stiffer. Both these increase blood pressure, so the heart must work harder to pump the same amount of blood. Therefore, blood pressure tends to be higher among seniors.

Lastly, there are changes in the blood itself. The overall blood volume decreases because age causes fluids in the body to dry up. Also, the speed of red blood cell production goes down. Hence, serious injuries and loss of blood take a long time to recover.

Thus, these are some of the cardiovascular changes that occur in seniors because of age.

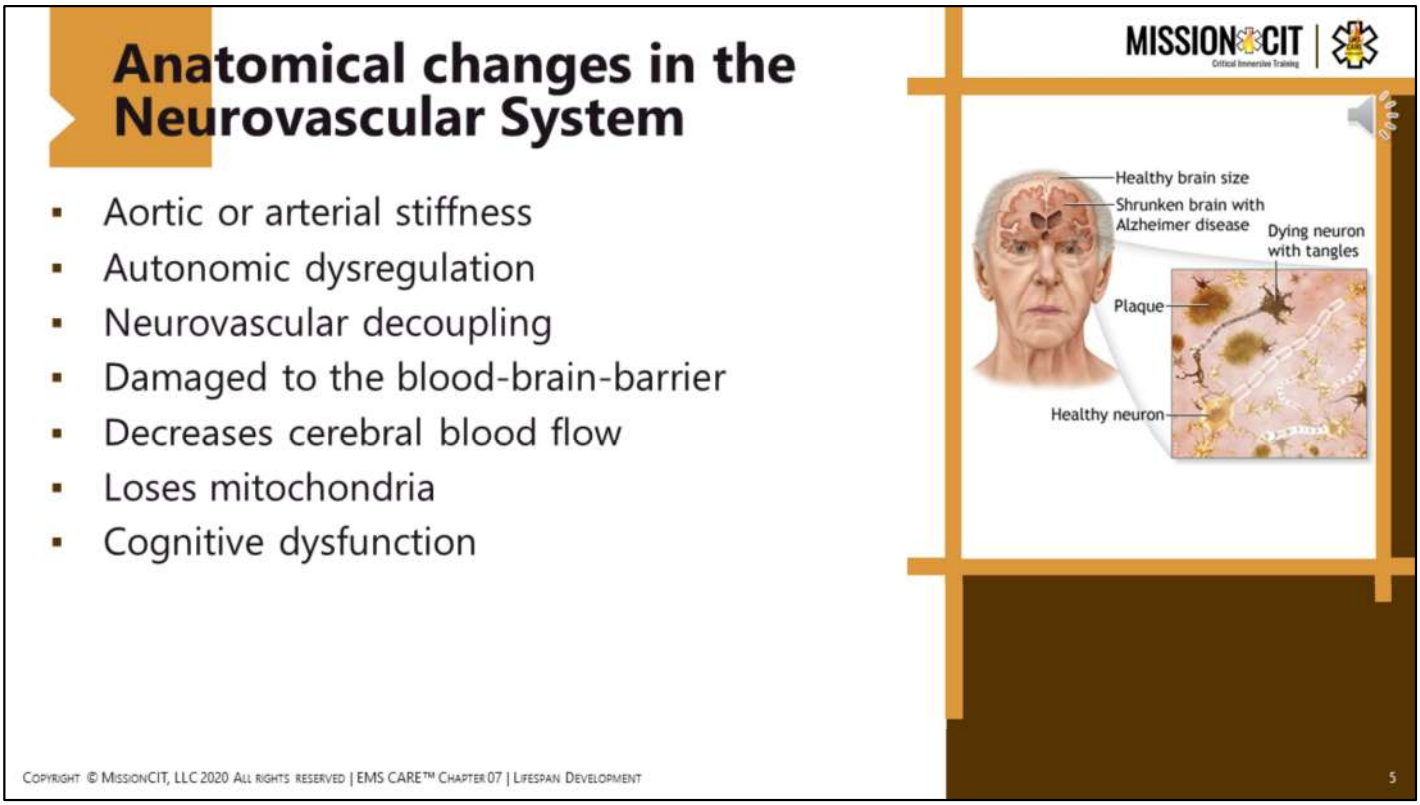


Many changes happen to the respiratory system as people age.

First off, the bones of the chest and spine become thinner and tend to change shape, so the shape of the ribcage becomes altered. In turn, the ribcage cannot expand and contract much during breathing, and this impacts the amount of oxygen that reaches the lungs.

Next, the muscles and other tissues in the airways may lose their capacity to keep the airways open at all times. Also, air sacs will lose their shape and become baggy. Both these changes cause the air to get trapped in your lungs, so the amount of oxygen that mixes with the blood reduces. Likewise, less carbon dioxide will be removed from the blood.

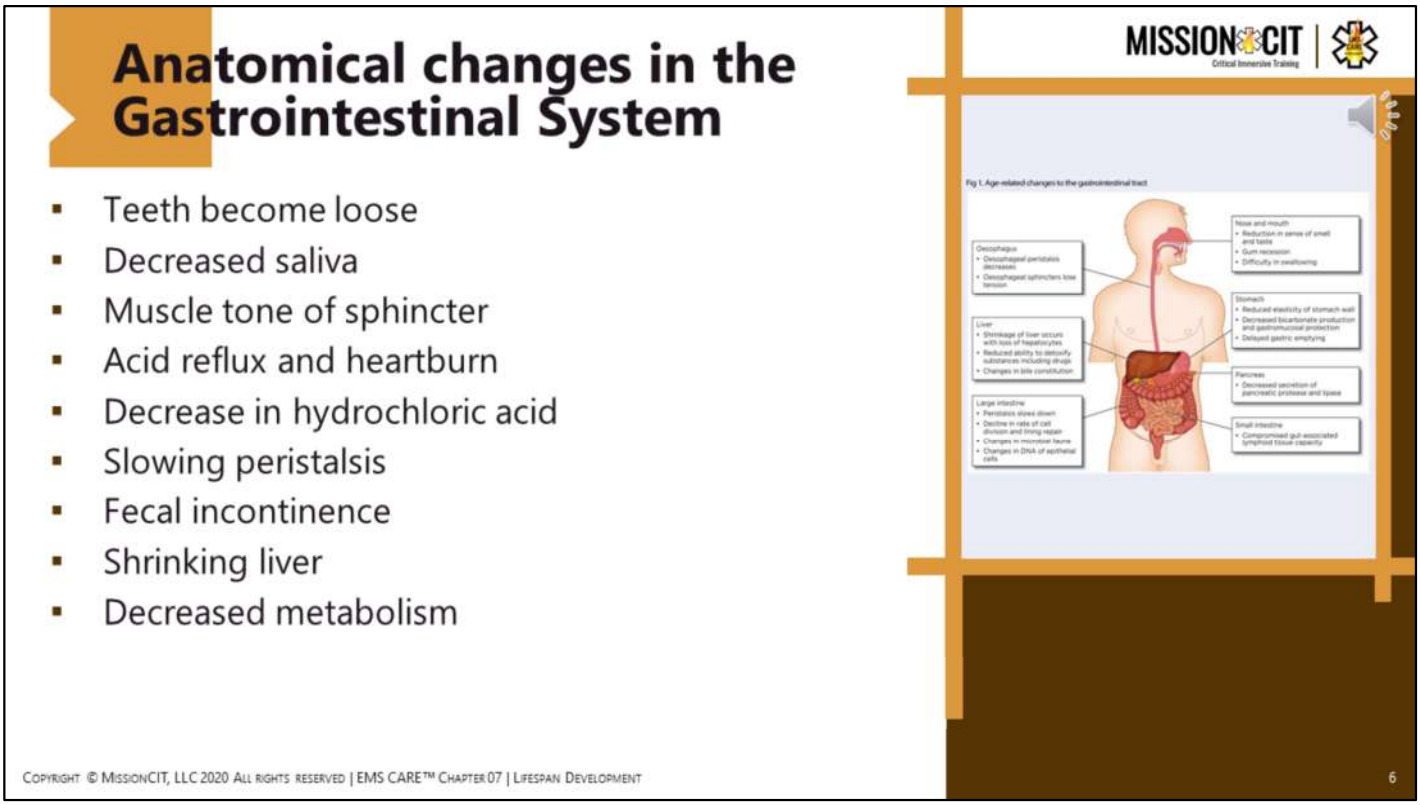
All these changes make it hard to breathe.



Many neurovascular changes happen as part of the aging process. Some of them are:

- Aortic or arterial stiffness
- Autonomic dysregulation
- Neurovascular uncoupling
- Damages to the blood-brain barrier

In particular, aging decreases cerebral blood flow while at the capillary level, the cerebral endothelium loses mitochondria. All these eventually lead to cognitive dysfunction.

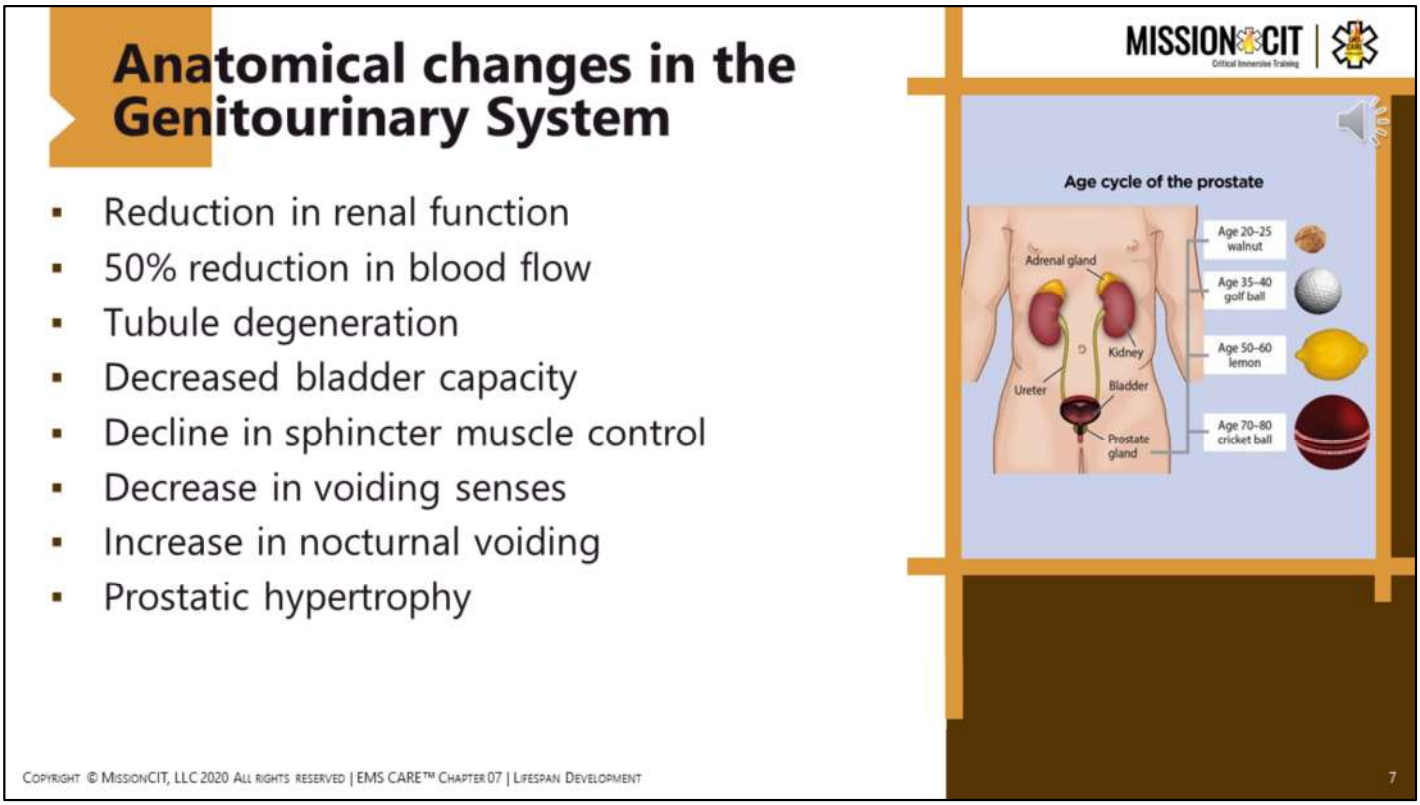


There is a profound change in almost every part of the gastrointestinal system. First off, the teeth become loose and may even fall off, thereby making it difficult to chew food finely. There is a decrease in saliva and the resultant lubrication that can make it difficult to swallow food.

Moving down, the muscle tone of the sphincter located between the esophagus and stomach becomes loose, and this can cause regurgitation of food, leading to acid reflux and heartburn. Next, there is a decrease in the hydrochloric acid levels in the stomach, and this impacts digestion and absorption.

The slowing peristalsis increases constipation while weak rectal muscles increase fecal incontinence. Finally, the liver shrinks as the blood flow decreases, resulting in decreased metabolism.

All these changes impact the way food is digested and the nutrients are absorbed by the body.



Just like any other system, the genitourinary system also goes through many changes as we age. Some of the prominent changes are:

- Reduction in the renal function
- A 50% reduction in the renal blood flow
- Tubule degeneration
- Decreased bladder capacity
- A decline in sphincter muscle control
- A decline in voiding senses
- Increase in nocturnal voiding
- Prostatic hypertrophy in males

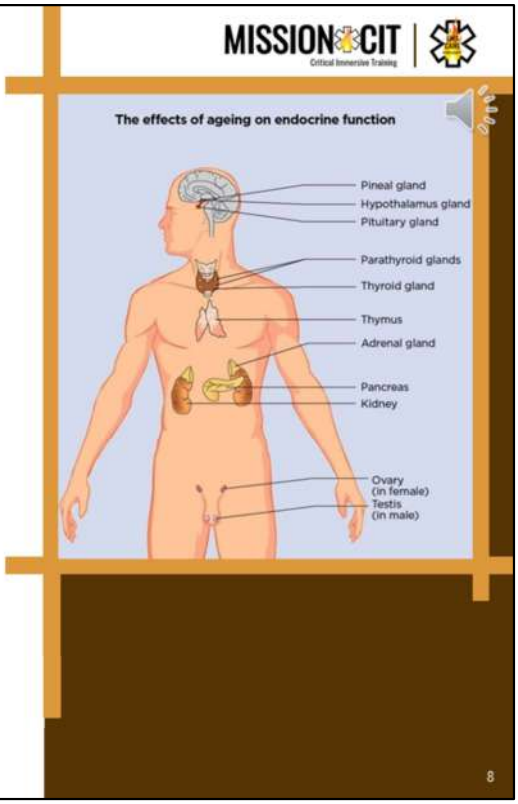
As a result of these changes, urinary tract infections are common, and can lead to fatigue and decreased mobility. Dehydration and hypovolemic shock are also possible as seniors tend to drink a lot less water for fear of wetting.

A condition called prostatic carcinoma is likely in males, and this is characterized by sudden moderate to high fever, chills, changes in bowel or bladder function, and melena.

If a patient is suffering from any of these symptoms, stabilize, and arrange for transportation.

Anatomical changes in the Endocrinal System

- Marked decrease in metabolism of thyroxine
- Reduced pancreatic beta-cell secretion
- Reduced secretion of hypothalamus and pituitary gland
- Increase in the secretion of antidiuretic hormone
- Epinephrine levels go up



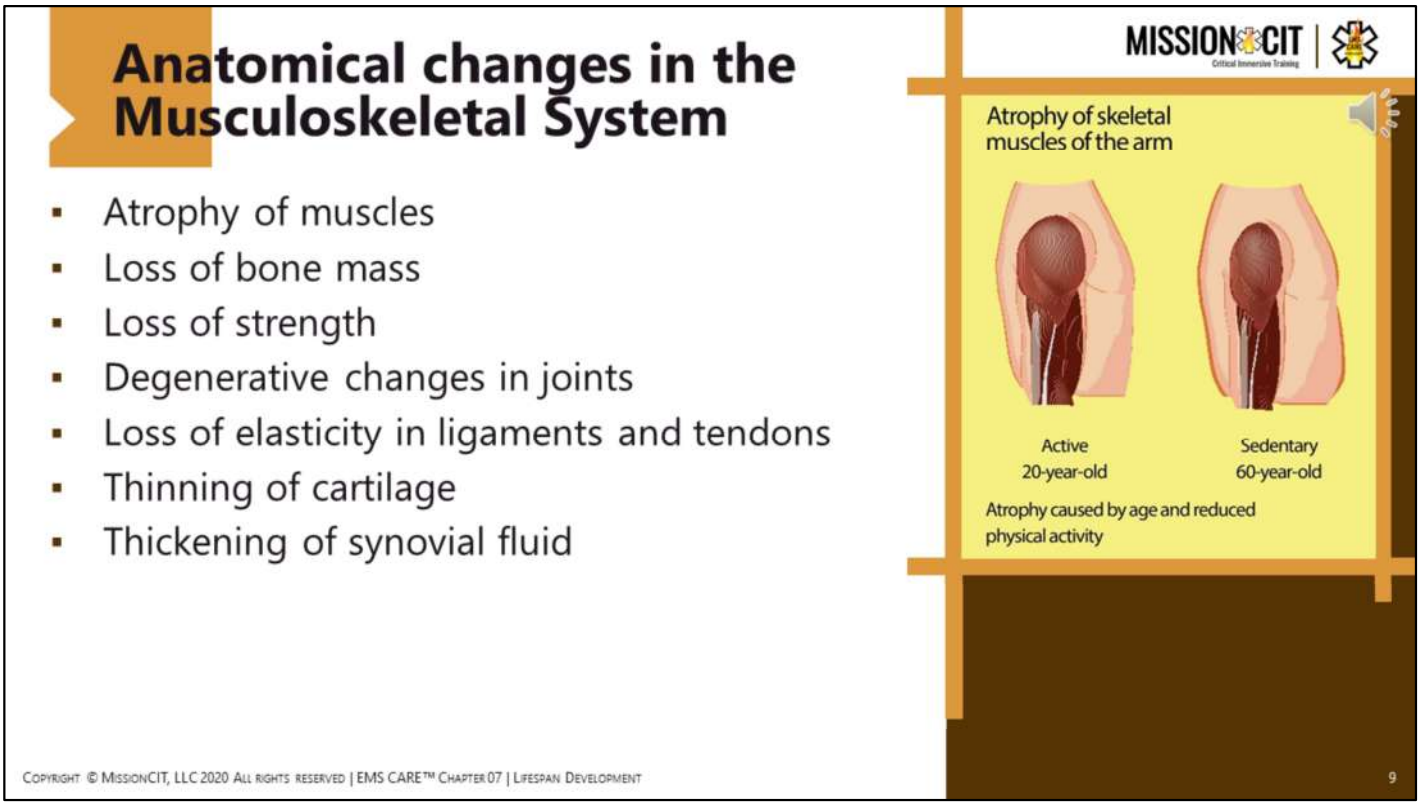
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Moving on, we will see the changes in the endocrinal system that is responsible for producing and managing different hormones needed for a variety of functions in the body.

As people age, the following changes happen.

- There is a marked decrease in the metabolism of thyroxine.
- The pancreatic beta-cell secretion also reduces, causing hyperglycemia.
- The level of hormones secreted by the hypothalamus and pituitary gland reduces as well.
- There is an increase in the secretion of antidiuretic hormone and atrial natriuretic hormones that causes a fluid imbalance in the body.
- Finally, the epinephrine levels go up.

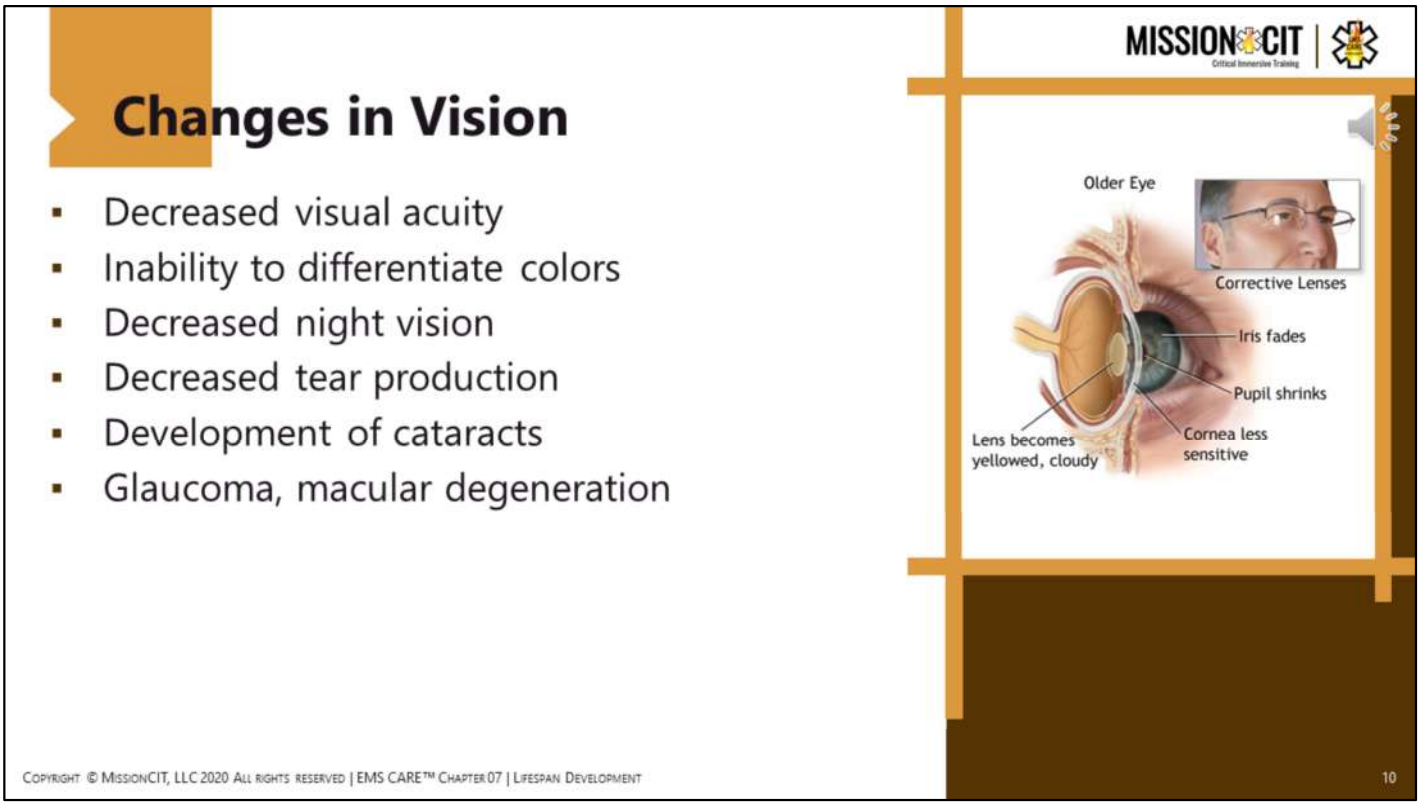
A possible emergency condition that these changes can lead to is hyperosmolar hyperglycemic.



Some of the prominent changes that happen with age are:

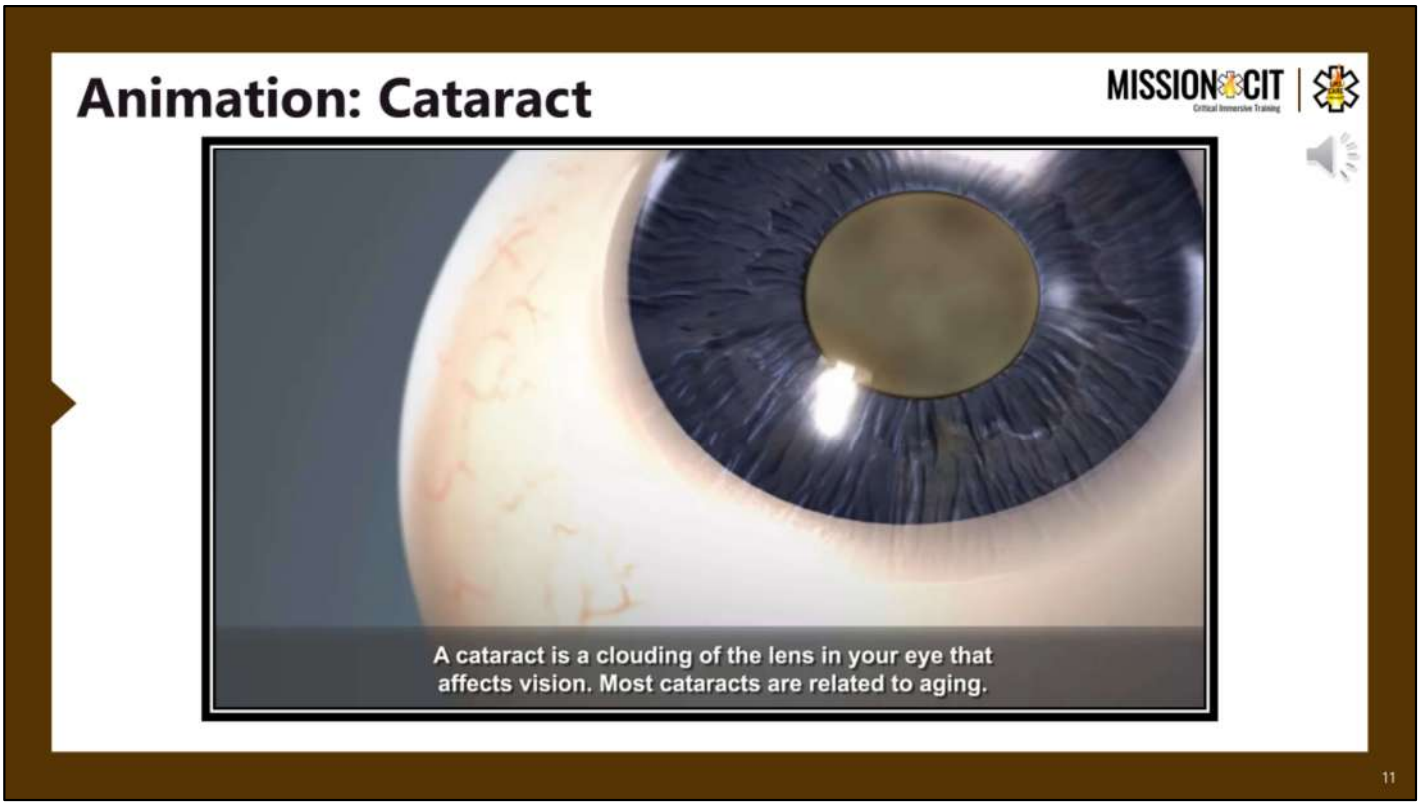
- Atrophy of muscles where the muscles waste away due to a lack of physical activity.
- Loss of bone mass and degenerative changes.
- Loss of strength.
- Degenerative changes in joints.
- Loss of elasticity in ligaments and tendons.
- Thinning of cartilage.
- Thickening of synovial fluid.

These are significant changes that can impact the mobility of people as they become older. It can also affect their daily activities.



Some of the possible changes that happen in vision are:

- Decreased visual acuity, as a result of which, seniors find it hard to see shapes and details of the things they see.
- Inability to differentiate colors.
- Decreased night vision.
- Decreased tear production.
- Development of cataracts.
- Possibility of diseases like glaucoma, macular degeneration, and retinal detachment.



This video from the National Eye Institute looks at the causes of cataract, a clouding of the lens in the eye that affects vision.

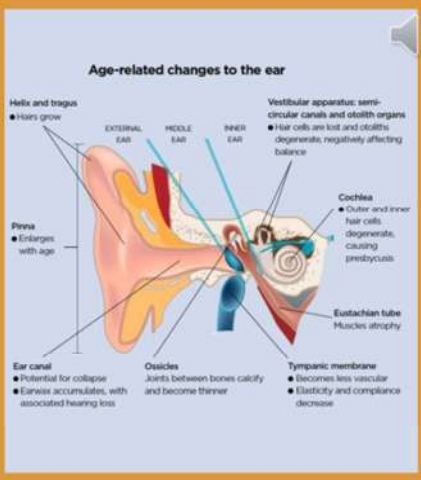
Animation: Glaucoma



This video looks at the causes of glaucoma, a group of diseases that damage the eye's optic nerve.

Changes in Hearing

- Age-related hearing loss
- One in three adults face it
- Changes are gradual
- Unable to hear high-frequency sounds
- Inner ear problems
- Loss of balance

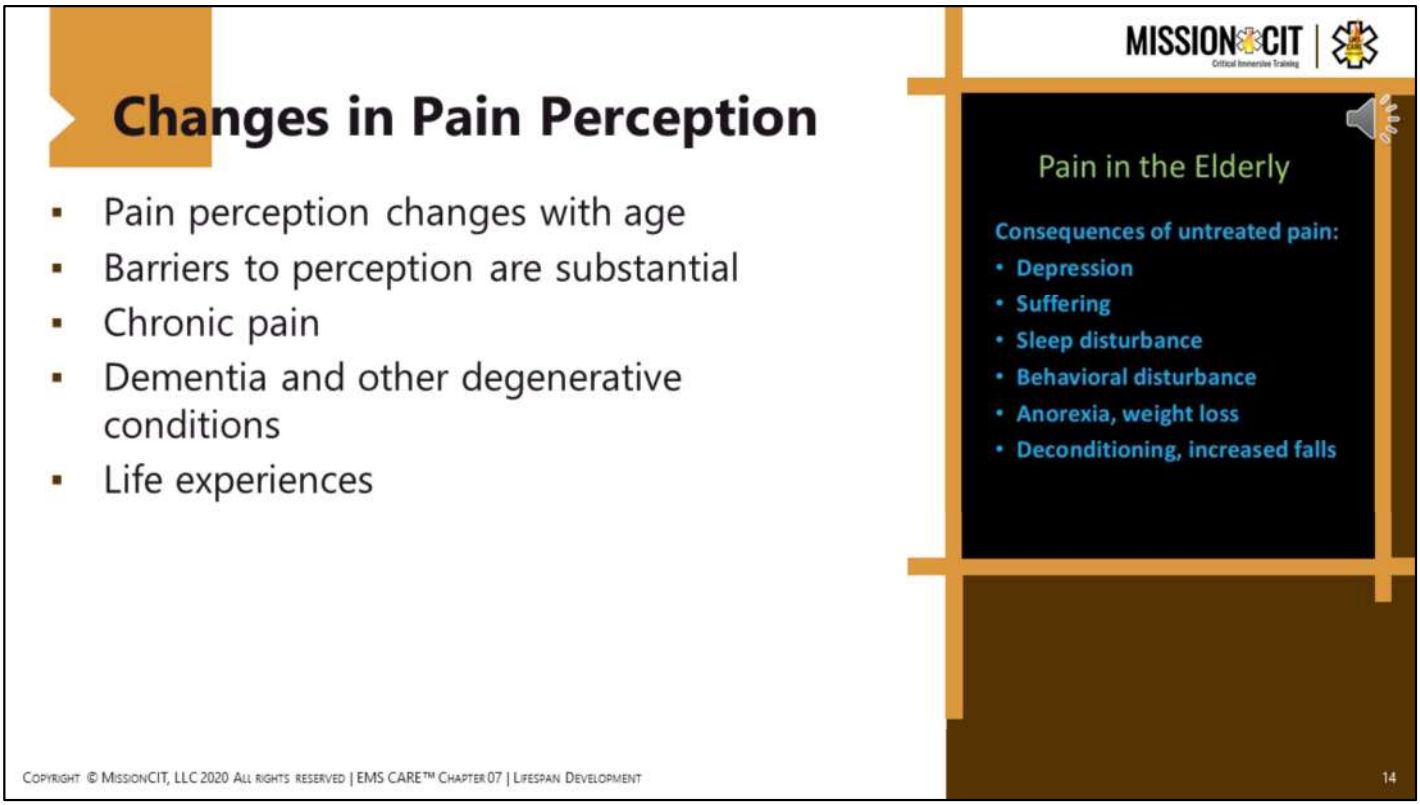


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One of the most prominent hearing-related conditions is presbycusis, an age-related hearing loss that happens in both the ears. It is a common problem linked with hearing and it is estimated that one in every three adults faces this problem. But these changes are gradual, so the patient may not be aware of it first.

Along with this, seniors may not be able to hear high-frequency sounds. Inner ear problems and loss of balance are other issues that come with aging.

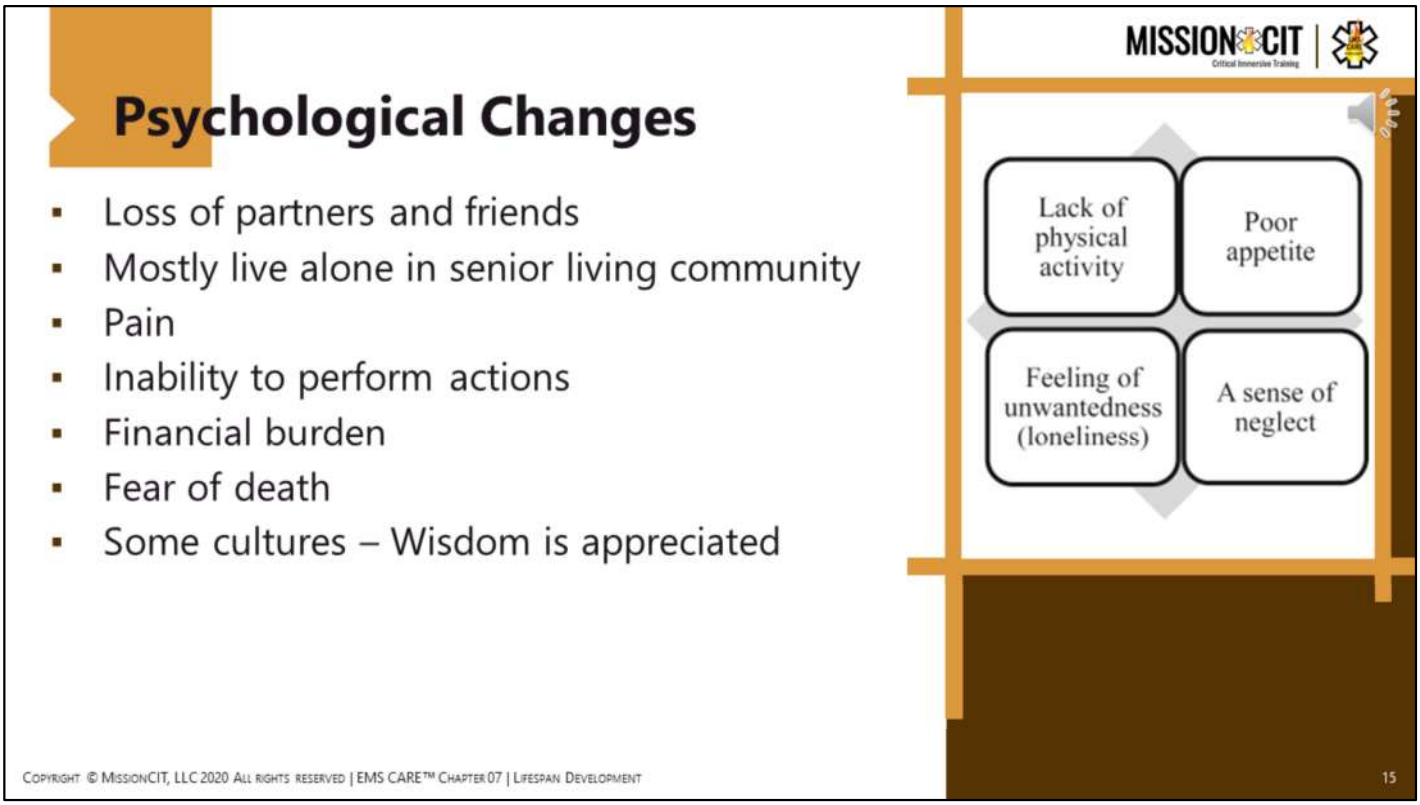
Due to these conditions, hearing aids are fairly common.



Pain perception varies so much between young adults and seniors, and understanding these differences is imperative for appropriate treatment.

In the elderly patient, the barriers to pain perception are substantial. Also, people who are more than 65 years of age tend to experience chronic pain. More importantly, conditions such as dementia make it difficult for them to express their pain in words.

Sometimes, their life experiences make them react differently to pain, but that doesn't mean they don't experience it.



This is also a time of many psychological changes that come from the loss of partners and friends, living alone in communities, pain, and inability to perform actions, financial burdens, and fear of death.

In some cultures though, the wisdom that comes with this age is seen as rewarding for the younger generations.

With these words, we come to the end of the lesson and Missah will next take you through the chapter review.