Fall Prevention for Community Dwelling Older Adults: An Update on Assessment and Intervention Strategies

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Objectives

- Be able to screen community dwelling older adults for fall risk and frailty

  - sit to stand, gait speed, new standards for timed up and go

  - be able to describe types of falls

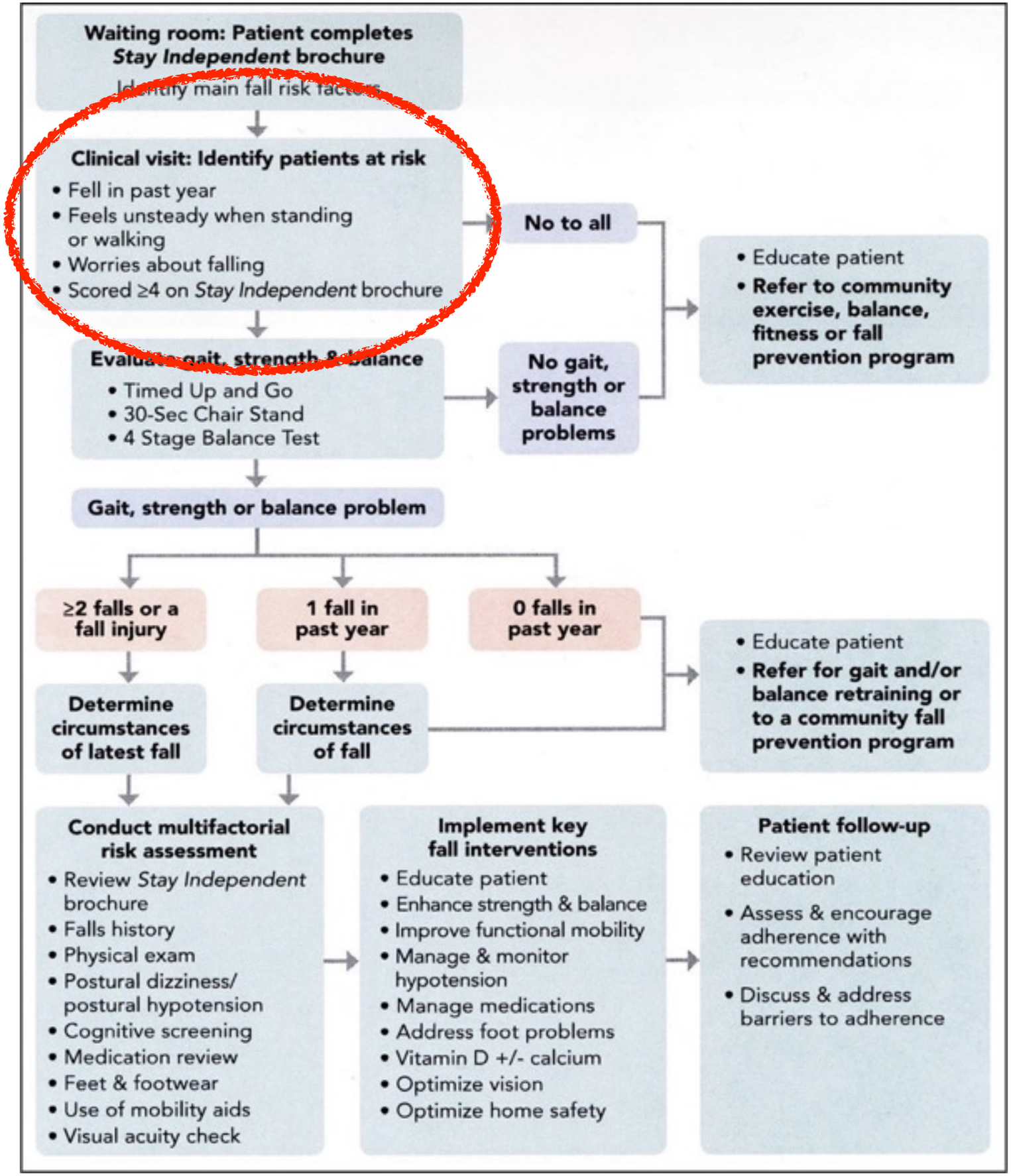
- Be able to answer questions about fall prevention programs- including this. . .

Afraid of Falling? For Older Adults, the Dutch Have a Cure

Photographs and Video by JASPER JUINEN Text by CHRISTOPHER F. SCHUETZE JAN. 2, 2018

The STEADI protocol:

Stop
Elderly
Accidents,
Deaths, and
Injuries



Stevens, *IHS Prim Care Provid* 2013

Please ask your patient

- If they fell in the past year
- Feels unsteady when standing or walking
- Afraid of falling
- Scored > 4 on the *Stay Independent** brochure

*Free from the CDC! www.cdc.gov/steadi/

What kind of fall was it?

- “Yes but it wasn’t that bad.”
- “No but I trip a lot”
- In order to establish a common language for fall recording, a grading scale has been validated by the folks at Johns Hopkins University:

Hopkins Falls Grading Scale

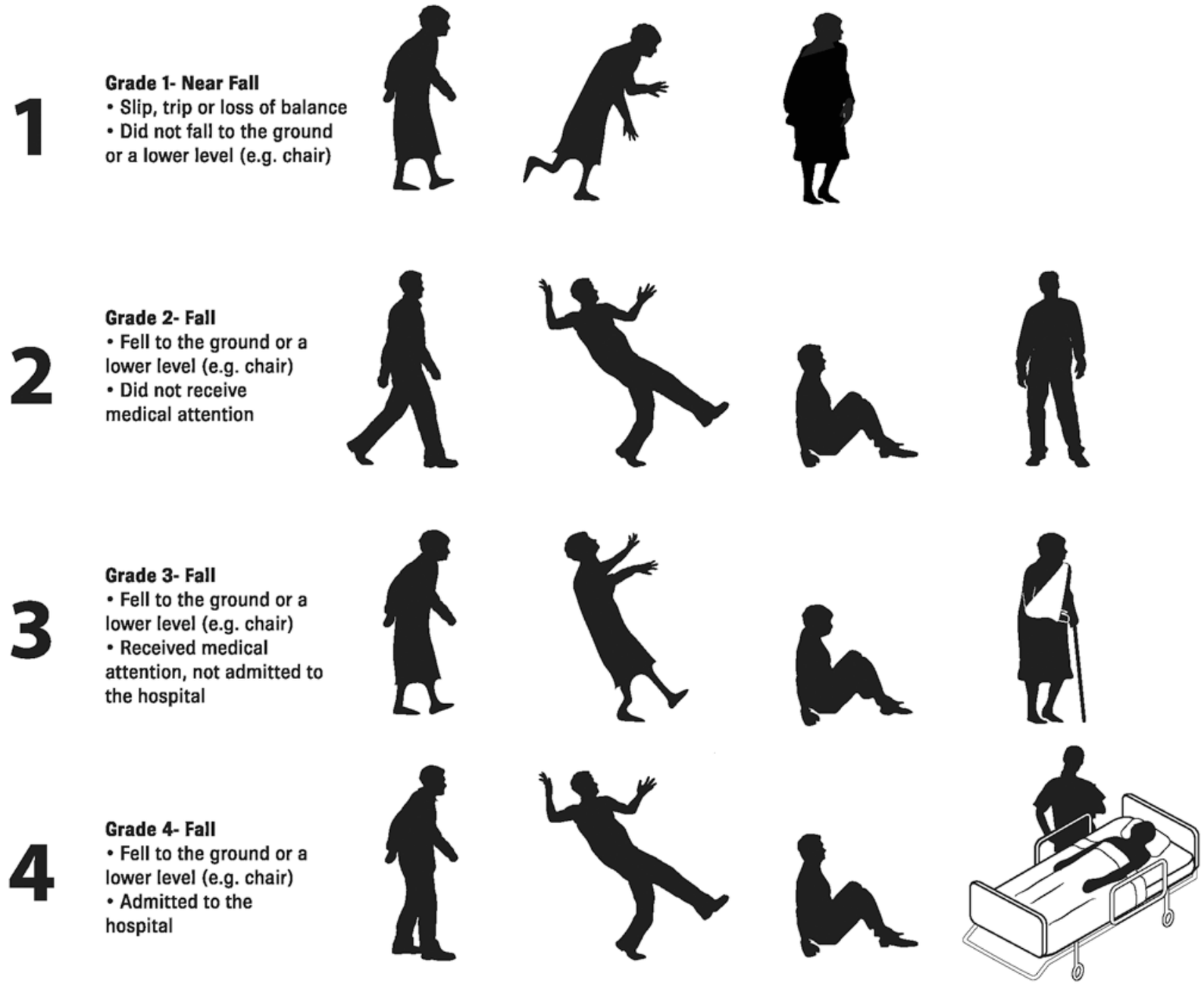


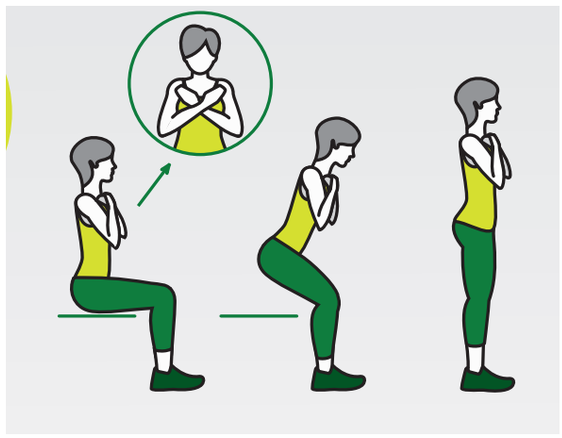
Figure 1. Hopkins Falls Grading Scale. © Johns Hopkins University

(Davalos-Bicharra et al *J Geriatric PT* 2013)

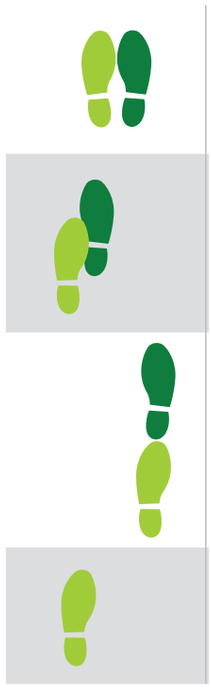
If yes, then:

- Timed up and go

- 30 second chair stand



- four stage balance test



Timed Up and Go details

- Normal pace, any device
- tape line, not a cone
- NEW standards **> 12 seconds** indicative of increased falls (Lusardi et al *J Geriatric PT* 2017)
- AND people who took longer than **9 seconds** had a “higher risk of developing disability” in the next 2 years (Makizako et al *Physical Therapy* 2017)

30 second chair stand
5 x Sit to Stand

- If you have a lap button, you can do both

- have the chair against the wall if possible

- 30 s chair stand has norms by age

- NEW standard for 5x sit to stand **>12 seconds for falls, >9 seconds for developing disability in 2 years** (Lusardi et al *J Geriatric PT* 2017, Makizako et al *Physical Therapy* 2017)

SCORING

Chair Stand
Below Average Scores

AGE	MEN	WOMEN
60-64	< 14	< 12
65-69	< 12	< 11
70-74	< 12	< 10
75-79	< 11	< 10
80-84	< 10	< 9
85-89	< 8	< 8
90-94	< 7	< 4

A below average score indicates a risk for falls.

Needs hands to stand?

30 second chair stand

5 x Sit to Stand

Gait velocity
Berg Balance Scale

Why gait velocity as well?

★ Gait speeds below 1.0 m/s are considered a marker of sarcopenia, predictor of frailty and disability (Pamoukdjian et al *J Geri Onc* 2016)

- Among hospitalized older adults, those that walked <.6 m/s were 2.5x more likely to die in the next 2 years (Ostir et al *Arch Phys Med* Reh 2015)

✳ Predictor of all-cause mortality in men but not in women (Liu et al *Gait & Posture* 2016)

Change in gait speed over time matters

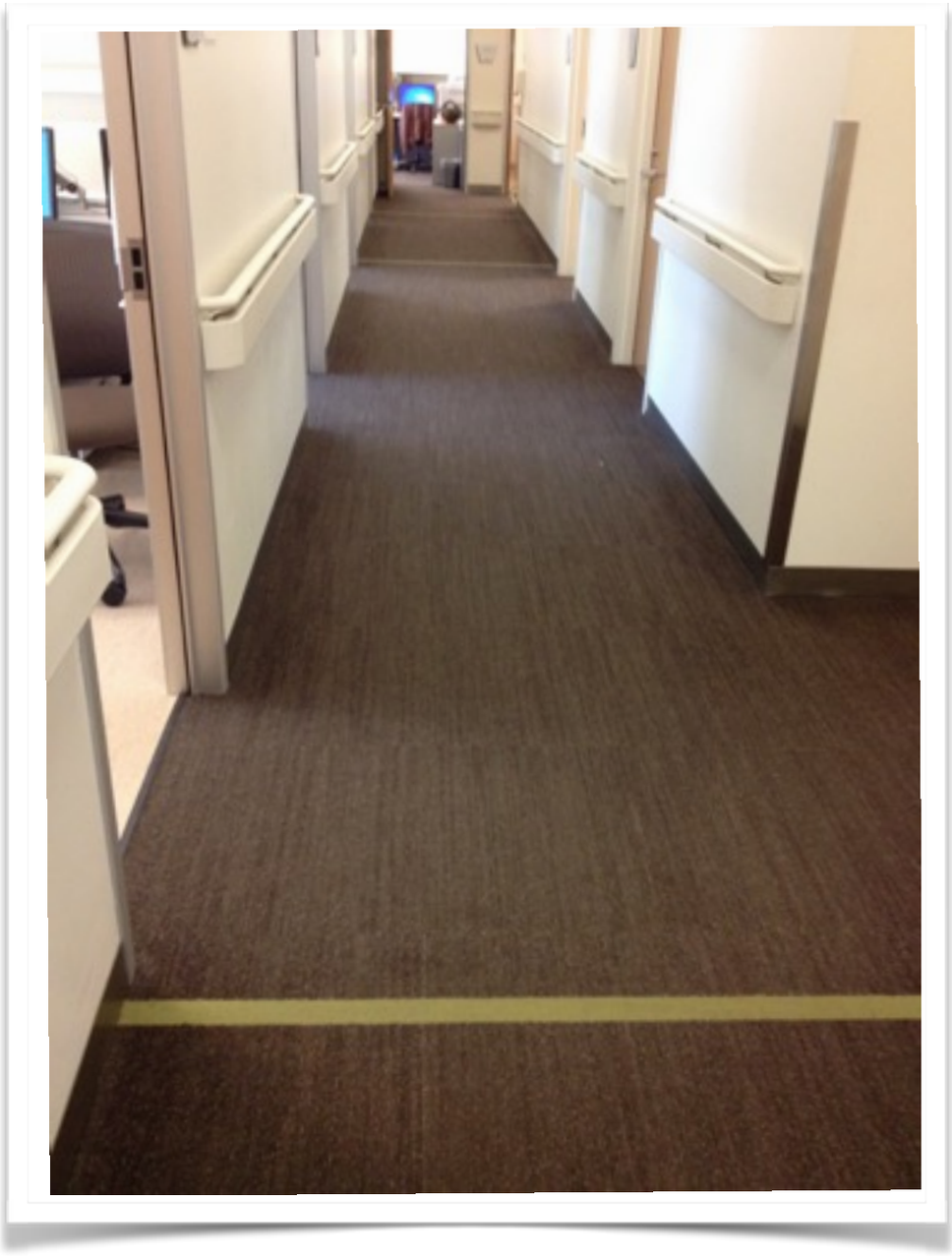
- Older adults who slow down more than 2.4% per year (.03 m/s)! had 2.1 times the risk of all-cause mortality

- n=2,364 aged 70-79 followed for 8 years

- Modifiable features of those who slowed down: High BMI, knee pain, muscular weakness, low physical activity (White et al *J Gerontology* 2013)

Best practice for gait speed

- Runway at least 4 m with 2 m “buffer zone” at each end (so you are not getting start / stop slowdown)
- Calculate distance ÷ time
- No talking



Why are they falling or walking slow?

- Multifactorial assessment
- Meds
- rule out orthostatic hypotension
- environment
- shoes
- physical assessments

Level 1: Functional Mobility

Able to stand no hands?

NO

Berg Balance Scale

YES

5X Sit to Stand
30 s chair stand
miniBEST

Level 2: Independent Gait

Gait velocity
(10 mwt or other distance)

<.4 m/s
Household

.4 -.8 m/s
Limited
Community

>.8 m/s
Community

Berg Balance Scale
TUG
DT TUG

BBS / miniBEST
DGI / FGA
TUG/ DT TUG

FGA / DGI
Four square step test
miniBEST

ABC

the miniBEST is the best

- Core Outcome Set consensus paper on balance measures for older adults

- 2 made the cut: Berg and Mini-BEST

- but the miniBEST “may be considered a more comprehensive measure” (Sibley et al PLOS One 2015)

- go to www.bestest.us

what makes the mini best the best?

- It just makes sense.
- Identifies fall risk
- Helps explain why- is it an input (sensory) or output (motor) problem?
- what to do next- remediate or compensate?
- If it's too hard, then use the Berg (Sibley et al PLOS One 2015)

Resources required for postural stability and orientation

Cognitive Processing

Orientation to Gravity

Biomechanical constraints

Sensory strategies

Movement Strategies

Control of Dynamics

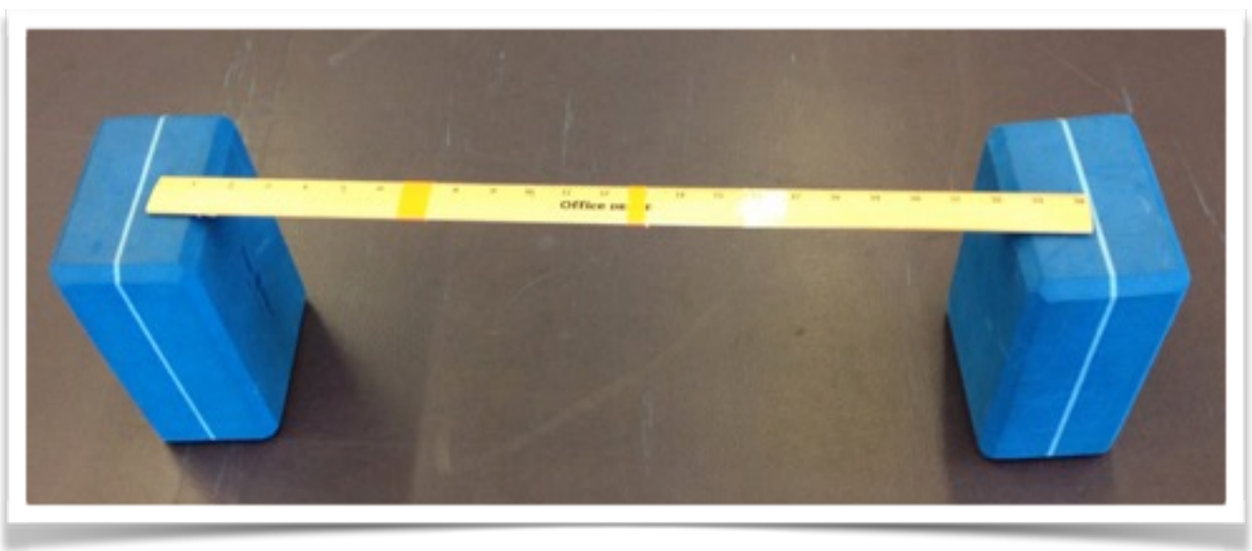
Horak 2006

sensory inputs for balance

- sensory weighting of vision, vestibular, and proprioceptive
    - standing eyes open and on foam, eyes closed
- orientation to gravity
    - on 10 degree ramp, eyes closed

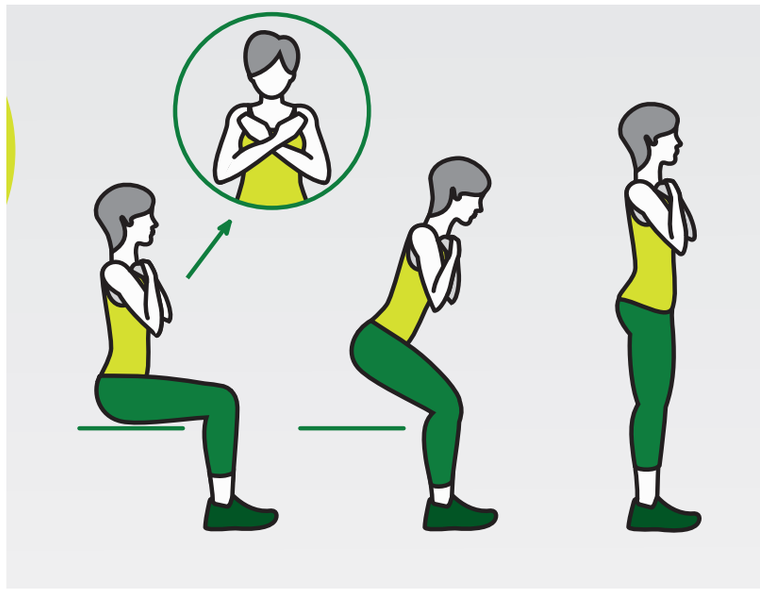
motor output strategies: Dynamic

- gait with speed change
- gait with head turns
- gait with pivot turn
- step over obstacle (9 inches high)
- dual task timed up and go



motor output of balance: anticipatory

- rise on toes
- sit to stand
- single leg stance



motor output strategies: reactive

- compensatory stepping correction *
  - forward
  - backward
  - laterally

REACTIVE POSTURAL CONTROL ***SUB SCORE: / 6***

4. COMPENSATORY STEPPING CORRECTION- FORWARD

Instruction: "Stand with your feet shoulder width apart, arms at your sides. Lean forward against my hands beyond your forward limits. When I let go, do whatever is necessary, including taking a step, to avoid a fall."

(2) Normal: Recovers independently with a single, large step (second realignment step is allowed).
(1) Moderate: More than one step used to recover equilibrium.
(0) Severe: No step, OR would fall if not caught, OR falls spontaneously.

Stand in front of the subject with one hand on each shoulder and ask the subject to lean forward (Make sure there is room for them to step forward). Require the subject to lean until the subject's shoulders and hips are in front of toes. After you feel the subject's body weight in your hands, very suddenly release your support. The test must elicit a step. NOTE: Be prepared to catch subject.

So what do we do about it??

what to do about it: APTA position statement

Interventions:

1. Physical therapists *must* provide individualized interventions that address all positive risk factors within the scope of physical therapist practice (CGS Grade A: Strong recommendation based on Level I evidence). Components of the intervention should include:
    a. Strength training that is individually prescribed, monitored, and adjusted (CGS Grade A: Strong recommendation based on Level I evidence)
    b. Balance training that is individually prescribed, monitored, and adjusted (CGS Grade A: Strong recommendation based on Level I evidence)
    c. Gait training (CGS Grade A: Strong recommendation based on Level I evidence)
    d. Correction of environmental hazards (CGS Grade A: Strong Recommendation based on Level I evidence)
    e. Correction of footwear or structural impairments of the feet (CGS Grade B: Recommendation based on Level II evidence)

(Avin et al PTJ 2015)

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Key ingredients

- Salient!
- Social
- Strengthening
- Safe!
- Skillful (Challenging!)
- Super Fun!

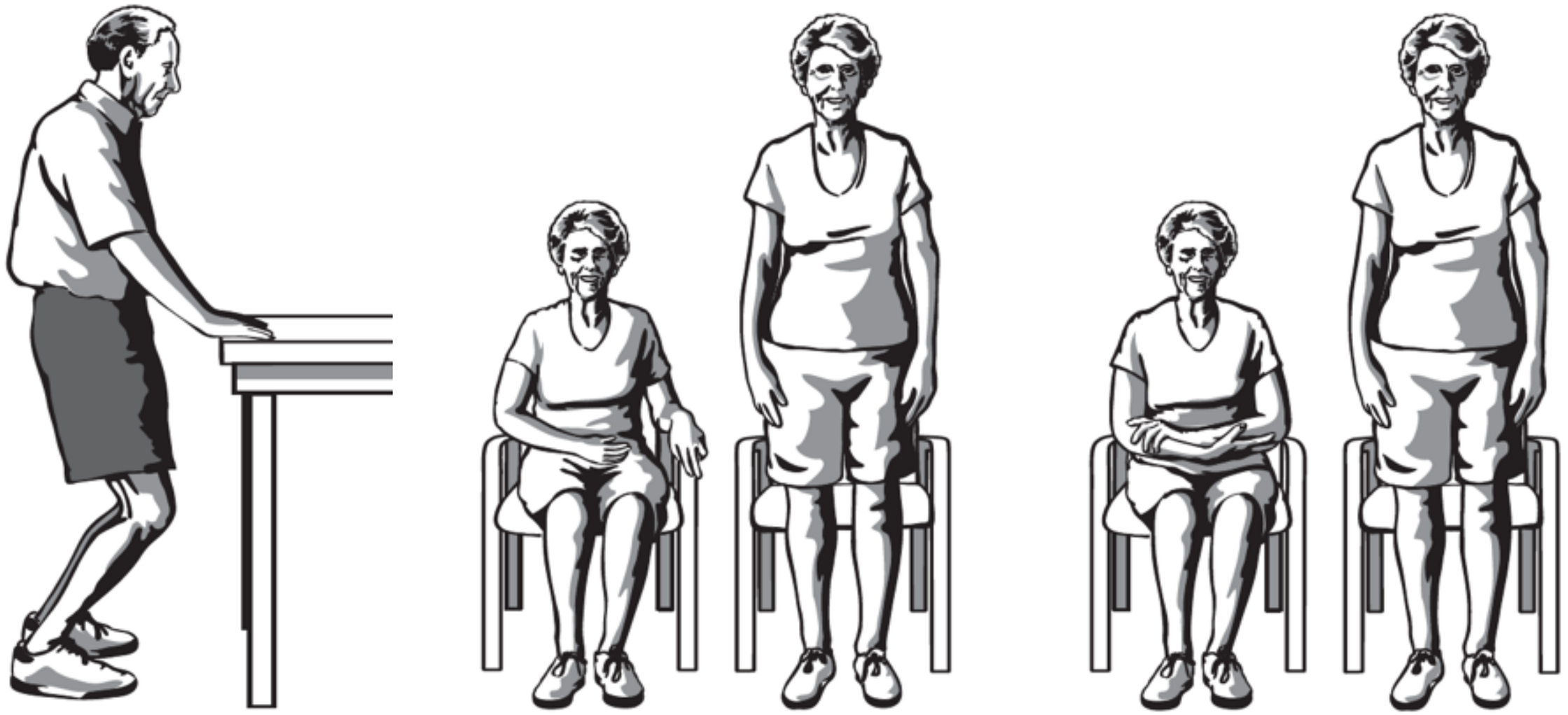
Strength training: progression is key

- Minimum requirement for “healthy” older adults
- 2 or more nonconsecutive days a week
- 1 set each 8-10 exercises, resistance to allow 10-15 reps
- Progress by # of sets
- Increase resistance from 15 RM to 10 RM (Peterson & Gordon, Am J Med 2011, Raymond et al *Arch Phys Med Rehabil* 2013-meta)

Which exercises, exactly?

- “Whole body”, body weight to machines to free weights
- Often quoted or tested: Leg press, knee extension, lat pull, chest press

The basics: Otago Program

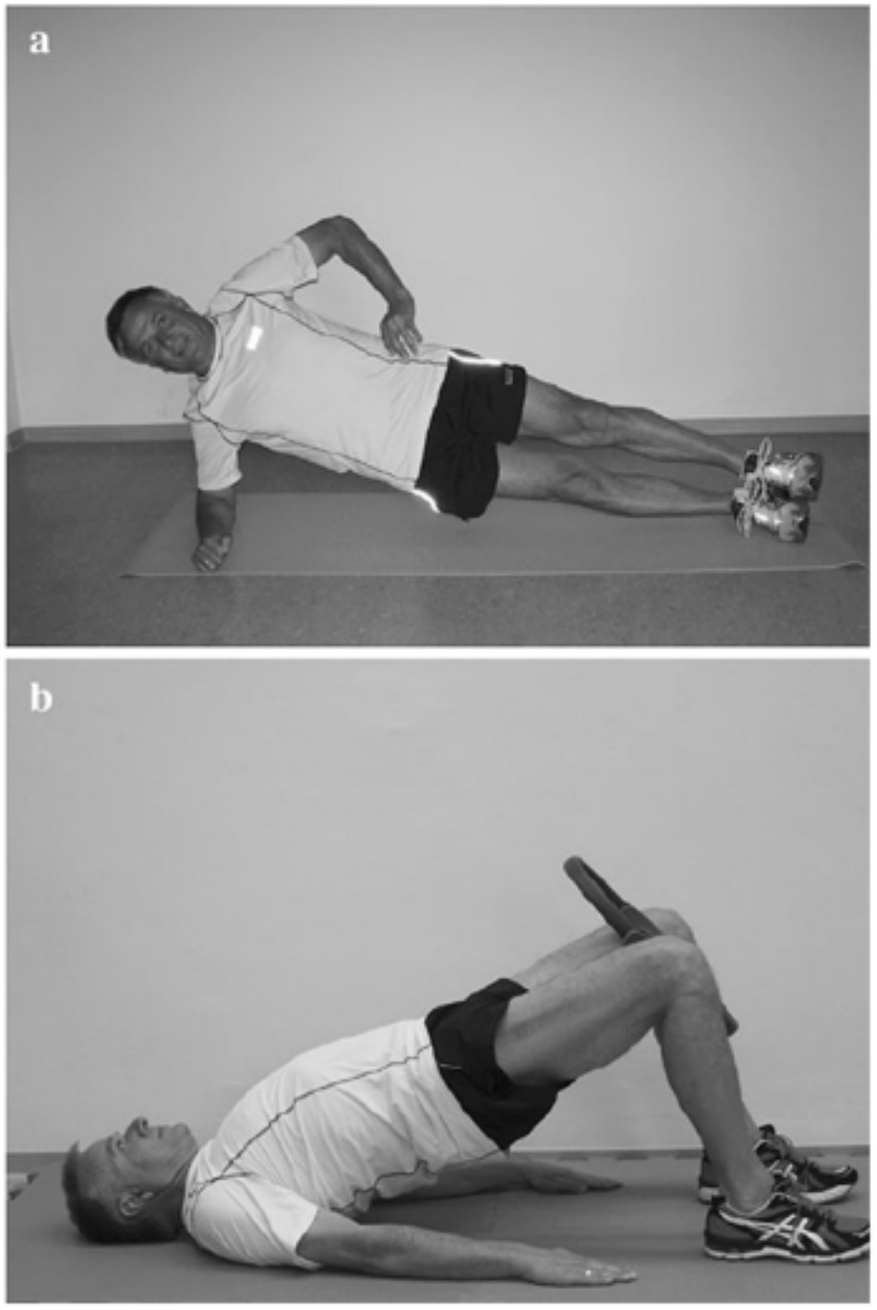


Example: otago Program

don’t forget core strength

- small but significant association with fall risk
- Core strength or Pilates based programs can be an effective adjunct

(Granacher et al Sports Med 2013)



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What about cognition?

- Impairments in dual tasking and executive function increases fall risk (Coppin et al Age Aging 2006, Hsu et al Osteoporosis Int 2012, Shumway-Cook, Motor Control 2007)
- Does dual task training help *reduce* fall risk?
  - Not enough conclusive evidence yet (Agmon et al *Clinical Interventions in Aging* 2014)

pragmatic two prong strategy

- Don’t dual task when you can avoid it!
- Dual task training and extinguishing “posture second” strategy
- Fun!

The rehab merits of dual tasking with tongue twisters?

- seventy-seven benevolent elephants
- You know New York, you need New York,

You know you need unique New York

- Challenges response monitoring, attentional vigilance, response inhibition!

Parting thoughts

If you are afraid you will fall,

it’s tempting to not walk at all,

but stay strong and stay fit,

and for gosh sakes don’t sit!

Get out, get moving, and stand tall!