Intensity and Dosage in Geriatric Physical Therapy

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Course Objectives

• Upon completion of the course, attending clinician will be able to:
  – Identify the need for intensive training for geriatric individuals
  – Identify evidence based outcome measures for strength, endurance, gait speed, balance and dual tasking
  – Discuss principles of dosage based on results of outcome measures for exercise prescription/progression

Course Objectives cont.

– Differentiate principles of dosage between acute and outpatient settings
– Discuss safe and effective exercises for the aging adult in each of the areas
– Present video case studies to best promote clinical application of these concepts

International Classification of Function (ICF) Model

Body functions and structures
Primary or secondary impairments
ROM
Strength
Sensation

Activities

• Abilities and limitations
  • Walking
  • Feeding
  • Dressing
Participation

• Personal maintenance
• Mobility
• Exchange of information
• Social relationships
• Home life and assistance to others
• Education
• Work and employment
• Community, social, and civic life

Modifying factors

• Environmental – external variables

• Personal – internal variables

Who has heard this??

• Memory decline is normal
• Endurance, strength decrease with age
• Falling is a part of aging
• People can maintain, but not GAIN strength
• Dizziness is a part of aging

What we hope to hear

• Memory decline is a factor of attention – and limited stimulation in routine environments
• People can make endurance, strength improvements at any age
• Falling is often a “Use it or lose it” problem of balance or a person to task mismatch. This may be in the form of physical or cognitive.

INTENSITY

• How do we define intensity?
  – Repetitions
  – Duration
  – Level of difficulty

INTENSITY

Why is intensity important?
INTENSITY
• This can’t possibly be applicable to my frail, elderly patient…..or can it????

INTENSITY
• Is it safe for the elderly?
• Is it beneficial for the elderly?
• Is it necessary for the elderly?

THE GOAL
A balance of allowing the patient to struggle enough during SAFE practice that the nervous system sees a need to make a change

This takes into consideration patient awareness, personality and their current levels of physical abilities

Evidence: Strength
WHY is strength important?
• Relationship to fall prevention
• Bone density
• Independence
• Activity level
• Quality of Life

Outcome measures: Strength
• 1 RM
• 8 RM
• MMT
• Isokinetic
• Functional strength testing
  – Sit to stands
  – Stairs

Dosage: Strength
• 2-3 times per week
• 2-3 sets
• 8-12 repetitions of a load that can be rated 60-80% RPE

• Functional strengthening – Use of RPE
Intensity: Strength

- Safe
- Effective (even for the frail elderly)
- Functional, task-specific overtraining

Power training

- How??
- Why??

Evidence: Endurance

WHY is Endurance important?
- Community access
- Cardiovascular health
- Safety in mobility

- (an individual’s capacity for balance is necessary throughout the day…not just morning)

Outcome measures: Endurance

- 6MWT
- 2MWT
- 400 m walk test
- 2 min step test

- Additional quantifications: BORG, spO2, BP pre/post

Dosage: Endurance

- HOW: Interval training, self-selected modality, RPE
- Determining HRmax
- Frequency
- Duration
- The “art of cumulative effects”

Intensity: Endurance

- BWSTT
- UE/LE ergometer
- Muscular endurance
Evidence: Gait speed

WHY is gait speed important?

- Relationship of gait speed to fall risk
- Community access
- Reaction times

Outcome measures: Gait speed

- TUG
- 10 meter walk test
- 3 meter walk test
  - Self-selected vs. max walking speed
- Retro walking

Dosage: Gait speed

- BWSTT: Based on gait speed from IE
- TUG or home applications – “beat your time”

Evidence: Balance

WHY is balance important?

- Fall prevention
- Fear of falling with resultant inactivity
- Quality of life
- Cost of supervision

Outcome measures: Balance

- Berg Balance Scale
- BESTest
- Modified CTSIB
- DGI
- Modified DGI
- Four square step test

Dosage: Balance

- Daily
- Task specific
- Creates a stimulus (causes imbalance)
- Dynamic
Intensity: Balance

• Task-specific overtraining
• Static vs. dynamic
• Somatosensory re-weighting

Evidence: Dual task training

• Linking to fall risk
• Dementia correlation
• Trainable and often overlooked

Measuring and defining attention

Focused – amount/vigilance
Sustained – duration
Divided – simultaneous two or more
Alternating – switching
Selected – filtering

No ONE clear way to define OR measure it!

Attention: How do we measure it?

Use standardized, objective measures of function in concert with formal distractions

• Test patient without distractions, record score
• Test patient with distractions, compare score
• “Functional attention cost” is the difference

Outcome Measures: Dual task

Combine an objective measure with everyday distracters

Timed ADL
TUGO

Compare performance with/without distracter
Compare performance pre/post intervention

- Functional Attention Cost

Dosage: Dual task training

• ~70% success rate (pathway deviation, LOB, timed testing, etc.)
• Cognitive vs manual
• Random vs blocked
• Focus on primary vs secondary task
Intensity: Dual task training

- Focus on adding more demands to enable the learner to make the primary task (functional mobility, swallowing or ADLs) automatic

<table>
<thead>
<tr>
<th>Mobility</th>
<th>Manual</th>
<th>Cognitive</th>
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</thead>
<tbody>
<tr>
<td>Walking</td>
<td>Carry water</td>
<td>Remember a fact/word during mobility</td>
</tr>
<tr>
<td>Standing w/ eyes closed</td>
<td>Pour water</td>
<td>Read from a magazine</td>
</tr>
<tr>
<td>Walking up stairs</td>
<td>Pull things out of a bag</td>
<td>Object recognition</td>
</tr>
<tr>
<td>Walking on uneven surfaces</td>
<td>Turn pages of a magazine</td>
<td>Alphabet backwards</td>
</tr>
<tr>
<td>Propel a w/c</td>
<td>Dial a phone</td>
<td>Recite a phone number</td>
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<tr>
<td>Get in/out of a chair rapidly</td>
<td>Write a note</td>
<td>Hold a conversation, keep eye contact</td>
</tr>
<tr>
<td>Walking backwards</td>
<td>Button a shirt</td>
<td>Count backwards by sevens</td>
</tr>
<tr>
<td>Avoiding obstacles</td>
<td>Thread a belt</td>
<td>Think of things you need to do this month</td>
</tr>
</tbody>
</table>

Outpatient vs Acute Care

- Role of the Physical Therapist
- Discharge Destination
- Medical Stability of the Patients
- Level of intensity that a pt can perform

What doesn’t change between settings?

- 38% of unintentional deaths
- 1.64 m treated in ED
- Every hour 1 fatality, 183 in ED
- Estimated Healthcare Cost in 2020: $43.8 b

F A L L S  F R E E:
Promoting a National Falls Prevention Action Plan

Home programs: Self measurements to drive intensity on their own

- Sit to stand repetitions
- Weights/repetitions
- Gait speed
- 6 minute walk test
- Task specific dual tasking
References