

Age-Related Changes



Gastrointestinal Aging Changes:

- ❖ Poor dentition
- ❖ ↓ number of taste buds
- ❖ ↓ muscle strength for chewing
- ❖ ↓ saliva production
- ❖ ↓ ptyalin in saliva
- ❖ Weakened gag reflex
- ❖ ↓ gastric acid secretion
- ❖ ↓ emptying of esophagus and stomach
- ❖ ↓ intrinsic factor
- ❖ Thickened bile
- ❖ Thinned gastric mucosa
- ❖ ↓ ability of small intestine to absorb sugars and lipids
- ❖ ↓ hepatic enzymes and storage capacity

Consequences

- ↓ taste sensation
- ↓ appetite
- ↓ chewing ability
- ↓ digestion of starch
- Possible swallowing difficulty
- Indigestion, flatus
- Risk of pernicious anemia
- problems with elimination
- ↓ tolerance for fats
- Possible change in drug metabolism
- Difficulty gaining weight

Hearing Aging Changes

- ❖ ↓ number of nerve cells in 8th cranial nerve
- ❖ ↑ production of cerumen
- ❖ ↑ amount of keratin in cerumen
- ❖ Atrophy of rigidity of ossicles
- ❖ ↓ elasticity of tympanic membrane

Consequences

- Presbycusis (hearing loss due to age-related changes in the inner ear)
- High frequency loss occurs first
- Tone discrimination loss
- Difficult following conversations
- Cerumen impaction
- Social isolation

Visual Aging Changes:

- ❖ Yellowing, opacity, rigidity of the lens
- ❖ ↓ pupil size
- ❖ ↓ accommodation
- ❖ Less efficient absorption of intraocular fluid
- ❖ Narrowing of visual field
- ❖ ↓ lacrimal secretions
- ❖ ↓ number of cones in retina

Consequences

- Presbyopia –inability to focus properly
- Distorted depth perception
- ↓ colour discrimination
- Need for Stronger light
- Increased sensitivity to glare
- Drier cornea

Genitourinary Aging Changes

- ❖ ↓ number of nephrons
- ❖ ↓ glomerular filtration rate and tubular reabsorption
- ❖ Change in renal threshold
- ❖ ↓ blood flow to kidneys
- ❖ ↓ bladder capacity from 500 ml to 250 ml
- ❖ ↓ elasticity of bladder
- ❖ ↓ bladder tone
- ❖ ↓ muscle tone of urethra
- ❖ Benign prostatic hyperplasia common in males

Consequences:

- ↓ creatinine clearance
- ↓ ability to concentrate urine
- risk of urinary retention
- incidence of incontinence
- urinary frequency; nocturia
- Effects on drug clearance via kidneys

Musculoskeletal Aging Changes

- ❖ Muscle cells atrophy
- ❖ Generalized symmetrical muscle wasting
- ❖ Demineralization of bones
- ❖ Deterioration of cartilage surface of joints
- ❖ Thinning of intervertebral discs
- ❖ Loss of cartilage in vertebral column
- ❖ Loss of elastic fibers in muscle tissue
- ❖ Kyphosis

Consequences:

- ↓ muscle strength after age 70
- Two-inch loss of height between ages 20 and 70
- incidence of osteoporosis
- ↓ joint range of motion
- ↓ flexibility
- ↓ mobility
- risk of falls
- Gait changes
- Changes in body image

Cardiovascular Aging Changes

- ❖ ↑ amount of collagen and fat in cardiac muscle
- ❖ Thickening and rigidity of valves
- ❖ ↓ oxygen utilization
- ❖ Myocardial hypertrophy, but over-all heart size is not affected by age
- ❖ Coronary artery blood flow decreased
- ❖ ↑ peripheral resistance
- ❖ ↑ myocardial irritability
- ❖ ↓ blood flow to all organs

Consequences

- ↓ stroke volume, cardiac output
- ↓ ability to increase heart rate in response to stress
- aortic volume and systolic blood pressure
- No change in resting heart rate
- risk of extra systoles
- Electrocardiogram changes

Integumentary Aging Changes:

- ❖ Thinning and atrophy of epidermis
- ❖ ↓ strength and elasticity of epidermis
- ❖ ↓ blood flow
- ❖ vascular fragility
- ❖ Loss of subcutaneous fat
- ❖ ↓ size and function of sweat glands
- ❖ ↓ sebaceous secretions
- ❖ “Clustering” of melanocytes
- ❖ ↓ number of nerve cells
- ❖ Thinning and graying of scalp, pubic, and axilla hair
- ❖ Thickening of nasal and ear hair
- ❖ facial hair in women
- ❖ ↓ blood supply to nailbed
- ❖ longitudinal striations in nails
- ❖ Accumulation of “debris” under nails

Consequences:

- susceptibility to infection, trauma, malignant lesions, pressure ulcers
- Skin is dry, scaly, wrinkled
- ↓ skin turgor
- ↓ ability to maintain body temperature and homeostasis; baseline temperature may be lower than normal
- Slower rate of healing
- Slower absorption of drugs by subcutaneous route
- “Liver Spots”
- Nails thicken, grow slowly, become brittle and yellowed
- risk of splitting, infections of the nails

Respiratory Aging Changes:

- ❖ ↓ elasticity of lungs
- ❖ ↓ number of alveoli
- ❖ ↑ size of alveoli
- ❖ ↑ diameter of alveolar ducts and bronchioles
- ❖ ↓ ciliary action
- ❖ ↑ anteroposterior chest diameter
- ❖ Weakening of respiratory muscles
- ❖ ↓ coughing reflex
- ❖ Calcification of costal cartilages

Consequences

- 50% increased residual capacity
- ↓ vital capacity
- ↓ mobility of bony thorax
- ↓ arterial blood oxygen level
- ↓ oxygen uptake during exercise
- risk of infection
- amount of dead air space
- ↓ exercise tolerance
- ↓ gas exchange

Neurological Aging Changes:

- ❖ ↓ number of neurons
- ❖ ↓ weight of brain
- ❖ Histological changes in brain; ↑ intracellular pigment, ↓ protein synthesis, senile plaques
- ❖ ↓rate of conduction in peripheral nerves
- ❖ Change in sleep patterns
- ❖ Depletion of dopamine and some of the enzymes in the brain
- ❖ ↑ accumulation of lipofuscin
- ❖ query diminished brain cholinergic reserve

Consequences:

- ↓ Adaptability
- Slower response to stimuli
- ↓ Sensation
- Impaired proprioception
- Gait changes
- ↓ deep tendon reflexes
- Slower voluntary movement
- Sleep pattern disturbances
- Susceptibility to environmental temperature changes
- ↓ short-term memory

Sources: Brown, Jeri B., Bedford, Nancy K., White, Sarah J. (1999) *Gerontological Protocol for Nurse Practitioners*. Lippincott Williams & Wilkins, Inc.; American Assn. for Geriatric Psychiatry. (2005). *Comprehensive Textbook of Geriatric Psychiatry*, 3rd Ed. W.W. Norton & Co. VIHA. Delirium. Age Related Changes.V3 - 01.09 www.viha.ca/mhas/resources/delirium/