

Improving Your Fall Prevention Metrics:
Let Technology Do The Heavy Lifting

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Objectives

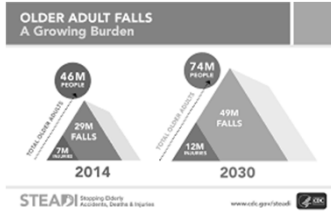
- ▶ Identify Fall Risk Factors in the Elderly
- ▶ Understand New Fall Risk Assessment Tools and Evaluation Techniques
- ▶ Review fall measures and assessment data – QAPI and PIP considerations
- ▶ Understand treatment protocols for fallers using rehabilitative technologies for improved outcomes

The Current Fall Risk Landscape

- ▶ How do we know if an older adult is likely to fall or has fallen?
- ▶ Fewer than half of Medicare beneficiaries who fell in the previous year actually talked to their healthcare provider about it
- ▶ New CDC initiatives require community providers to inquire of older patients, "Fallen in the past year? Injured? Feel unsteady when standing or walking? Worried about falling?"
- ▶ A fall within the last 6 months is single most predictive factor for a future fall

Every 20 minutes an older adult dies from a fall.

Each year, 3 million more are treated in emergency departments for non-fatal falls.



https://www.cdc.gov/steady/pdf/steady_tool_kit_materials_handout-a.pdf

5 MINUTES BEFORE CHANGE OF SHIFT?

LET ME SPICE THINGS UP FOR YOU!



Risk Factors

- ▶ Age
- ▶ Medication use
- ▶ Chronic Pain
- ▶ Cognitive Impairment
- ▶ Impaired Balance – visual, somatosensory, vestibular
- ▶ Hypotension
- ▶ Decreased LE function and use of mobility aids
- ▶ Urinary Incontinence
- ▶ Acute/chronic illness
- ▶ Environmental factors

Tools and Evaluation – Gait Speed

- ▶ GAIT SPEED IS A CRITICAL RISK ASSESSMENT AND PROGRESS MEASURE
- ▶ Gait speed declines with age
- ▶ Differs between men and women due to L.E. strength & leg length differences
- ▶ Can be assessed quickly and reliably
- ▶ Can be used to assess fall risk and ADL independence
- ▶ Gait speed declines because of problems with:
 - ▶ Ankle propulsion – weak triceps surae and/or limited ankle ROM
 - ▶ Hip propulsion – weak hip flexors and/or limited hip ROM
 - ▶ Decreased single stance time
 - ▶ Weak hip abductors
 - ▶ L.E. pain

Timed Up and Go (TUG) Test

Test for mobility

- ▶ Patient sits in standard chair and the time to rise and walk 10 feet out, turn and come back to sitting is measured.

FALLERS demonstrate:

- ▶ SIT-TO-STAND > 4 sec
- ▶ 10 FOOT WALK > 6 sec
- ▶ TURN 180 degrees takes > 2 sec or > 4 steps
- ▶ TUG SCORE > 12 sec indicates substantial fall risk

Fall Assessment Tests: Tinetti (POMA), Berg, Functional Reach

Test	Total	High	Med	Low
Tinetti	28	<18	19 - 23	>24
Berg	56	<40	40 - 45	>45
Tug	secs	>30	29 - 21	<12
Fn Rch	inches	1-6"	6 - 10"	>10

Muscle Strength and Fall Risk

Muscle Strength Testing Scale

Rating	Observation
0	No muscle contraction is detected.
1	A trace contraction is noted in the muscle by palpating the muscle while the patient attempts to contract it.
2	The patient is able to actively move the muscle when gravity is eliminated.
3	The patient may move the muscle against gravity but not against resistance from the examiner.
4	The patient may move the muscle group against some resistance from the examiner.
5	The patient moves the muscle group and overcomes the resistance of the examiner. This is normal muscle strength.

Source: www.jocfa.com/ajot/ajotnety/ajotcourse/15840/musclestrength.htm

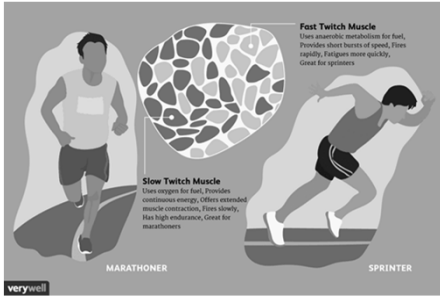
Muscle Strength and Fall Risk

- ▶ Sarcopenia and dynapenia, which describe the age-related loss of muscle mass and strength, occur at a rate of 1% to 5% annually from the age of 30.5. The rate of strength decline depends on a person's age and physical activity. Strength declines 1.5%/year between the 50th and 70th year and up to 3% per year after age 70 (Keller).
- ▶ The World Health Organization's 2007 "Global Report on Falls Prevention in Older Age" states, "Loss of muscle strength leads to a loss of function and to a higher level of frailty, which intensifies the risk of falling."

Strength and Aging

- ▶ Sedentary older adults lose strength more quickly than active adults who are involved in strength training. (Lindele)
- ▶ After the age of 60, power decreases even more rapidly at a rate of 3% to 5% annually, affecting the ability to move and react quickly. (Meter, Goldspink)
- ▶ This means 60-year-olds who maintain sedentary lifestyles will, at the age of 70, be up to 50% weaker than they were at the age of 60.
- ▶ Lower extremity weakness is one of the greatest predictor of falls. (Rikli)

Type I and Type II Muscle Fibers and Aging



Electrical Stimulation effective for exercise intolerant and medically complex patients

Motor-level Stimulation
Comparison of Voluntary and Electrically-Induced Contractions

Voluntary	Electrically-induced
<ul style="list-style-type: none">■ Type I fibers recruited first■ Asynchronous<ul style="list-style-type: none">- Decreases fatigue■ GTO protect muscles	<ul style="list-style-type: none">■ Type II fibers recruited first■ Synchronous recruitment<ul style="list-style-type: none">- Based on PPS■ GTOs do not limit contraction

Moving from Assessment to Treatment

- ▶ Medicare costs for fall injuries reported in excess of \$31 billion annually.
- ▶ Assessments can only predict falls and not prevent them
- ▶ CMS QAPI tools provide SNF's with individual facility approach templates
- ▶ <https://www.cms.gov/Medicare/Provider-Enrollment-and-Certification/QAPI/Downloads/QAPIAtaGlance.pdf>

Data and Measures – QAPI FMP Fall Management Program

- ▶ AHRQ – Agency for Healthcare Research and Quality suggestions for FMP measures
- ▶ accurate measurement system is an important component of the quality improvement process that allows staff to determine if changes in care lead to improvement.
- ▶ The Tracking Record for Improving Patient Safety is the key tool used for measuring fall events/issues
- ▶ The key indicators for the FMP are outcome measures that include falls, residents who fall, residents with two or more falls and fall related serious injuries. When studied over time these key indicators are the best markers of improvement.
- ▶ Number of falls each month
- ▶ Number of residents who fall each month
- ▶ Number of residents with two or more falls each month
- ▶ Number of falls with serious injury each month

Additional FMP measures

- ▶ Family and resident satisfaction
- ▶ Number of survey tags related to falls
- ▶ Number of lawsuits related to falls
- ▶ Changes in staff awareness – opinion based information before and after implementation
- ▶ Changes in staff organization –PDSA and Root Cause Analysis suggestions
- ▶ QAPI is ongoing reflected in changes in above

Falls are Multifactorial – So Are Interventions and Treatments

- ▶ Technology interventions address multiple causes of falls including:
 - ▶ Weakness and physical dysfunction
 - ▶ Pain, neuropathy, surgical effects, tissue injury
 - ▶ Joint abnormalities and disease processes
 - ▶ Edema and loss of ROM, cardiorespiratory changes
 - ▶ Impaired movement patterns and neurodegenerative disease

Technology to Improve Gait Speed

- ▶ Measurement of gait via wearable sensors provides treatment targets for impaired gait components:
- ▶ LEAF devices attached to chest measure mobility and alert staff
- ▶ Electrical stimulation (NMES, TENS, IFC, MFAC)
 - ▶ Decrease pain, improve circulation, increase muscle strength and force generation, improve sensory awareness
- ▶ Patterned E-stim (PENS) to improve muscle force generation
 - ▶ Select Type II muscle fibers lost in large numbers in aged and medically complex patients

Technology to Improve Strength

- ▶ E-stim plus correctly dosed exercise provides greatest improvement in strength gains
- ▶ Add NMES during strengthening and functional activities for maximum improvement
- ▶ Increase resistance training at highest intensity tolerated
- ▶ Use aerobic capacity training at proper dose to improve circulation – enhance with NMES

Technology to Improve Mobility

- ▶ Virtual Reality
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4211206/>
- ▶ Balance Trainers – wearable sensors, mechanical support during balance training
- ▶ Assisted cycling and ergometry – normalize movement patterns and increase aerobic capacity
- ▶ Vibrating shoes, walk-aid and functional Estim
- ▶ Supportive/corrective orthoses to gain mobility and decrease pain during movement

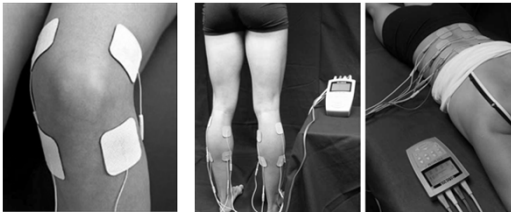
Aerobic Capacity and Strength Trainers



ACP OmniCycle and NMES Combination



Electrical stimulation has been demonstrated to improve and train type II muscle fibers in the elderly



Gait and Mobility Trainers



OmniStand Balance Trainer



Balance training and virtual reality



Falls are Preventable and Treatable

- ▶ Assessment tools indicate fall risk and measure progress with treatment
- ▶ QAPI and PIP's focus on fall metrics within individual facilities – supports regulatory compliance and drives toward best practice
- ▶ Implement treatment utilizing appropriate adjunctive technologies for patients to increase strength, balance, and improve mobility
- ▶ Appropriate timely treatment with evidence based technology augmented protocols is cost effective and reduces falls and fall injuries

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