

# The Deconditioned Elderly Patient: Have We Been Getting it Wrong?

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# The Debilitated Patient

A review of outcomes for > 84,000 patients over 65 y/o revealed:

- ▶ Rate of functional recovery and discharge home for patients admitted to rehab centers due to overall debility is very comparable to those admitted for hip fracture or myopathies.
- ▶ The category “debility” is quite problematic in that it is very broad. We need better criteria to define who will benefit from OT/PT/ST.

Ref: Kortebein P, Granger CV, Sullivan DH. A comparative evaluation of inpatient rehabilitation for older adults with debility, hip fracture, and myopathy. *Arch Phys Med Rehabil.* 2009 Jun;90(6):934-8. doi: 10.1016/j.apmr.2008.12.010.

# HAD Vs. Frailty

- ▶ Deficits from HAD “closely mirror those of older adults with frailty.”
- ▶ “Frailty often develops insidiously over a period of months or years,”
- ▶ HAD can develop rapidly over a period of just a few days

# Indicators of Frailty

Frailty has been described as having at least 3 of the following 5 characteristics:

- ▶ Muscle weakness
- ▶ Slow movement speed
- ▶ Self-reported exhaustion
- ▶ Low physical activity
- ▶ Unintentional weight loss.

Ref:Fried LP, Tangen CM, Walston J, et al. Frailty in older adults: evidence for a phenotype. *J Gerontol A Biol Sci Med Sci.* 2001;56:M146-M156.

## **Frailty Concept Diagnoses (Examples)**

- Malnutrition:** Nutritional Marasmus  
Other severe protein-calorie malnutrition
- Dementia:** Senile dementia with delusional or depressive features  
Senile dementia with delirium
- Impaired Vision:** Profound impairment, both eyes  
Moderate or severe impairment, better eye/lesser eye: profound
- Decubitus Ulcer:** Decubitus Ulcer
- Incontinence of Urine:** Incontinence without sensory awareness  
Continuous leakage
- Loss of Weight :** Abnormal loss of weight and underweight
- Feeding difficulties and mismanagement**
- Incontinence of Feces Incontinence of feces**
- Obesity (morbid) Morbid obesity**
- Poverty :** Lack Of Housing  
Inadequate Housing  
Inadequate material resources
- Barriers to Access of Care:** No Med Facility For Care  
No Med Facilities Necessary
- Difficulty in Walking:** Difficulty in walking  
Abnormality of gait
- Fall :** Fall On Stairs Or Steps  
Fall From Wheelchair

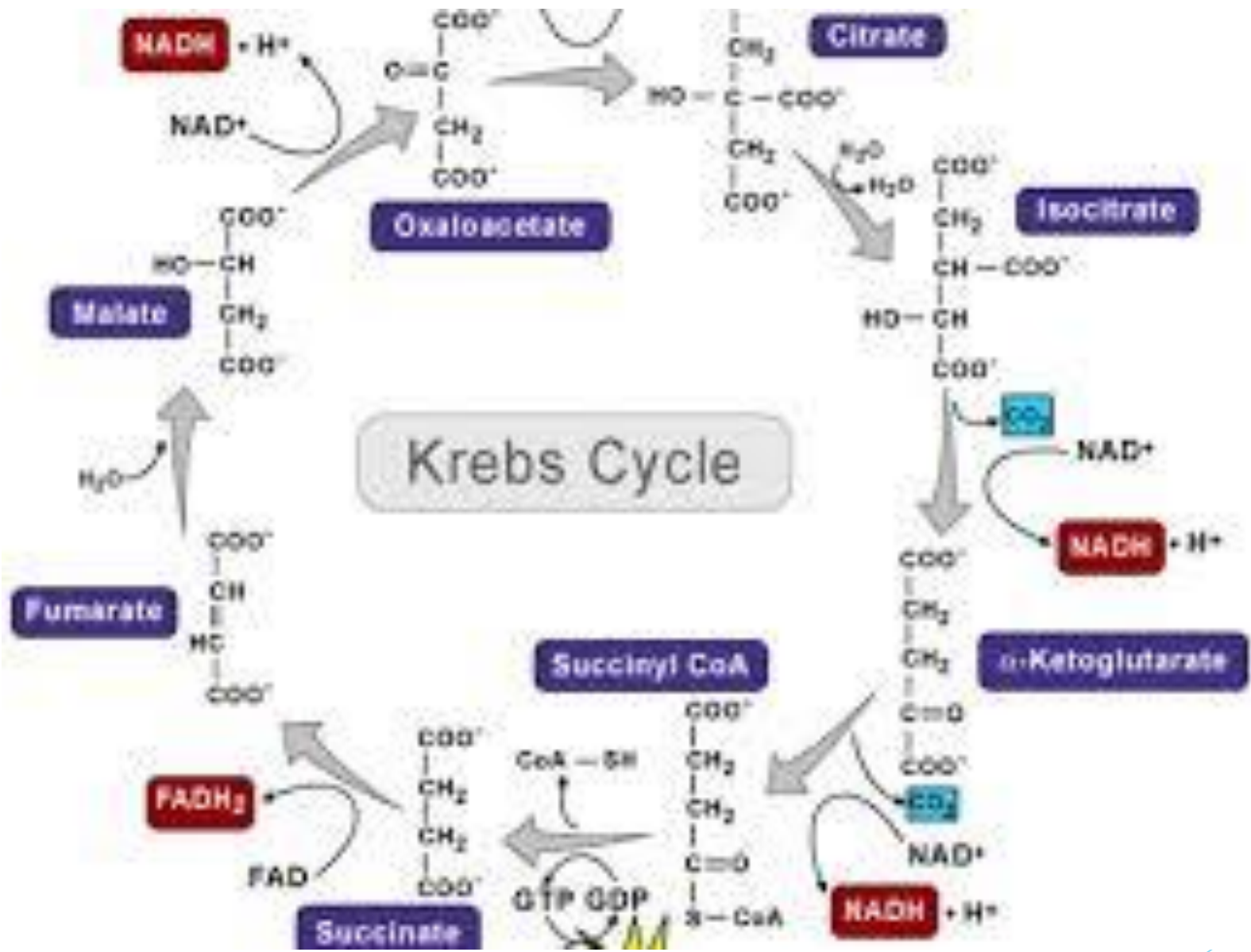
# The Effects of Bedrest

- ▶ 14 to 17% atrophy of Type 1 and 2 muscle fiber respectively, seen after 72 hours of immobilization.
- ▶ Antigravity muscles such as quadriceps and lumbar extensors weaken more rapidly than flexor muscles, such as hamstrings
- ▶ Mitochondria show reduced oxidative capacity, leading to reduced muscle blood flow and increased fatigue of muscle.
- ▶ Muscle recovery from immobility may be slower than muscle injury from direct trauma.

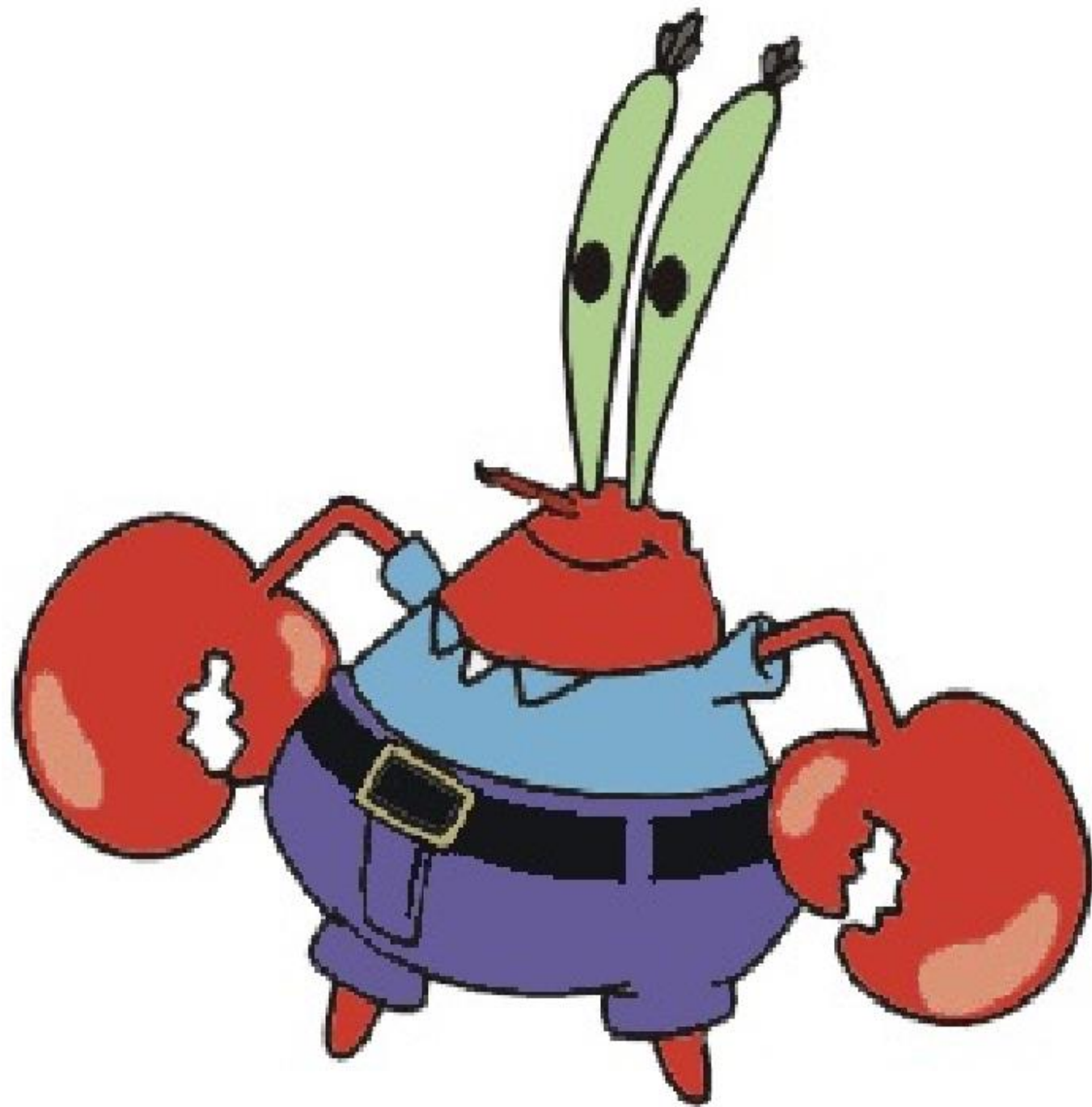
Ref: Nigam, Y. et al (2009) Effects of bedrest 3: musculoskeletal and immune systems, and skin. *Nursing Times*; 105; 23, early online publication

# Things to Watch for and Consider

- ▶ Significant muscular weakness
- ▶ Decreased stamina
- ▶ Diminished appetite
- ▶ Fatigue
- ▶ Decreased ability to carry out ADL's
- ▶ Atrophy-sarcopenia





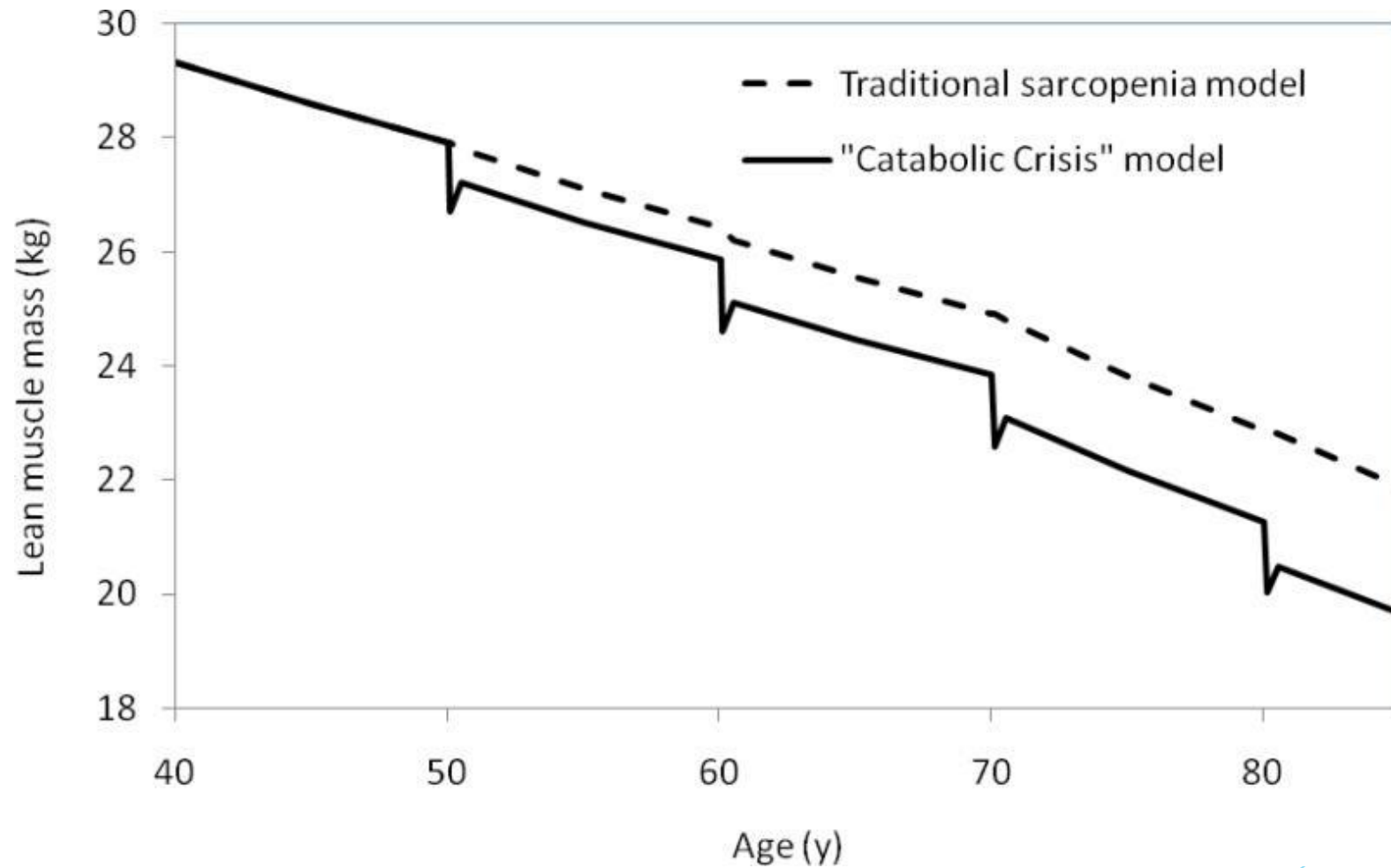


# What is Sarcopenia?

An age-related loss of muscle mass (not always function) that generally begins in the 4<sup>th</sup> decade of life. It often accelerates between ages of 65-75 and is more pronounced among physically inactive people. It may also be related to:

- ▶ Age related reduction in the number of motor nerve cells
- ▶ Reduced levels of hormones such as testosterone, HGH, and IGF.
- ▶ Reduced ability of the body to synthesize protein with age.

# Catabolic Crisis Model of Sarcopenia



# Sarcopenia

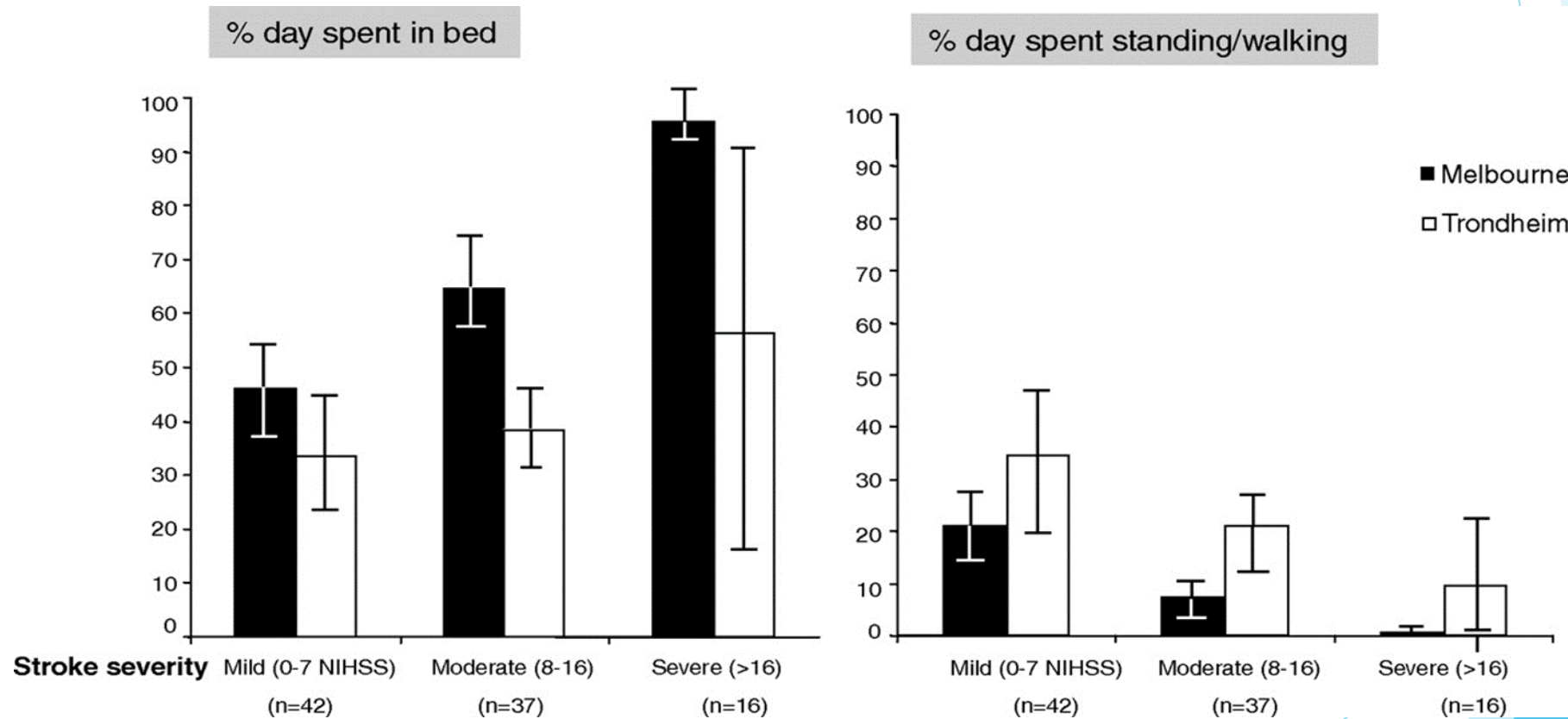


# What happens when older patients with HAD are sent home?

- ▶ 3 times the rate of re admission within 30 days as medically complex patients discharged with higher functional levels.
- ▶ Increased rates of falling.
- ▶ As many as 68% of patients are discharged to post acute care below their pre hospitalization of function
- ▶ Hospitalized older adults are 61% more likely to develop ADL disability than non-hospitalized older adults.

Ref: Jason R. Falvey, Kathleen K. Mangione, Jennifer E. Stevens-Lapsley Rethinking Hospital-Associated Deconditioning: Proposed Paradigm Shift, *Phys Ther.* 2015;95:1307-1315.]

# Norway vs. Australia-where to have your stroke?



# So What are we Doing With Older Patients?

- ▶ “low-intensity and generalized treatments that may not adequately maximize physical function—thus, leaving older adults with HAD vulnerable to rehospitalization, further disability development, and higher mortality rates.”



# General Conditioning Activities

Traditional method used by PT/OT of exercising older adult with HAD. Typically may include:

- ▶ Ambulation in hallways or rooms
- ▶ General non specific AROM exercises at sub therapeutic intensities (SLR's)
- ▶ Use of 2 lb. (1 kg) weights for LE muscle groups





# Thus, the real problem with only using GCA's

“These activities are often performed without application of the principles that define skilled exercise therapy—intensity, frequency, duration, or specificity.”

“When all else fails, examine the patient.”

—Conventional medical intern  
wisdom

# What about the Aerobic component?

- ▶ Studies suggest that frail elderly subjects show a more aggressive response to Resistance Training (RT), particularly when Sarcopenia is involved, vs aerobic- based training.
- ▶ New recommendations suggest using aerobic exercise only when done together with RT and balance-specific training.

# But Guess What?

The most important treatment is Resistance Training. RT has been found to:

- ▶ Preserve lean muscle mass
- ▶ Reduce deterioration of hormone levels
- ▶ Start to improve protein synthesis in as little as 2 weeks.

Ref: Web MD



# The Way Forward

“Treatment of frailty has focused mainly on 2 factors: nutritional supplementation and exercise training, with a heavy focus on RT.”

“Older adults have a diminished muscle protein synthetic response to protein intake and instead depend much more heavily on exercise to maintain a balance between muscle protein breakdown and synthesis.”

# Exercise intensity for basic strengthening

## Recommended method for skeletal muscle strengthening :

- ▶ Loads between 70-80% of the individuals 1RM (rep maximum)
- ▶ This loading will generally cause momentary muscular failure after approx. 8-12 repetitions.
- ▶ Subtle form changes are often noted with the final 2 repetitions
- ▶ When using the Borg scale of RPE, the patient is instructed to aim for an intensity of 15-17 on a 6-20 scale

# What about frequency/duration?

A majority of the studies indicate that effective results are strongly dose dependent. Current evidence indicates:

- ▶ Training may be effective if carried out 2-3 times per week.
- ▶ It is recommended that patients perform 2-3 sets of 8-12 repetitions for key muscle groups such as quadriceps, hip extensors, etc.
- ▶ Duration in many studies was noted to be 8-12 weeks. How long are we seeing patients for?

Ref: Mayer F, et al. The Intensity and Effects of Strength Training in the Elderly. Dtsch Arztebl Int. 2011 May; 108(21): 359-364.

# To increase rate of muscle force development:

- ▶ Studies suggest higher intensity training (> 85% of 1 repetition Maximum) is needed.
- ▶ This closely mirrors requirements for younger subjects in terms of intensity of training.



Ref: Mayer F, et al.





# Does it Work?

Study of elderly subjects s/p hip fracture (avg 79-82 y/o) who completed a 10 week strengthening regimen found statistically significant gains for:

- ▶ Average gait speed
- ▶ Fast gait speed
- ▶ 6 Minute Walk Duration
- ▶ SF-36 Physical Function

Ref: Mangione K, et al, Home-Based Leg Strengthening Exercise Improves Function One Year After Hip Fracture: A Randomized Controlled Study *J Am Geriatr Soc.* 2010 Oct; 58(10): 1911-1917. doi: 10.1111/j.1532-5415.2010.03076.x

# What about really elderly people?

An 8 week study using 90+ y/o institutionalized frail subjects who underwent a high intensity training program found:

- ▶ Average strength gain of 174% for quadriceps
- ▶ 9% increase for mid thigh muscle mass
- ▶ Mean gait speed improvement of 48%.

Ref: Fiatarone, M.A., Marks, E.C., Ryan, N.D., Meredith, C.N., Lipsitz, L.A. & Evans, W.J. High intensity training in nonagenarians. Effects on skeletal muscle. *Journal of the American Medical Association*, 3034, 1990



# Is this Type of RT safe for older adults?

- ▶ ACSM guidelines indicate that it is, when carried out under supervision of trained personnel. (Think about the COP/criteria for determining if a service is skilled)
- ▶ Falvey, et al, cite several other studies indicating that this training is safe, even for patients with chronic conditions.
- ▶ Post exercise muscle soreness with initial loading bouts are the primary concern noted in the research. This can be managed with proper dosing of the exercise prescription at the start of the program.

Ref: American College of Sports Medicine. ACSM's Guidelines for Exercise Testing and Prescription. 9th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2013.

# Assessing Your Patient

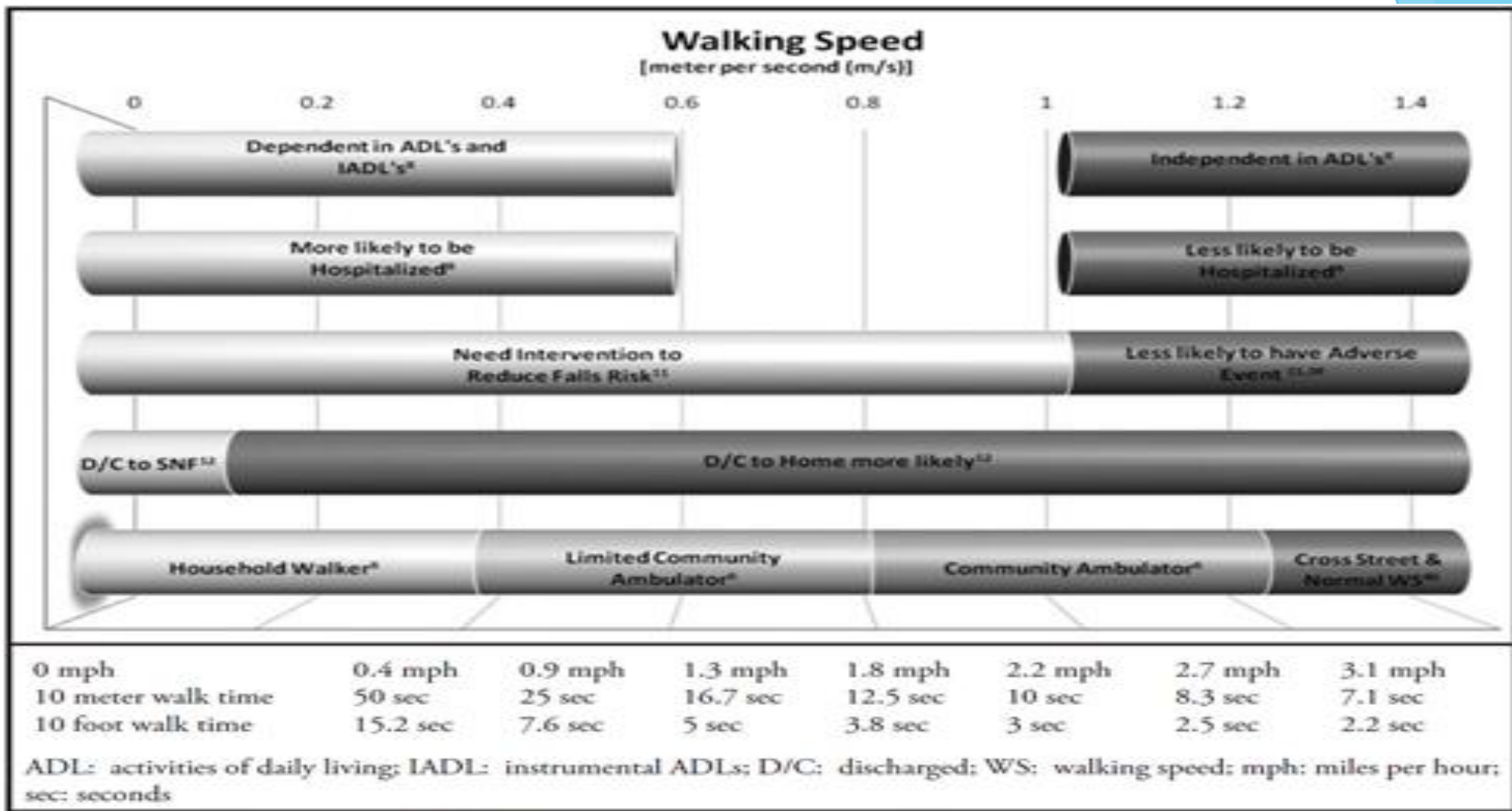
Remember-examine the patient! There are many evidence-based field tests to assess strength and muscle condition. These all have normative data:

- ▶ 30 second or 5 Times chair stand tests
- ▶ Grip dynamometry
- ▶ Hand held computerized dynamometry
- ▶ Gait speed tests

# Example: The 5 Meter Walk test-a simple assessment tool

- ▶ Test asks patient to walk a straight 5 meter (16.4 foot) distance.
- ▶ Mark 5 feet before and after the 5 meter timing course
- ▶ Patient is instructed to cover the entire distance at self selected speed
- ▶ Slow gait speed (>6 seconds to cover the 5 meter course) was associated with an odds ratio of 3.05 for elderly patient morbidity and mortality after cardiac surgery.

Ref: Afilalo J, et al, Gait speed as an incremental predictor of mortality and major morbidity in elderly patients undergoing cardiac surgery *J Am Coll Cardiol*. 2010 Nov 9;56(20):1668-76. doi: 10.1016/j.jacc.2010.06.039.



**Figure 1. A collection of walking speed times that are linked to dependence, hospitalization, rehabilitation needs, discharge locations, and ambulation category.**

# Are We Leaving Frail Patients With Unmet Needs?

