Frailty and Falls: Screening in the Community

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Presentation Objectives

- Define frailty
- Discuss the complexity of frailty
- Frailty and sarcopenia
- Screening for frailty
- Define falls and discuss fall risk
- Screening for fall risk
- Role of Physical Therapy

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https://www.greatmovesphysicaltherapy.com/news/fall-prevention/

Frailty

WHAT WORD OR PICTURE COMES TO YOUR MIND WHEN YOU HEAR THE WORD FRAILTY?

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Frailty?

- There are a number of suggested theories and definitions of frailty
- About 75 available frailty screening tools
- Historically, there has been confusion about which screening tools to use in health care
- Recent increase in awareness about the need for improved definition, conceptual framework and screening suggestions

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J Am Med Dir Assoc. 2013 June ; 14(6): 392–397. doi:10.1016/j.jamda.2013.03.022.

Frailty Consensus: A Call to Action

John E. Morley, MB, BCh[a,*], Bruno Vellas, MD[b,c], G. Abellan van Kan, MD[b,c], Stefan D. Anker, MD, PhD[d,e], Juergen M. Bauer, MD, PhD[f], Roberto Bernabei, MD[g], Matteo Cesari, MD, PhD[b,c], W.C. Chumlea, PhD[h], Wolfram Doehner, MD, PhD[d,i], Jonathan Evans, MD[j], Linda P. Fried, MD, MPH[k], Jack M. Guralnik, MD, PhD[l], Paul R. Katz, MD, CMD[m], Theodore K. Malmstrom, PhD[a,n], Roger J. McCarter, PhD[o], Luis M. Gutierrez Robledo, MD, PhD[p], Ken Rockwood, MD[q], Stephan von Haehling, MD, PhD[r], Maurits F. Vandewoude, MD, PhD[s], and Jeremy Walston, MD[t]

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Frailty Consensus: Frailty Defined

"Physical frailty is a medical syndrome with multiple causes and contributors that is characterized by diminished strength, endurance, and reduced physiologic function that increases an individual's vulnerability for developing increased dependency and/or death."

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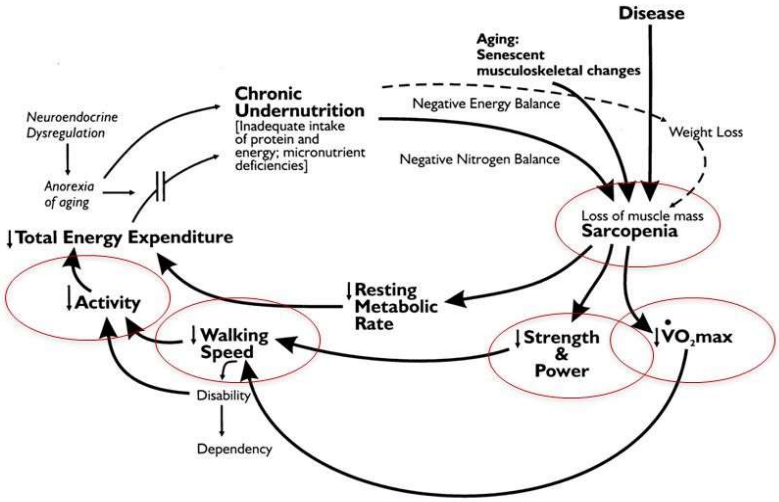
Hypothesized Cycle of Frailty



Fried L P et al. J Gerontol A Biol Sci Med Sci 2001;56:M146-M157

The Gerontological Society of America

the Journals of gerontology Series a

Sarcopenia

- Age-related loss of muscle mass
- Estimated 8-10% per decade until age 70 loss increases to 15% per decade
- Muscle fiber types:
  - Type I (endurance): slow twitch
  - Type II a (strength), IIb (power): fast twitch
  - Predominantly loss of Type II muscle fibers (b>a)

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Muscle Changes with Sarcopenia

- Loss of leg strength/power per decade
  - 10-15% until age 70 years
  - 25-40% >70 years
- Loss of strength is greater than loss of muscle mass
- Greater loss of muscle power vs strength and endurance
- Leg muscle power predictor for fall risk, physical performance and functional status
- Grip strength and leg strength are correlated
- A contributor to weight loss, exhaustion, low energy

Malafarina et al 2012, Foldvari et al 2000, Bean et al 2002

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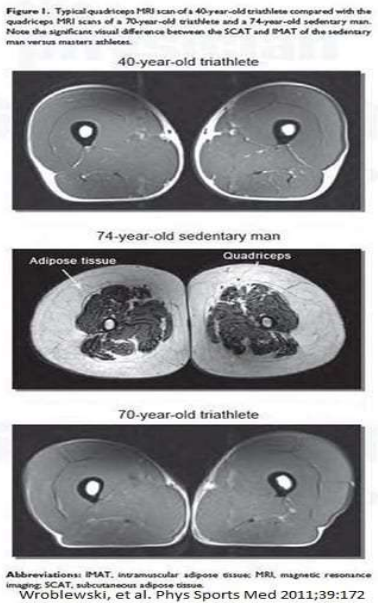
Sarcopenia: Lifestyle matters more than age!



Wroblewski, et al. Phys Sports Med 2011;39:172

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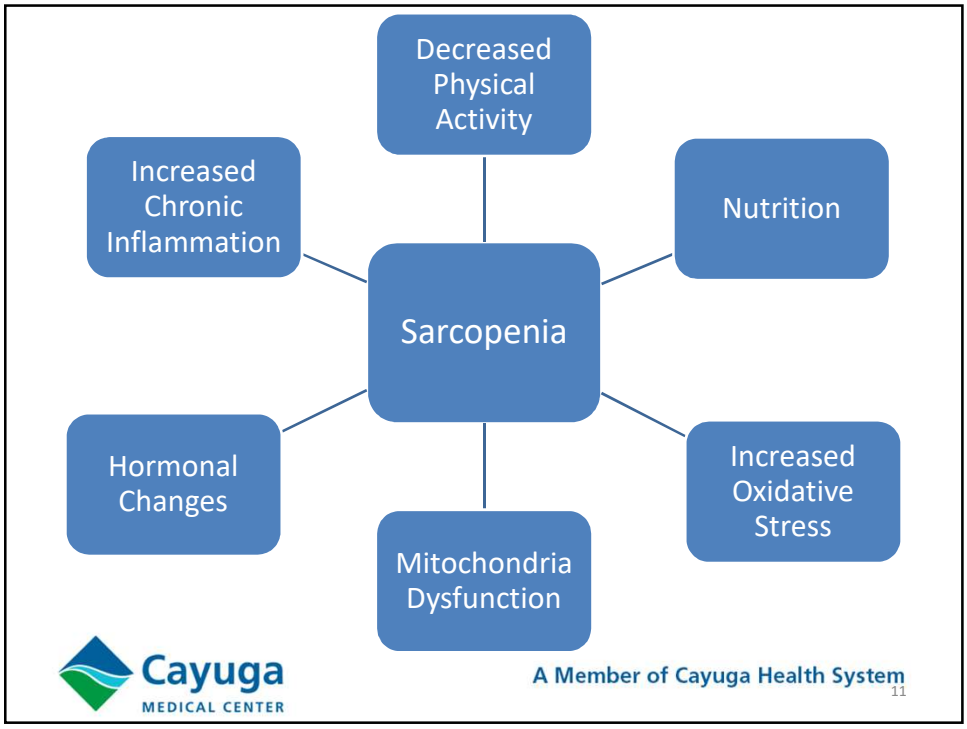
Decreased Physical Activity
Increased Chronic Inflammation
Nutrition
Sarcopenia
Hormonal Changes
Increased Oxidative Stress
Mitochondria Dysfunction
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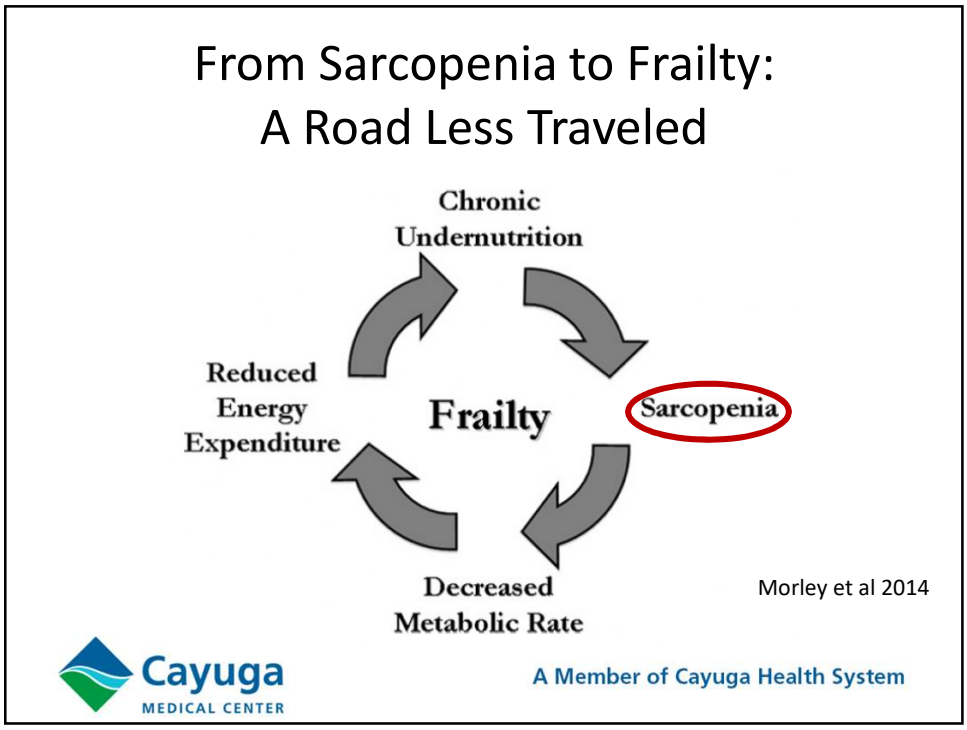
From Sarcopenia to Frailty:
A Road Less Traveled
Chronic Undernutrition
Reduced Energy Expenditure
Frailty
Sarcopenia
Decreased Metabolic Rate
Morley et al 2014
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WHY IS SCREENING FRAILTY IMPORTANT?

As multisystem dysregulation accumulates, **predictable** functional changes begin to appear and can serve as **warning signs** of vulnerability, development of frailty and adverse health outcomes.

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Frailty is Associated with:

- Increased hospital admission
- Increased risk for post-operative complications
- Increased fall risk
- Increased risk for cardiovascular event or illness
- Increased risk for nursing home living status
- Increased risk for mortality
  - 3x more than non-frail over 3 years
  - 6x more than non-frail over 7 years

Fried et al 2001, Rockwood et al 2009, Vermeulen et al 2011, Morley et al 2014

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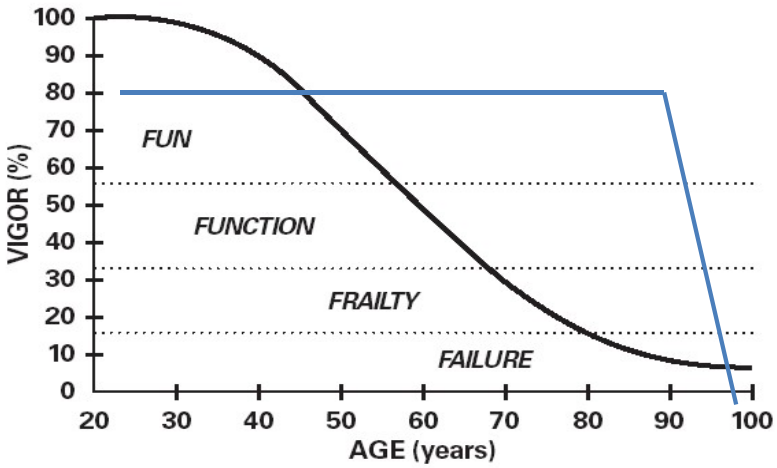
Slippery Slope of Aging



Shwartz, 1997

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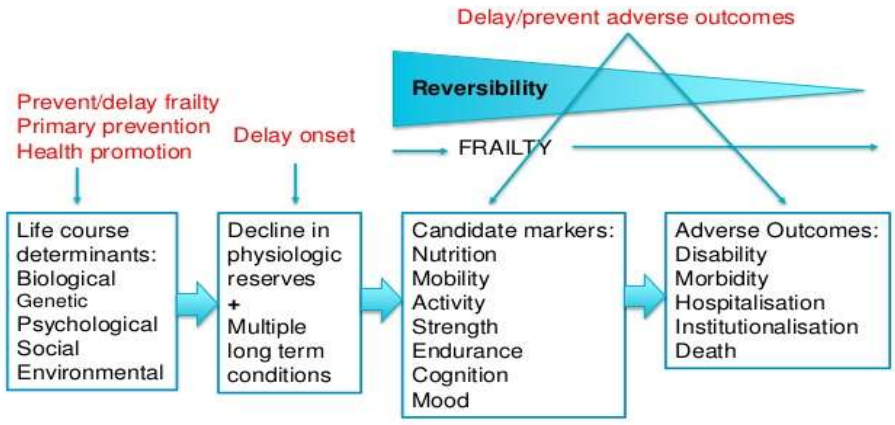
Frailty – a complex syndrome of increased vulnerability

NHS England



www.england.nhs.uk

Rodriguez-Mañas L, **Fried** LP. **Frailty** in the clinical scenario. **Lancet**. **2014** Nov 6

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Transitions between Frailty States

- 754 participants – non-disabled >70 y/o
- 57.5% at least one transition between robust, pre-frail, frail during 54 month follow-up
- In first 18 months:
  - Robust – 40.1% to pre-frail, 4.2% to frail
  - Pre-frail – 11.9% to robust
  - Frail- 63.9% remained frail, 23% to pre-frail, 13% died, 0 reversed to robust

Gill et al 2006

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Natural Course of Frailty Components

- Non-frail compared to frail individuals
  - Exhaustion (Risk Ratio 1.53): 9 years prior to onset
  - Slowness (RR 1.94), low activity (RR 1.59), weakness (RR 1.39): 6 years prior to onset
  - Weight loss (RR 3.36): only at onset of frailty

Stenholm et a. 2018

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FRAILTY SCREENING AND DIAGNOSIS

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Frailty Consensus: Summary

1. Physical frailty is an important medical syndrome
2. Physical frailty is a manageable condition
3. There are simple screening tools available
4. All Patients >70 y/o should be screened

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Frailty Consensus: Screening

- Who should be screened?
  - Everyone > 70 years old
  - Everyone w/ recent weight loss (5%) due to illness
- Who can screen patients?
  - Should be part of annual Geriatric Assessment
  - Any healthcare provider familiar with a screening tool
- Who can diagnose frailty
  - Should be diagnosed by a Physician with a Geriatric specialty using criteria of a well-defined model.

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Cardiovascular Health Study Frailty Screening Scale/Fried Criteria

Weight Loss	• >10#, >10% from age 60 y/o
Exhaustion	• Fatigue, weakness in past month
Slow Movement	• Gait speed <.60m/s
Weakness	• Grip strength lowest 20% (age/gender)
Low physical activity	• <383kcals/wk (M), <270 kcal/wk (F)

Robust = 0/5 Pre-Frailty = 1-2/5 Frailty = 3-4/5

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FRAIL Scale

(International Academy of Nutrition and Aging)

Fatigue	• Do you feel worn out or feel tired?
Resistance	• Can you climb one flight of stairs?
Ambulation	• Can you walk 100m or 1 block?
Illness	• Do you have more than 5 illnesses?
Loss of weight	• >5% of body weight in 6 months?

Robust = 0/5 Pre-Frailty = 1-2/5 Frailty = >2/5

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Study of Osteoporotic Fracture Frailty Criteria (SOF)

Frailty Criteria	Data Collection	Score
Weight Loss >5% in past 3 years	Weight/weight 3 years ago = % loss	Score = 1 if >5% loss
Weakness	Rise from chair without arms 5x	Score =1 if unable
Exhaustion	Ask "Do you feel full of energy?"	Score = 1 if "no"

Robust = 0/3 Pre-Frailty = 1/3 Frailty = 2-3/5

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Frailty Consensus: Management

- Reduction in polypharmacy
- Vitamin D supplementation
- Caloric and protein support
- Exercise and physical activity

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PT Treatment of Frail Individuals

Reduce symptoms and restore function after acute illness, exacerbation

+

Manage co-morbidities and screen for risk of additional health problems, mobility deficits

_____

Moving the patient closer to a state of optimum health, independence and quality of life

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Physical Therapy

- Aim to restore function
- Initiate appropriate exercise plan
- Establish long term plan
  - exercise and activity
  - disease symptom management
  - adaptations, support, resources
- ***Recommend minimum of 1 year of exercise meeting recommended criteria for treatment of frailty! Exercise should be ongoing!***

Karavirta 2011, 2014

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https://www.greatmovesphysicaltherapy.com/news/fall-prevention/

Falls

COMMON, COSTLY, DETRIMENTAL AND PREVENTABLE

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http://www.bphc.org/whatwedo/childrens-health/injury-prevention/Pages/Older-Adult-Falls-Prevention.aspx

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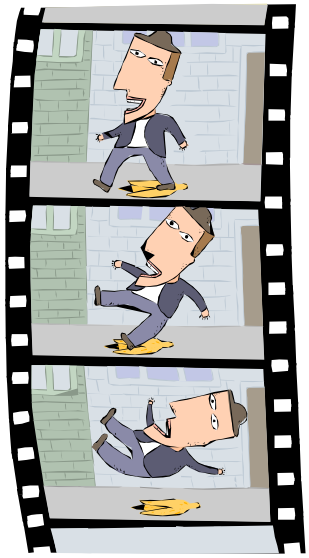
Falling -

Falling is not a NORMAL part of aging!



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What is Balance?

- Balance is the process by which we control the body's center of mass with respect to the base of support while the body is stationary or moving

- Types of Balance
  - Postural balance
  - Static balance
  - Dynamic balance
  - Stability Limits

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What is Postural Control?

- Act of maintaining, achieving, restoring a state of balance during any posture or activity

- Types of Postural Control
  - Anticipatory
  - Reactionary

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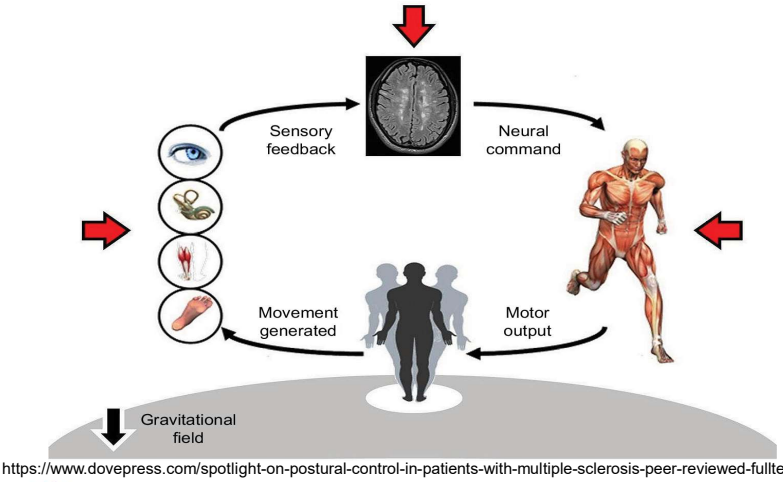
Postural Control



https://www.dovepress.com/spotlight-on-postural-control-in-patients-with-multiple-sclerosis-peer-reviewed-fulltext-article-DNND

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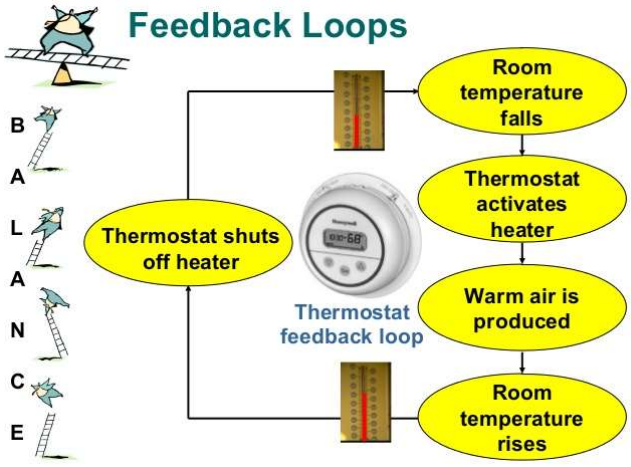
Thermostat Example



https://www.slideshare.net/coachpointer/homeostasis-4-themes-ppt

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WHY IS BALANCE IMPORTANT FOR OLDER ADULTS?

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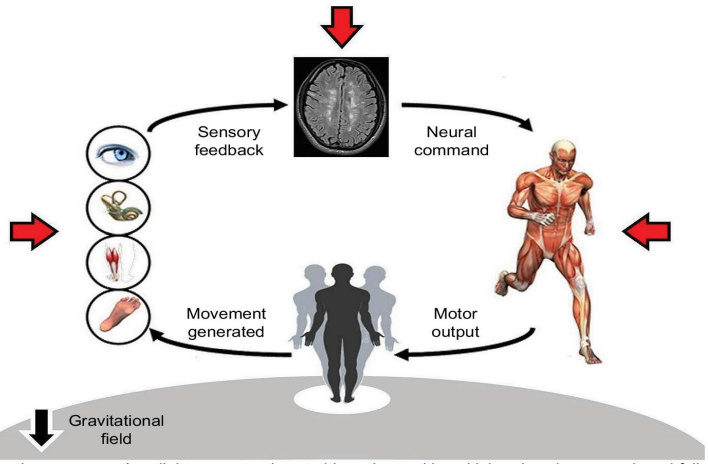
Postural Control



https://www.dovepress.com/spotlight-on-postural-control-in-patients-with-multiple-sclerosis-peer-reviewed-fulltext-article-DNND

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Sensory

- Vision changes
  - Visual acuity is associated with postural sway
  - Visual conditions: *cataracts*, macular degeneration, glaucoma
  - Depth perception, peripheral vision changes (glasses – bifocals or trifocals)
- Decrease in vestibular system function
  - Vestibular conditions: positional vertigo, disequilibrium, many others
- Loss of sensation due to illness or loss of sensory cells
  - Conditions: peripheral neuropathy or loss of senation caused by diabetes, cancer treatment, spinal conditions, vascular disease or unknown cause

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Neurologic

- Neurologic conditions:
  - Parkinsons disease, stroke, Alzheimer's disease
- Cognition and mental alertness
  - Memory loss, safety awareness, and decision making
  - Anxiety and depression
- Psychomotor slowing
  - Reduced Reaction time, central nervous system processing

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Musculoskeletal

- Decrease of muscular strength/power due to loss of muscle mass
- Loss of flexibility and joint mobility
- Lifestyle of inactivity
- Bone integrity changes
  - Osteopenia, osteoporosis

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FALLS AND FALL PREVENTION

Center for Disease Control and
National Council on Aging Recommendations

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Fall and Fall Risk Defined

- Fall: An event which results in a person coming to rest inadvertently on the ground or floor or other lower level, not as a result of a major intrinsic event or overwhelming hazard
- Risk: probability that an unwanted health event will occur
  - Assumption: risk is never absent (zero)

WHO http://www.who.int/mediacentre/factsheets/fs344/en/

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CDC Falls Facts

- Community living older adults: 30-40%
  - One in three: strong epidemiological evidence
  - Risk increases with advancing age
  - "Pre-test Probability" of falling

Question: what is acceptable level of risk?

Answer: it depends….

Reality: risk will never be "0"

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file:///Users/Reilley/Downloads/MHLCymruBestPracticeguideENG%20(1).pdf

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Fall Prevention

Primary
- Early detection of risk prior to adverse event
- Remove modifiable risk factors
- Avoid falls and injury

Secondary
- Early detection of falls, FOF, mobility decline
- Prevent recurrent falls, mobility decline
- Restore function after a fall

Tertiary
- Reduce secondary complications of falls
- Reduce fall rate OR avoid falls
- Maintain current living status

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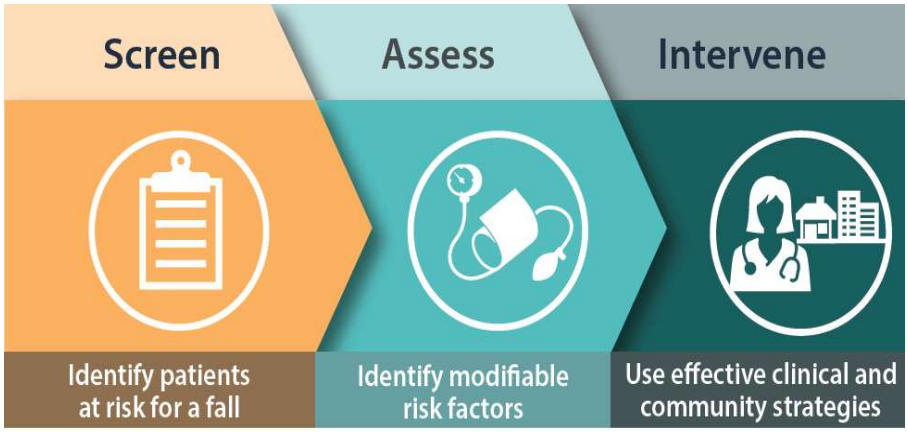

www.cdc.gov

STEADI Stopping Elderly Accidents, Deaths & Injuries

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Estimates of Rehab Service Utilization

- Rehab services received in the last year
  - Less than ½ (40.6%) at high risk
  - Less than ¼ (23%) at moderate risk
- Those that received rehabilitation, few reported treatment for fall-related issues.
  - Low risk (2.8%)
  - Moderate risk (12.6%)
  - High risk (34.7%)

Gell & Patel 2018

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Types of Screenings

- Community Screening
  - Fall Risk screening for older adults not receiving intervention
  - Error on side of false positives to avoid missing anyone at risk
  - Immediate PT/medial assessment may not be possible
- Clinical Screening
  - Screening all older adults for fall risk on arrival to clinic/office
  - No matter what the reason for referral or visit
- Annually
  - Screen as part of annual Medicare visits
  - If needed: detailed multifactorial medical and PT assessment

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SCREENING IN THE COMMUNITY

Stay Steady

TOMPKINS COUNTY FALL RISK SCREENING EVENTS

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Stay Steady

Self-report

- Have you fallen?
- Fear of Falling ?
- Medications?
- Need for assistance or use of an assistive device?
- Stay Independent Brochure (optional)
  - >4 or Yes any of the above

Mobility Screen

- Timed Up and Go Test
- 30 second chair rise test
- 4 – stage balance test
  - Narrow stance, semi-tandem, tandem, SLS
  - <10 on tandem stance

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SCREENING IN THE CLINIC

Current evidence and recommendations:

American Geriatric Society
British Geriatric Society

American Physical Therapy Association: Academy of Geriatric Physical Therapy

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AGS/BCS Guidelines for Fall Risk Screening

- Everyone >65 y/o, regardless of reason for referral
- During initial interview
  - Have you had a fall in the past year?
  - Are you worried about falling (FOF)
  - Are you here because you recently fell?
  - Do you have difficulty with walking or balance?
  - Observe patient mobility in the office during visit

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Screening to Assessment

- If yes to any of the recommended questions, specifically >2 falls in the last 12 months indicates need for multifactorial fall risk assessment including balance and gait assessment (PT referral)
- Older adults with history of even one fall should have a multifactorial balance/gait assessment

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AGS Multifactorial Risk Assessment

- Assessment of integrated musculoskeletal function and postural control: PT and /or OT referral
- Medication review:
  - Psychotropic medications or taking or > 3-4 medications of any type
  - Monitor possible side effects with any new meds of changed doses
  - BEER's list criteria
- Orthostatic Hypotension testing
- Diagnostic test: should be selected based on individual needs
  - Lab and Imaging
- Nutrition consult
- Vision examination
  - Yearly or after any acute changes
- Foot/Footwear assessment

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Clinical Guidance Statement

Management of Falls in Community-Dwelling Older Adults: Clinical Guidance Statement From the Academy of Geriatric Physical Therapy of the American Physical Therapy Association

Keith G. Avin, Timothy A. Hanke, Neva Kirk-Sanchez, Christine M. McDonough, Tiffany E. Shubert, Jason Hardage, Greg Hartley

K.G. Avin, PT, PhD, Department of Physical Therapy, Indiana University School of Health and Rehabilitation Sciences, Indianapolis, Indiana.

T.A. Hanke, PT, PhD, Physical Therapy Program, College of Health Sciences, Midwestern University, Downers Grove, Illinois.

N. Kirk-Sanchez, PT, PhD, Department of Physical Therapy, University of Miami, Coral Gables, Florida.

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APTA Geriatric Section Clinical Guideline Statement 2015

- Screening all adults >65 y/o, no matter the reason for PT evaluation
- Questions:
  - Falls in the past 12 months
  - Fear of falling, concern about balance
- Balance and mobility:
  - Observations of gait and balance, Timed up and Go

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Systematic Reviews

OPEN

Determining Risk of Falls in Community Dwelling Older Adults: A Systematic Review and Meta-analysis Using Posttest Probability

Michelle M. Lusardi, PT, DPT, PhD[1]; Stacy Fritz, PT, PhD[2]; Addie Middleton, PT, DPT, PhD[3]; Leslie Allison, PT, PhD[4]; Mariana Wingood, PT, DPT, GCS[5]; Emma Phillips, PT, DPT, GCS[6]; Michelle Criss, PT, GCS[7]; Sangita Verma, PT, DPT, GCS[8]; Jackie Osborne, PT, DPT, GCS[9]; Kevin K. Chui, PT, DPT, PhD, GCS, OCS[10]

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Recommendation for Screening Questions

Measure	Cut-off	PoTP % (+)	PoTP% (-)
Any Previous falls	Yes/no	44	26
Psychoactive meds	Yes/no	38	26
Assistance with ALDs	Yes/no	38	26
Fear of falling	Yes/no	38	28
AD use	Yes/no	36	26

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Recommendation for Performance Based Measurements

Measure	Cut-off	PoTP % (+) test	PoTP% (-) test
TUG	>12 sec	47	25
Standing on 1 leg	<6.5 sec	45	28
5x sit to stands	>12 sec	41	20
Gait speed	<1.0 m/s	39	20
	<.60m/s	61	23

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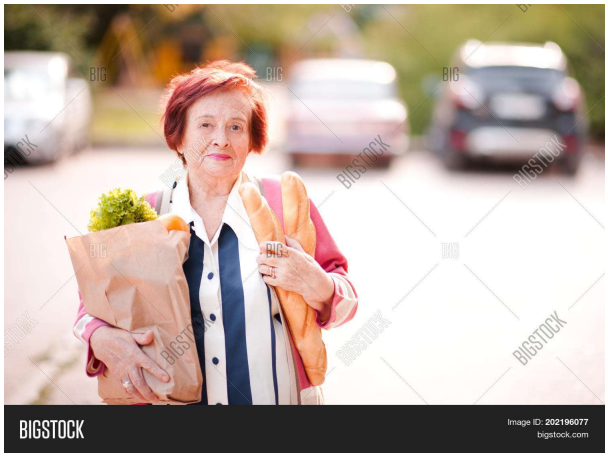
Meet Jane- 70 year who lives independently in our community



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Clinical Example- Initial Encounter

Screening	Results	PrTP	+ and - LR	PoTP %
Fall hx	**Yes**	**30%**	**1.8, .8**	**44%**
Fear Of Falling	**Yes**	**44%**	**1.4, .8**	**52%**
Assistive Device	No	52%	1.3 / .9	49%
Psychotropic meds	**Yes**	**49%**	**1.4, .8**	**57%**
ADL assist	No	57%	1.4, .8	52%
Gait speed	**<1.0 m/s**	**62%**	**1.5, .6**	**62%**
SLS	**<6.5 sec**	**62%**	**1.9, .9**	**76%**
TUG	<12 sec	76%	2.1, .8	**72%**

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Clinical Example- 6 months later

Screening	Results	PrTP	+ and - LR	PoTP %
Fall hx	No	30%	1.8, .8	26%
Fear Of Falling	**Yes**	**26%**	**1.4, .8**	**32%**
Assistive Device	No	32%	1.3 / .9	29%
Psychotropic meds	No	29%	1.4, .8	25%
ADL assist	No	25%	1.4, .8	21%
Gait speed	>1.0 m/s	21%	1.5, .6	14%
SLS	>6.5 sec	14%	1.9, .9	13%
TUG	<12 sec	13%	2.1, .8	**11%**

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Clinical Example- 6 months later

Screening	Results	PrTP	+ and - LR	PoTP %
Fall hx	No	30%	1.8, .8	26%
Fear Of Falling	**Yes**	**26%**	**1.4, .8**	**32%**
Assistive Device	No	32%	1.3 / .9	29%
Psychotropic meds	**Yes**	**29%**	**1.4, .8**	**36%**
ADL assist	No	36%	1.4, .8	31%
Gait speed	>1.0 m/s	31%	1.5, .6	22%
SLS	>6.5 sec	22%	1.9, .9	20%
TUG	<12 sec	20%	2.1, .8	**16%**

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Physical Therapy

- Primary, Secondary and Tertiary Prevention
- Multifactorial gait and balance assessment and POC
- Implement POC to include treatment for
  - modifiable impairments
  - increase confidence, activity level
  - anticipatory and reactive postural control strategies
- Establish long term discharge plan for exercise
- ***Recommend 52 hours within a 6 month time frame of balance specific exercises/training combined with a general fitness program to include muscle strength, power and endurance training!***

Sherrington et al 2013, 2017

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SCREENING IN THE COMMUNITY

Stay Steady

TOMPKINS COUNTY FALL RISK SCREENING EVENTS

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Stay Steady

Self-report

- Have you fallen?
- Fear of Falling ?
- Medications?
- Need for assistance or use of an assistive device?
- Stay Independent Brochure (optional)
  - >4 or Yes any of the above

Mobility Screen

- Timed Up and Go Test
- 30 second chair rise test
- 4 – stage balance test
  - Narrow stance, semi-tandem, tandem, SLS
  - <10 on tandem stance

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Resources

- American Geriatric Society http://www.americangeriatrics.org/health_care_professionals
- CDC- STEADI toolkit https://www.cdc.gov/steadi/materials.html

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