

## **PT IN GERIATRICS**

Geriatrics is the branch of medicine that focuses on health care of the elderly. It aims to promote health and to prevent and treat diseases and disabilities in older adults.

Gerontology is the branch of biomedical sciences that studies aging. The term "geriatrics" is used to refer specifically to the medical study of diseases and problems of the elderly.

Changes with ageing

### **SKIN:**

- Epidermis thinner and fragile
- Dermis less elastin and flexible
- Hypodermis thinner and less padding
- UV light accelerates skin ageing
- Senile purpura

### **EYE**

- Ptosis
- Dry eye
- Tearing
- Flatten & uneven cornea with light scattering
- Hyperopia (farsightedness)
- Smaller pupil requiring brighter light to read
- Slower dark adaptation
- Reduced contrast sensitivity

### **BONE**

- Continual loss of bone mass from the 4th decade
- Hormonal change with more bone resorption than formation
- Less Ca absorption
- Shorter and stoop

- Brittle with easy fracture
- New bone formation at the verge of joints
- Cartilage thinner

## NERVOUS SYSTEM

- 30,000-50,000 neurons die each day with diminishing reserve
- IQ slowly decline after the age of 25
- Reduced short term memory
- Decreased retrieval ability
- Interrupted and less deep sleep
- Reduced pain, touch, temperature, and vibration sensations
- Reduced postural control and balance

## HEART

- Heart becomes more rigid with decreased output
- Heart beat less responsive to stress
- Heart beat less variable with each breathing
- Irregular heart beat more common with ageing
- Systolic blood pressure increases with age
- Pulse pressure widened with hardened vessels
- Less efficient venous return prone to postural hypotension

## LUNGS

- Lungs become more rigid with early closure of small airways
- Less efficient blood gas exchange
- Chest wall becomes more rigid too
- Reduced Lung Volume and Vital Capacity
- Bronchial villi thinner and cough reflex less effective

- Reduced ability to cope with challenges like climbing stairs, running
- Reduced immunity prone to chest infection

## GIT

- Saliva glands secret less with dry mouth
- Taste and smell senses decline
- Less healthy teeth affecting chewing/nutrition
- Stomach muscle weakened and less hungry
- Small intestine villi absorb less calcium, vitamin B12, folic acid
- Large intestine muscle weakened and secretes less mucus prone to constipation
- Less liver blood flow and function with fall in toxic substance/drug clearance
- Bile thicker with cholesterol prone to gallstones

## Problems in old age

- Alzheimer's
- arthritis
- balance disorders
- cancer
- cardiovascular disease
- incontinence
- joint replacement
- pulmonary disease
- Stroke

## GERIATRIC ASSESSMENT

### ✘ AIMS:

- + Better recognize common geriatric disorder.
- + Plan an effective treatment program.

- + Improve over all health and functional outcomes.
- + Reduce vulnerability to subsequent illness.
- + Provide better quality of life.

#### EFFICIENCY OF ASSESSMENT

<b>Problem area</b>	<b>Screening measure</b>	<b>Abnormal response</b>
Mobility	Note the time after asking the patient: 'RISE FROM THE CHAIR, WALK 20FT, TURN , WALK BACK TO THE CHAIR AND SIT DOWN'	Unable to task 15 second
Physical disability	1.Have you had any fall in last year?	Yes to all six Questions
	2.Do you have trouble with the activities of personal life like bath, dress, toilet or eat?	
	3.Do you have trouble with light house hold work like cooking?	
	4. Do you have trouble with heavy house hold work like washing cloths?	
	5.Are you able to go out for shopping or to see a family friend?	
	6.Are you able to do strenuous activities such as cycling or fast walking?	

Problem area	screening measure	Abnormal response
Vision	Test each eye with Snellen eye chart, with glasses if applicable	Can't read 20 /40
Hearing	Whisper short sentences at 6-12 inches	Unable to hear
Urinary incontinence	Do you have problem with urine leaks?	Yes to the question
Nutrition , weight loss	Have you lost weight ? If yes, how much?	Loss of 5 per cent
	BMI	BMI< 21
Memory	Name 3 objects ask to recall in 5 min	If remember <3
Depression	Have you often been bothered by feeling sad or depressed?	Yes to the question

## COMPONENTS OF ASSESSMENT

### ✘ HISTORY TAKING: General Guidelines

- + Remember that patient having age related changes in one or more body system.
- + Keep the pace slower than usual
- + Introduce yourself in start of history taking
- + Adopt the most effective way of communication such as eye contact, gentle touch or loud voice.



Modified performance oriented mobility assessment( poma)

GAIT SCORE =\_\_\_\_/12,      BALANCE SCORE =\_\_\_\_/16

TOTAL SCORE (Gait + Balance ) =\_\_\_\_/28

{< 19 high fall risk, 19-24 medium fall risk, 25-28 low fall risk }

+ 4. Gait

+ 5. Mini-cog assessment instrument

#### GOAL-SETTING

- ✗ Functional independence is the ultimate goal.
- ✗ To relieve pain
- ✗ To improve or maintain ROM of different joint
- ✗ To improve or maintain strength and endurance of movement
- ✗ To improve or maintain cardiovascular endurance
- ✗ To improve or maintain ambulatory status

#### THERAPEUTIC INTERVENTION

##### ✗ RANGE OF MOTION EXERCISES

- + Flexibility decreases with age and joint become stiff
- + Development of contracture, it develop within 1 week of inactivity

Passive ROM: therapeutic benefits

- + To maintain range of motion
- + To prevent complication of inactivity

such as - contracture formation

- cartilage degeneration

-deep vein thrombosis etc

##### ✗ Active ROM: therapeutic benefits

- + To preserve joint function

- + To maintain physiological elasticity and contractility of muscle
- + To maintain and improve ROM
- + To induced muscle relaxation
- + To decrease pain
- + To increase circulation and thereby preventing DVT.
- + To provide sensory feedback from the contracting muscle
- + To provide a stimulus for bone and joint tissue integrity
- + To improve neuromuscular coordination

#### STRETCHING EXERCISE

- ✘ 1. **Static stretching:** the muscle tendon unit under a slow, gentle stretch that is maintain for a period of 20 to 60 seconds
- ✘ 2. **proprioceptive neuromuscular facilitation stretching:** the inhibition technique that attempt to reduce muscle tone
  - + The most popular technique is Hold-Relax
- ✘ **Ballistic stretching:** it is contraindicated in
  - elderly individuals
  - sedentary individuals
  - musculoskeletal pathology and
  - chronic contracture
- ✘ Because,
  - + the high velocity, high intensity movement are difficult to control.
  - + Tissue weakened by immobilization or disuse, can be injured easily
  - + Dense connective tissues of chronic contracture become more brittle and tears more readily

#### MOBILIZATION EXERCISE

- ✘ Joint mobilization stretching technique: specially use for restricted capsular tissue



✘ Therapeutic benefits

- + To stimulate the mechanoreceptors that may inhibit the transmission of nociceptive stimuli at the spinal cord or brain stem level
- + To cause synovial fluid motion, this is the vehicle for bringing nutrients to the avascular portion of the articular cartilage
- + To prevent painful or degenerative stasis when a joint is swollen or painful
- + To elongate hypomobile capsular and ligamentous connective tissue
- + To mechanically distend the shorten tissue

Strengthening exercise

✘ Force-generating capability is prerequisite for performing many everyday activities.

✘ Therapeutic benefits

- + The increase in muscle strength
- + Improve in neuromuscular co-ordination
- + Improve stability of joint
- + An increase in bone mineral density
- + Lessen the amount of stress placed on the joints that are mostly affected by degenerative process in older adults

✘ TYPES OF RESISTANCE:

✘ 1. body weight:

- + Body weight offers sufficient resistant for initial training, similar to active ROM.
- + Progression can be done by performing exercises in different positions

✘ 2. manual resistance:

- + The main disadvantage of this exercise is that the amount of resistance can not be measured quantitatively.

✘ 3. mechanical resistance:

- + Equipment ranges from simple to complex

- + In case of old-olds (>85 years) this equipment should not be used, as it may result in muscle soreness or inhibition
- ✘ 4. Intensity of exercise:
  - + Start with base line assessment of intensity,
  - + Popular method is find out repetition maximum (RM)
- ✘ 5. Frequency and duration:
  - + For each level of intensity, sessions are 2-3 times a week
  - + A single session consists of 3 sets of 10RM
  - + Resistance can be increased when 1 or 2 sets are done in a smooth manner
- ✘ 6. Rest intervals:
  - + Patient should rest for 1-2 minutes between sets in a same session
- + 7. mode of exercise:
  - + Functional strength is affected not only by the absolute ability to generate force but also by the ability to generate force across the varying lengths of the muscle during movement.
  - + So the strengthening exercise includes dynamic exercise as well as static exercises

## AEROBIC EXERCISES

- ✘ This endurance activities that do not require excessive speed or strength but do require on cardiovascular system
- ✘ Therapeutic benefits
  - + Improvement in maximal cardiovascular functional capacity: Older people can increase  $VO_2$  max to the same relative degree as young people
  - + Improvement in the energy level:
    - decrease LDL and triglyceride level
    - increase HDL.
- ✘ Improvement in the body composition
  - + Reduction in fat mass and increase in muscle mass

- ✘ Reduction in disability:
  - + improve stability of joint and thereby reduce disability
- ✘ Psychological well-being:
  - + lessen depression and improve belief in self-efficacy.
- ✘ Improvement of functional status
- ✘ Reduction in the risk of developing age-related disease
  - + like coronary heart disease, HT, Atherosclerosis, Diabetes and osteoporosis.

#### ✘ EXERCISE PROGRAM

- ✘ 1.Aerobic warm-up: 5-7 min
  - + Indication: to reduce the chances of injury
  - + 2.aerobic conditions:
    - + Protocol: mode,
      - ✘ intensity- 60% of MHR,
      - ✘ duration- 30 minute,
      - ✘ frequency- 5 days in a week
    - ✘ 3.Cool down: 10 min
  - + Indication: To expedite the recovery process after aerobic exercise  
To prevent injury
  - + Protocol: slow walk for 5 minutes and slow exercises

#### GAIT TRAINING

- ✘ The purpose is to make a patient walk at functional speed.
  - Orthotics
- ✘ The responsibility of physical therapist is to identify abnormal positions and movements that are responsible for;
  - + pain,

- + Misalignment of body segment,
- + Difficulty in maintaining weight bearing position,
- + Unequal weight distribution and
- + Gait deviation
- ✘ Indications:
  - + To provide mobilization or to control movement
  - + To support a weakened structure
  - + To prevent deformity and correct anatomical alignment
  - + To promote ambulation and assist motion to improve body function
  - + To relieve pressure on areas and to reduced pain
- ✘ Principles:
  - ✘ There should be a practical balance between the objective that are ideally desired and the tolerance of elderly patients
  - ✘ The basic principle refers to the application of force to the involved body segments.
  - ✘ Comfort and tolerance are important for an elderly patient
  - ✘ Attempting biomechanical control is not appropriate in most of geriatrics,
  - ✘ Plastic orthosis is the choice in elderly patient,
  - ✘ AFOs are well tolerated by elderly individual
  - ✘ HKAFOs usually not recommended, as they are cumbersome
  - ✘ A hip orthosis is used to restrict the movement of hip adduction and flexion

#### Re-assessment

- ✘ There should be ongoing reassessment while administering geriatric physical therapy program.

This enables to judge the effectiveness of treatment towards the goal set, with a required modification in the treatment strategies