Functional Approach to Evaluation & Treatment of the Effects of Aging

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Objectives

1. Outline the scope of functional compromise in the aging population.
2. Review pertinent biology & physiology of aging w/emphasis upon how function is impacted by body system compromise.
3. Outline evidence based function centered approaches to assess function & provide treatment in a busy practice.

So What?

• Preserve quality of life & decrease costs
• 1/3 of total healthcare expenses for 65+.
• 16% of population of USA is 65+, 18% by 2020, greatest increase in 85+.
• Between now & 2030, fastest growing segment of population will be ages 65-74; 2030 – 50, every 9th American will be 75+.
  National Center for Health Stats, 2010.
• As age increases, so do chronic conditions, activity limitations
• 50% community living elderly use assistive devices.
  Felsenthal, 2005.

Compression of Morbidity

• Increased longevity & survival from previously lethal diseases increases risk of chronic diseases, functional limitations, & cost of care.
• Disproportionately large amounts of cost in last few weeks to months of life.
• Increased costs near end of life are those of dying, not aging per se.’
  – Experton, et. al., 1996.
What’s The Problem?

- Bias against elderly based on chronological age.
- Attribute problems to inevitable effects of aging.
- Justifies inaction, lack of treatment.
- Racial & ethnic disparity among older Americans; by 2050, Hispanics increase 6-18%, blacks 8-12% & Asians 3-8%, Non-Hispanics will drop 22%.

CDC, 2008

What’s the Solution?

- Medical treatment plus prevention
- Prevent disability & restore function

Biology & Physiology of Aging

- Gradual loss of lean tissue & bone mineral, increase in fat.
- Progressive anterior thrust of head, c-spine extension, increased thoracic kyphosis, lumbar straightening.
- Upper & lower limb joint flexion increases.
- Decreased arm swing & step length.
- Widened standing base.
- Center of Gravity moves behind hips.
- Increased postural sway.

Aging Posture
**Effect on Function**

- Hard to see wall clocks, exit signs, room numbers
- Lean backward, imbalance, fall
- Decreased strength, greater proximally
- Harder to do - sit to stand
- Chairs need firm seats, arms, lean forward

**Effect on Function**

- Functional compromise caused by medical /surgical issues, mental status/emotional factors, & environment.
- Deconditioning is induced by physical inactivity & reversed by physical activity, - contributes to functional decline and advancing comorbidities.

**Neurologic Changes in Aging**

- Decreased visual activity, reaction to light, accommodation, pursuit
- Short stepped broad based gait
- Decreased strength, sensation to LT/proprioception, double simultaneous stimulation
- Decreased reflexes
- Decreased recall of long lists
- Unchanged immediate recall; new learning occurs more slowly

**Aging Effects on Organ System**

**Functional Performance**

- Wide individual differences
- Different systems age at different rates
- Anemia – iron deficiency & of chronic disease
- Slowed GI transit time
- Slowed hepatic biotransformation
Aging Effects on Organ System Functional Performance

- Impaired renal concentration & dilution
- Hyponatremia, hypernatremia
- Decreased glucose tolerance
- Altered thyroid function
- Impaired temperature regulation

Exercise

- Increase activity “lessens” physiologic age.
- Maintain critical ROM in major joints
  - Shoulder abduction, flexion & internal rotation
  - Forearm pronation/supination
  - Hip & knee flexion & extension
- Address cardiac issues, coexisting conditions esp. anemia, thyroid dysfunction.

Systems Aging Changes

- Skin - decreased moisture, elasticity, sensitivity
- Cardiopulmonary - decreased maximal HR, contractility, vital capacity, BP rises.
- Urologic - frequency, hesitancy, creatinine, nocturia; decrease bladder capacity; decreased creatinine clearance.
- Hydration – 25% less thirst perception, many meds, increase need for water.
- Temperature – Decrease thermoregulation & febrile response.

Pharmacology

- Decrease in liver & kidney function & absorption/distribution of drugs increases sensitivity to medication effects.
- As medications increase, so do side effects.
- Substance abuse is common (20%)
- CAGE: Cut down, Annoyed/Angry, Guilty, Eye-opener
- Medication use guideline: MASTER: Minimize, Alternatives, Start low & slow, Titrate therapy, Educate, Review regularly
## Pharmacy Considerations

- Too many medications
- Frequent use of OTC's also
- Not taking meds as prescribed (1/3 – 1/2)
- Lack of resiliency in homeostatic mechanisms
- Altered receptor sensitivity

Clark, et.al, 2010

## Comorbidity, Frailty, Disability

- **Comorbidity** - Interactions can have adverse effects; treatment prioritization; fragmented, multi provider / setting care; prevention is key
- **Disability** isolation,
  - Minimize risk for dependency, social mortality
  - Decreased access to care; prevention is key
- **Frailty**
  - Vulnerable to stressors
  - Treat underlying conditions
  - Minimize Risks

## Functional Assessment

- **MMSE**
- **Geriatric Depression Scale**
- **Driving**
  - Near vision at least 20/40
  - Near normal neck rotation
  - Good visual attention

### Functional Assessment Table

<table>
<thead>
<tr>
<th>No.</th>
<th>Question</th>
<th>Answer</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Are you basically satisfied with your life?</td>
<td>Yes/No</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Have you dropped many of your activities and interests?</td>
<td>Yes/No</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Do you feel that your life is empty?</td>
<td>Yes/No</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Do you often get bored?</td>
<td>Yes/No</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Are you in good physical condition?</td>
<td>Yes/No</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Are you afraid that something bad is going to happen to you?</td>
<td>Yes/No</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Do you feel happy most of the time?</td>
<td>Yes/No</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Do you often feel helpless?</td>
<td>Yes/No</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Do you prefer to stay at home, rather than going out and doing new things?</td>
<td>Yes/No</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Do you feel you have more problems with anxiety that most?</td>
<td>Yes/No</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Do you think it is wonderful to be alive?</td>
<td>Yes/No</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Do you think you would like to be more active now?</td>
<td>Yes/No</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Do you feel full of energy?</td>
<td>Yes/No</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Do you feel that your situation is hopeless?</td>
<td>Yes/No</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Do you think that most people are better off than you are?</td>
<td>Yes/No</td>
<td></td>
</tr>
</tbody>
</table>

**Scoring:** Assign one point for each of these answers:


A score of 0 to 1 is normal. A score above 4 suggests depression.
Functional Assessment

Balance
- Transfers to/from chair
- Withstand sternal nudge
- Reaching upward, bending over

Gait
- Initiation w/o hesitation, stumbling
- Enough step height
- Step symmetry
- Turning

Functional Assessment

Falls
- 1/3 of elderly
- Cause of 90% of hip, pelvis, forearm fractures
- Inclement weather
- Inattention, depression, cognitive impairment, living alone
- Visual impairments, reduced neurologic function, musculoskeletal weakness/stiffness, postural hypotension, gait changes, decreased hearing
  Clark, et.al, 2010

So, What to Do?

- Home safety assessment
- Assess vision & hearing, ENT function
- Assess nutrition, Vitamin B12 deficiency, balance & strengthening exercises
- Avoid sedatives/centrally acting drugs
- Balance/gait training

Home Safety Assessment

- Floors - high polished? Slick? (nonslip in tub, mats)
- Carpet - avoid thick pile & borders
- Rugs / Mats – slide? (nonskid back?)
- Lighting – Low or uneven? esp. in bath/bedrooms, stairs
- Glare – Tinted/polarized glass
- Stairs – Light switches on stairs, night lights, nonskid edges, less than 6 inches step height
Home Safety Assessment

- **Handrails** – cylindrical, 1-2 inches from wall, ends turned in, beg and stops
- **Towel bar** – replace w/nonslip grab bars
- **Bath/ Shower** – nonslip surface & grab bars; shower chair, hand held shower
- **Bed height** – Patella to floor (18”)
- **Soft mattress** – non sag edges support seated adult

- **Chair height** – 14 – 16 inches seat to floor, armrests 7 inches above seat & extended 1-2 in. beyond seat
- **Shelf height** - Reach tools, locate items at proper height
- **Stove** - mark on/off dials clearly
- **Temperature** - avoid hypothermia, maintain 72° F winter temperature

Common Functional Issues

**Pain**
- 75% musculoskeletal
- Spine issues = DJD, spinal stenosis
- Shoulder Pain, UE/LE Pain, hip & knee pain

**Dysphagia** - increased time, decreased muscle contractions
  - trouble with thin liquids or mixed consistencies

**Arthritis**
- RA (shoulder)
- OA (hips)
- Decreased ROM
- Tendon, ligament, capsule laxity

**Osteoporosis**
- Back & flank pain
- Causes fractures
Common Functional Issues

Fractures
- Wrist, hip, shoulder
- Issues with DVT, weight bearing

Stroke
TBI
- Incontinence
- Sleep disturbance

Motor Neuron Disease/ Parkinson’s – dysphagia, self care, respiratory issues

PNS Issues – drug/toxic, alcohol, nutritional, neuropathies, neuropathy due to entrapment, rheumatic diseases, cancer, metabolic disease.

Visual Issues – risk for balance & falls

PVD/Skin Issues – claudication, decreased balance, ulcers, lymphedema

Depression – (16 – 30% over age 65)
- 3 times increased if functionally dependent.
- Watch for mood, poor motivation, fatigue, suicidal ideation; sleep disturbance, loss of appetite, impaired concentration/ memory & psychomotor retardation may indicate severe depression.
- Use meds with lower anticholinergic activity.

Anxiety – differentiate between primary disorder & those due to medical illness or medication

Delirium – acute fluctuating cognitive deficits w/attention disorder & disorganized thought can be due to acute illness, drug toxicity

Dementia – (5% over 65, 20% over 80)
- Insidious loss of memory, abstract reasoning, problem solving, judgment, & personality changes. Check for reversible causes such as thyroid, calcium, niacin, B12 issues, drug toxicity, depression, organ failure, SDH or tumor.
Pharmacologic Pain Treatment Issues

- **Opioids**
  - Start with low dose & titrate slowly to comfort
  - Anticipate & prevent side effects
  - Begin bowel program early
- **NSAIDs/Acetaminophen**
  - Avoid high doses for prolonged time
  - Don’t exceed maximum dose
  - Watch for GI, renal, platelet issues

- **Non Opioid Analgesics / Adjuvants**
  - **Steroids** – avoid prolonged high doses
  - **Antidepressants** - watch for anticholinergic side effects
  - **Anticonvulsants** – start with low dose, check CBC, LFTs, etc.
  - **Anti-arrhythmics** – low dose; avoid with pre-existing heart disease

Basic Management Principles

- Ascertain baseline level of function
- Discover available resources & options
- Avoid immobilization
- Be aware of altered physiologic responses
- Determine patient’s goals/motivation
  - Wants, expectations, reinforcement, cost
- Determine family expectations

- Differentiate between delirium, dementia, & depression
- Emphasize function, management not diagnosis
- Emphasis task specific exercise
- Encourage socialization & stimulation
- Minimize medications
- Realize that improvements occur slowly
Siebens Domain Management Model

I. Medical/Surgical Issues
   • Symptoms, diseases, prevention

II. Mental Status / Emotions / Coping
   • Cognition, emotions, coping/behavioral systems, spirituality, patient preferences (advance directives)

III. Physical Function
   A. Basic ADL’s - self care, home mobility
   B. Intermediate ADL’s - community mobility, budget management, etc.
   C. Advanced ADL’s – Avocational, Vocational

IV. Living Environment
   • Physical, Social, Financial/Community Resources

- Siebens, 2010