

Promoting Healthy and Active Ageing

Lesson 03

Normal physiological changes in ageing

Intended Learning Outcomes

- Identify normal physiological changes across body systems.
- Differentiate between normal and pathological ageing processes.
- Explain nursing implications of age-related physiological changes in clinical care.



Why is it important for nurses to know about the age-related physiological changes ?

- ❖ able to understand the physiological, psychological and social issues faced by older adults
- ❖ able to differentiate the age-related changes and pathological conditions.
- ❖ able to provide comprehensive effective care to the older adults.
- ❖ able to identify the potential complications such as falls, adverse drug interactions, etc...



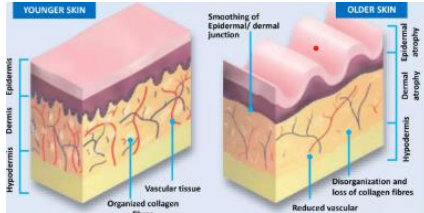


Pic: Justdial.com

Introduction

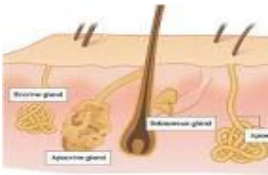

- Aging is normal process of time related change, begins with birth and continuous throughout life.
- It is gradual, continuous process of natural change
- During early middle age, bodily function begin to decline gradually
- Active Ageing is multidimensional process : physical, mental, social and spiritual.

- The “Basic Rule” is that by age 70, organ systems and organ functions diminish by 50%.
- Clinical observations support this “basic rule” in that
 - Pulmonary function,
 - Cardiac output,
 - Liver function, and
 - Kidney function all diminish by age 70 to about 50% of that observed at age 25.

Major Skin Changes

| Physiological changes in skin | Effects | |
|--|---|---|
| <p>Epidermal and dermis thickness decreases</p> <p>Thinning of subcutaneous tissue</p> | <ul style="list-style-type: none"> Increased susceptibility to chemical and mechanical trauma and slower healing. decrease oil production |  |
| <p>Functional melanocytes decrease, change in distribution</p> | <ul style="list-style-type: none"> Reducing skin protection from UV rays. Age spot (lentiginosenilis) greying of hair | <p>Age spot</p>  |
| <p>Slow production of collagen and elastin</p> | <p>Causing wrinkles & reduced elasticity</p> |  |

Major Skin Changes

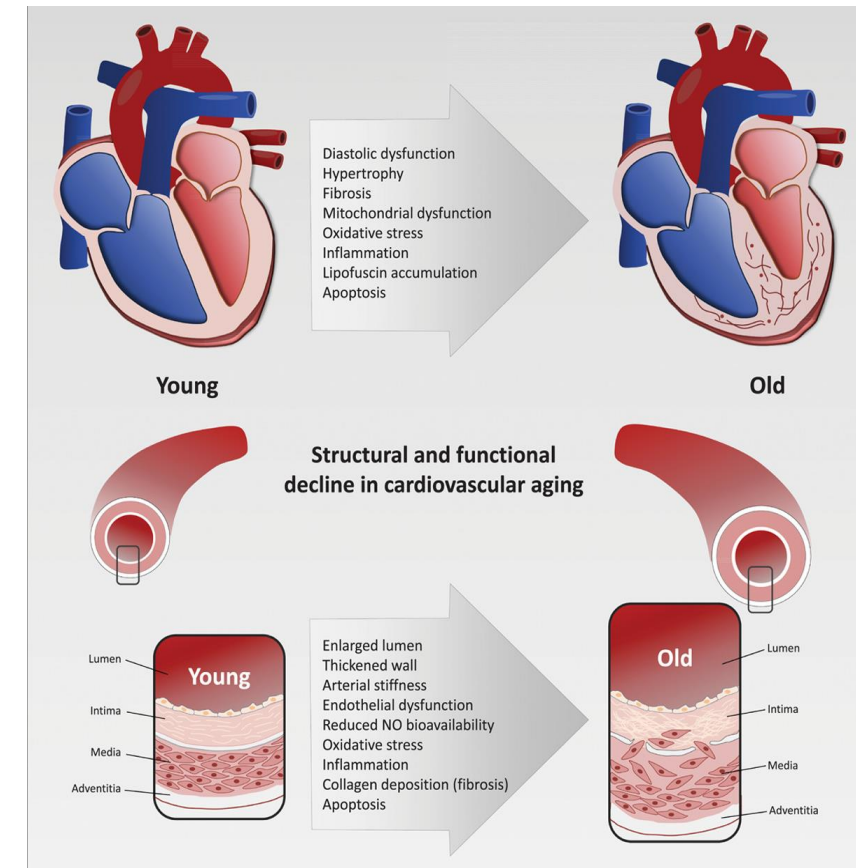
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| <p>Sweat glands diminish in number and function ----</p> | <p>Reducing perspiration, and predisposed to hyperthermia</p> | |
| <p>Keratinocytes are smaller and proliferate more slowly</p> | <p>more susceptible to infection, allergy, damage due to environmental factors, tumours</p> |  |
| <p>Reduced blood flow to the connective tissues.</p> <p>Lunula may disappear</p> | <ul style="list-style-type: none"> • Nails may be dull or yellowish white appearance, • The nails become thicker , easily brittle nail grow slowly |  |

Special consideration to safe the skin of older adults

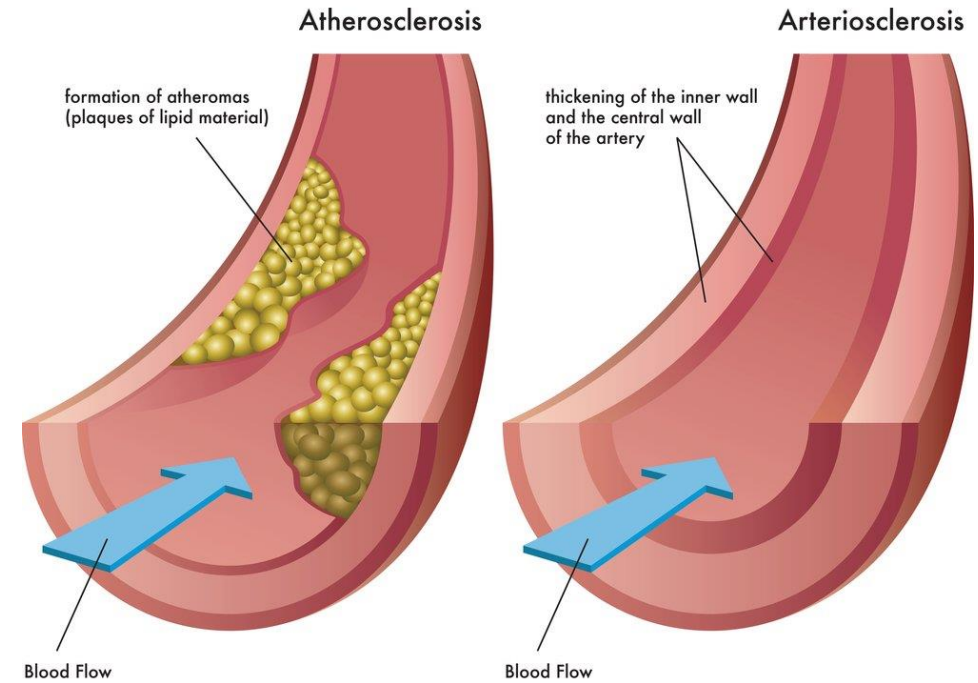
- rough handling, pulling bedsheets/ cloth to be avoided
- be careful on using hot and cold application
- less alkaline mild soaps can be used
- emollient can be applied to prevent dry skin
- monitor the skin for signs of bedsore
- care to be taken if any wound
- prolonged moisture can affect the skin- wet cloths, linen, to be removed immediately
- apply powder to avoid friction while massaging
- avoid aggressive rubbing or scrubbing during cleaning
- hydration and nutritious food is important

Changes in Cardiovascular System

- There is normal atrophy of the heart muscle, especially in the left ventricle,
- Calcification of the heart valves,
- Longer recovery of cardiac muscles after each heart beat– heart rate decline
- Decreased cardiac output , less oxygen to the tissues and organs
- Reduced renal and hepatic function and less cellular nourishment.
- The reduced blood flow results in reduced stamina

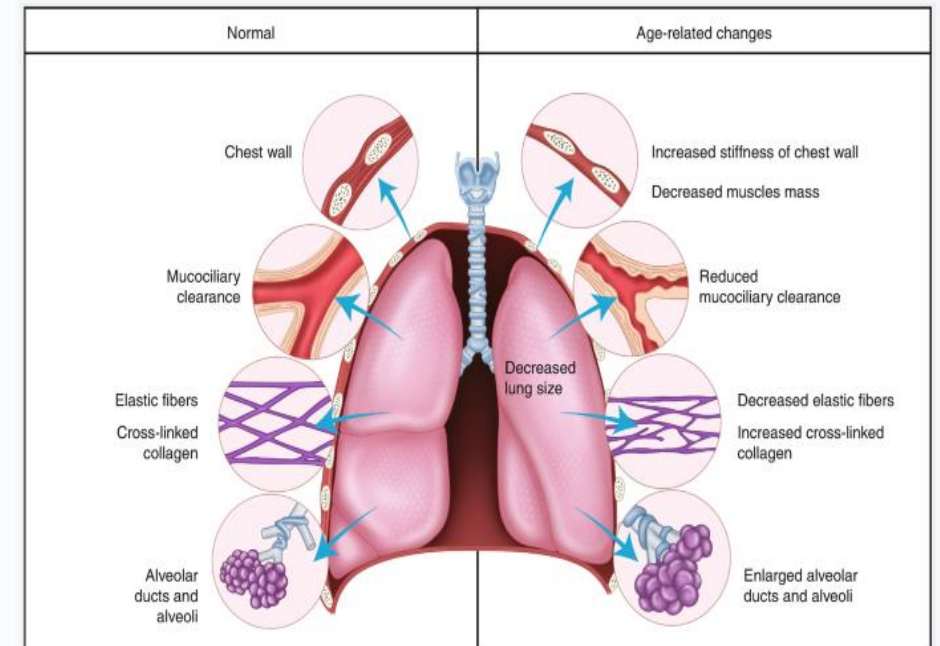


- Loss of elasticity in artery walls (arteriosclerosis)
- Intra-artery deposits (atherosclerosis).
- Changes in artery- elastic arterial walls become rigid and cannot expand
- Blood pressure increase as arterial resistance is increased in
- Changes in vein predispose to slower return of venous blood to heart– leads to venous stasis, varicose veins and thrombophlebitis.
- Slight arrhythmias- skipped arterial or extra beats

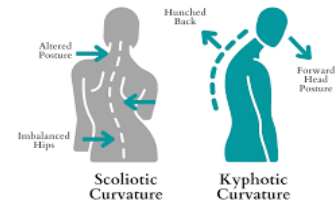


Changes in Respiratory System

- The airways and lung tissue become less elastic with reduced cilia activity.
- Calcification of the laryngeal, and tracheal cartilage causing the stiffness
- There is decreased oxygen intake and exchange.
- The muscles of the rib cage atrophy and calcification of costal cartilage in ribs ----reducing the ability to breathe deeply, cough and expel carbon dioxide.
- Pitch of male voice increase



- Kyphosis (humpback), scoliosis (lateral spinal curve), shortened thorax and chest wall stiffness ---- limit chest expansion and reduced effective ventilation.
- Greater dependence on use of diaphragm- increase energy expenditure reduced effective ventilation leads to decreased stamina with shortness of breath and fatigue.
- Lungs diminishes in size, become flabbier, less elastic due to elastic fibers decreases, increase cross linked collagen.
- Vital capacity or maximum amount of air expelled from lungs after a full inspiration is decrease (about 20%.)
- Residual volume (amount of air left)
- Alveoli duct and alveoli become enlarged leading to decreased efficiency of oxygen-carbondioxide exchange
- Decrease efficiency of oxygen-carbondioxide exchange causes increase level of Co2 and decrease level of O2 in blood—predisposed to lower O2 supply to vital organs in acute respiratory conditions. Also increased possibility of sleep disorders.



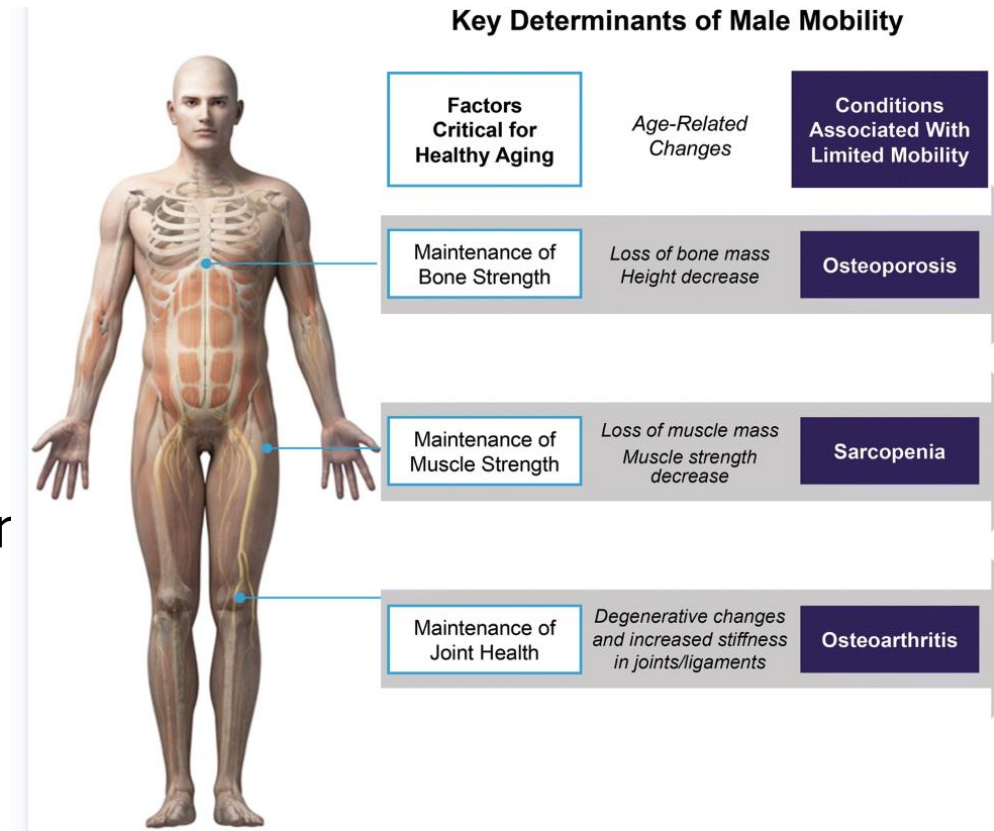
Changes in Musculo- Skeletal System

- There is generalized atrophy of all muscles accompanied by a replacement of some muscle tissue by fat deposits.
- **Sarcopenia**- loss of muscle mass. It can be preventable with regular exercise.
- Some specific implications of this are:
 - reduced ability to breathe deeply and
 - reduced gastro-intestinal activity which can lead to:
 - constipation or bladder incontinence, particularly in women.

- Calcium is lost and bones become less dense.

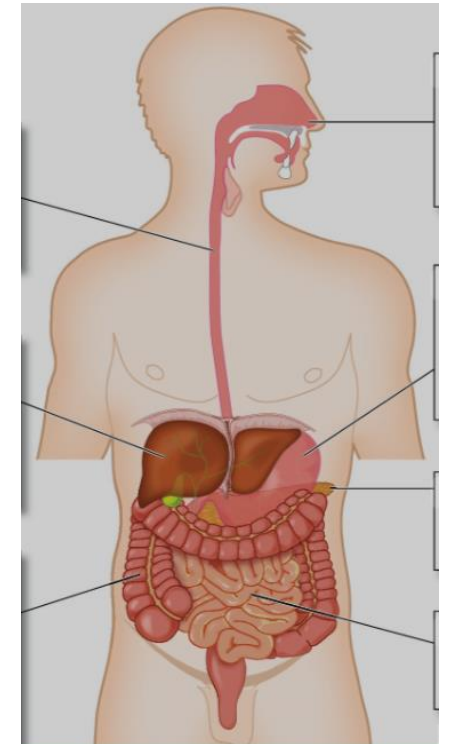
This can result in:

- osteoporosis and a reduction of weight bearing capacity
 - leading to the possibility of spontaneous fracture
 - thinning of the vertebrae also results in a reduction in height
- In addition, the vertebrae can calcify, resulting in postural changes



Changes in Gastrointestinal system

- Reduced elasticity of stomach wall
- There is reduction in the production of hydrochloric acid, digestive enzymes and saliva
- Peristaltic movement slow down
- These changes may result in:
 - gastrointestinal discomfort,
 - impaired swallowing and
 - delayed emptying of the stomach.
- The breakdown and absorption of foods may also be impaired,
- Malnutrition, resulting in deficiencies of vitamin B, C, and K
- Decrease metabolic rate.
- Food being less absorbed and utilized.
- Decrease in the overall metabolism of drugs



Changes in Urinary system

- kidney tissue decreases.
- Number of nephrons decreases.
- Blood vessels supplying the kidneys can become hardened ----this causes the kidneys to filter blood more slowly.
- Elastic tissue of bladder wall becomes tough, and the bladder becomes less stretchy--
- bladder cannot hold as much urine as before.
- Bladder muscles weaken.
- Blockage of the urethra: In women this can be due to weakened muscles that cause the bladder or vagina to fall out of position (prolapse). In men the urethra can become blocked by an enlarged prostate gland

Changes in Reproductive system

- In women :
 - Menopause occur
 - Due to menopause oestrogen level decrease causing hot flashes and mood swings
 - A loss of subcutaneous fat, and elastic tissue in external genitalia, which shrink slightly in size
 - Vaginal walls become thinner, drier, less elastic, shrink in size----Decreased amount of vaginal lubrication
 - Atrophy of the ovarian, vaginal and uterine tissues
 - Ovaries, uterus decrease in size with age, latter become more fibrous. Ovulation gradually ceases.
 - muscles and grandular tone diminish and skin is less elastic resulting in loss of firmness and sagging of breast

Changes in Reproductive system

- In men:
 - sperm production reduced and fewer viable sperm are produced and motility of sperm decreases. But, most of men continue to produce enough viable sperm to fertilize ova well into older age.
 - The amount & consistency of the seminal fluid changes and ejaculatory force is diminished.
 - Testosterone levels probably decrease with age and testis become less firm and smaller
 - Prostate enlarges.
 - Enlarged prostate may compress the urethra and inhibit the flow of urine
- Both older men and women generally require more stimulation to become aroused and more time to reach orgasm.

Sensory changes with ageing

1. Changes in vision:

- Pupil begins to decrease in size and there is decreased response to light.
- Which makes reading and close work difficult.
- This condition, which is known as presbyopia, can be corrected by wearing glasses with convex lenses.
- There is thickening and yellowing of the lens of the eye.
- This result in:
 - light diffraction,
 - increased sensitivity to glare
 - more difficulty distinguishing pastel colours, especially blues and greens.

Sensory changes with ageing

2. Changes in Hearing

- There is a decrease in sensitivity to high frequency tones
- Decreased discrimination of similar pitches because of changes in the bones and cochlear hair cells of the inner ear.
- Approximately 30% of all older adults have some hearing impairment.

Sensory Changes with Ageing

3. Changes in Taste and Smell

- Taste and smell are interrelated and important for eating as well as checking for hazards in the environment such as spoiled food, smoke and fumes.
- Older adults experience some decline in the ability to taste resulting from a reduction in the total number of taste buds, especially after the age of 80.
- Some individuals also experience a decline in their sense of smell, but this is usually because of abnormal conditions such as blockage or disease of the olfactory receptors in the upper sinus.

Case Discussion: Mr. Kumaran is a **76-year-old retired postman** who attends a community health clinic for a routine check-up.

Nurse observed the following.

- Reports that his **vision is less sharp** at night and he needs reading glasses.
- Complains of **slowed walking pace** and stiffness in the morning.
- Notes occasional **forgetfulness**, such as misplacing keys, but no major memory gaps.
- **One week ago**, he experienced dizziness, lost balance, and fell in the bathroom, injuring his hip.
- On assessment, nurse finds:
 - HbA1c: 8.5% (undiagnosed diabetes suspected).
 - Unintentional weight loss in past 3 months.
 - Mild tremor in his right hand.
- Mr. Kumar says, *“I thought all this was just part of getting old.”*

1. Distinguish Normal vs. Pathological Changes
2. What are the other nursing assessments?
3. What tools can be used?
4. Suggest nursing actions to support Mr Kumaran’s independence & QoL.



*Thank
you*

