

PHYSICAL ACTIVITY AND FALL PREVENTION



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Physical Activity

- **Necessary for life!**
 - Social environments
 - Vocational responsibilities
 - Hobbies
 - Activities of Daily Living (ADLs)
 - Fall prevention
- **When interrupted, morbidity ensues**
 - Sickness, sprained ankle, arthritis, progressive decline with aging
 - Social environments → Stay home
 - Vocational responsibilities → Cannot work
 - Hobbies → Unable to enjoy
 - Activities of Daily Living (ADLs) → loss of independence
 - Fall risk → increased

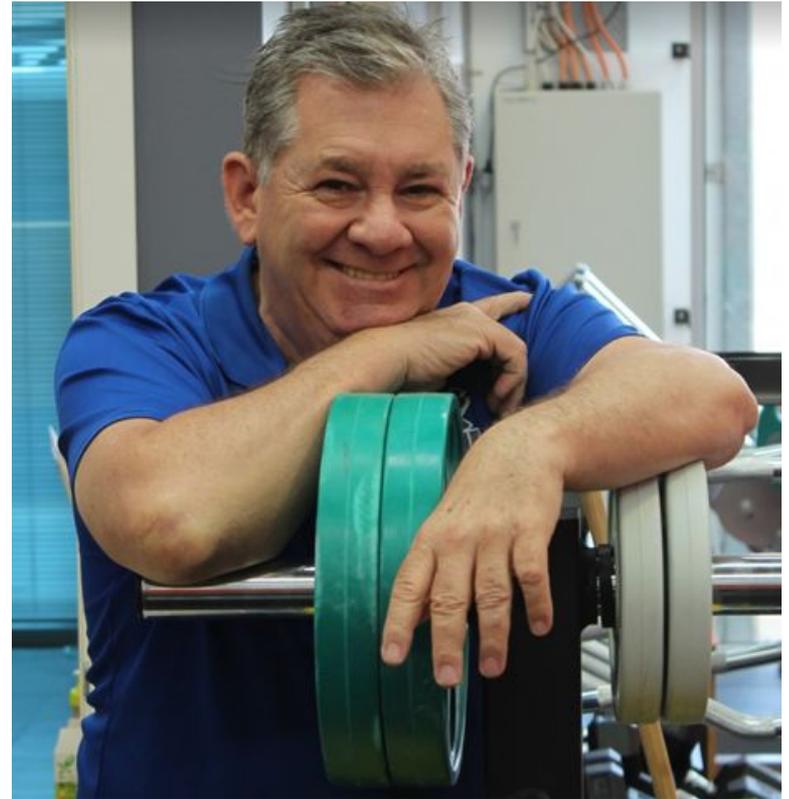


Morbidity of Falls⁵

- Unintentional injuries are the 5th leading cause of death in older adults, and falls are responsible for 2/3 of the deaths resulting from unintentional injuries.
- Within an average community, fall rates in those over 65 are 35-40% annually.
- 50% of patients hospitalized after a hip fracture will not regain their full function.
- Within the hospital, fall rates are around 1.5 falls/bed annually, with 10-25% of institutional falls resulting in fracture, laceration, or the need for hospital care.
- Falls are associated with increased morbidity, mortality, and hospitalizations .

Protective Effects of Physical Activity

- Regular participation in physical activity is not only integral to the maintenance of good health and functional independence in older adulthood but will also lower the risk for falls and fall-related injuries.⁵
- Conversely, physical inactivity doubles the risk of developing a disability that will adversely affect mobility as well as the ability to perform even the most basic activities of daily life.⁵
- “There is consistent evidence from prospective and case-control studies that physical activity is associated with a 20–40% reduced risk of hip fracture relative to sedentary individuals.”²



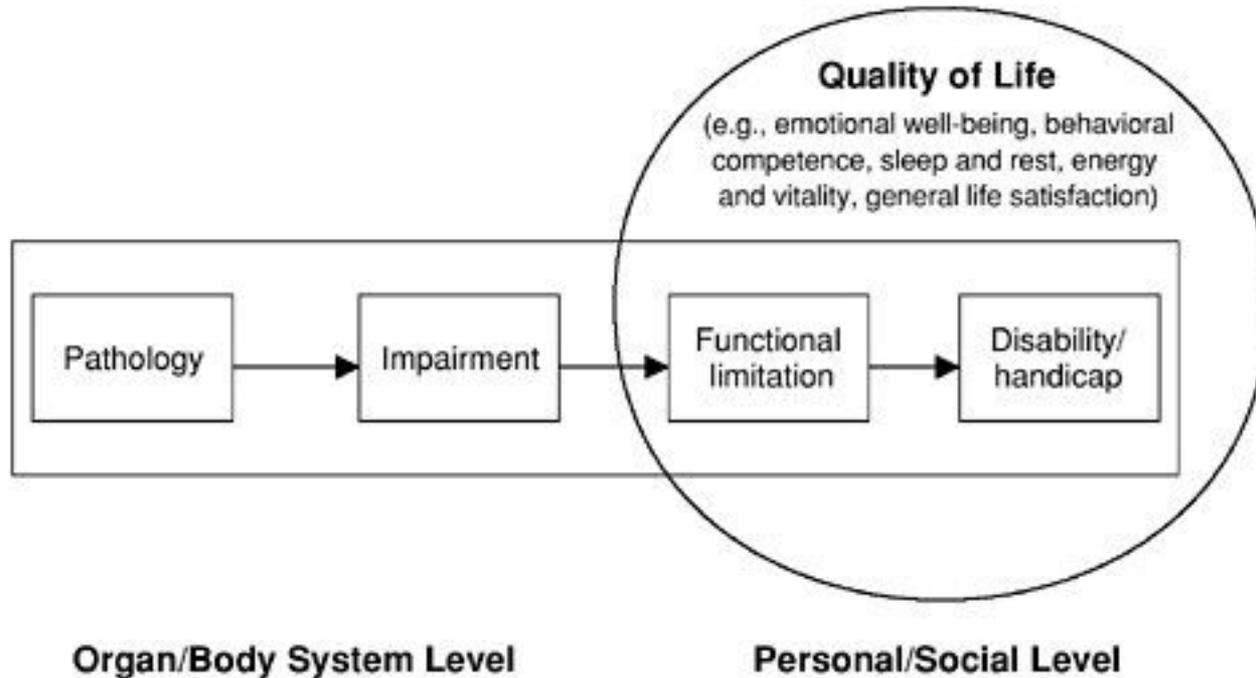
Current physical activity and older adults

- **Least active population**
 - 20% older adults (>65) meet guidelines vs. 48% adults (18-64)³
 - <33% meet the Physical Activity Guidelines for Americans (PAGA) (150min/MVPA/wk)⁷
 - Most studies range from 20-50%⁶

Despite, reporting and measurement challenges, it is apparent that older adults are falling short of the PAGA



Nagy's Model of Disability (1965)



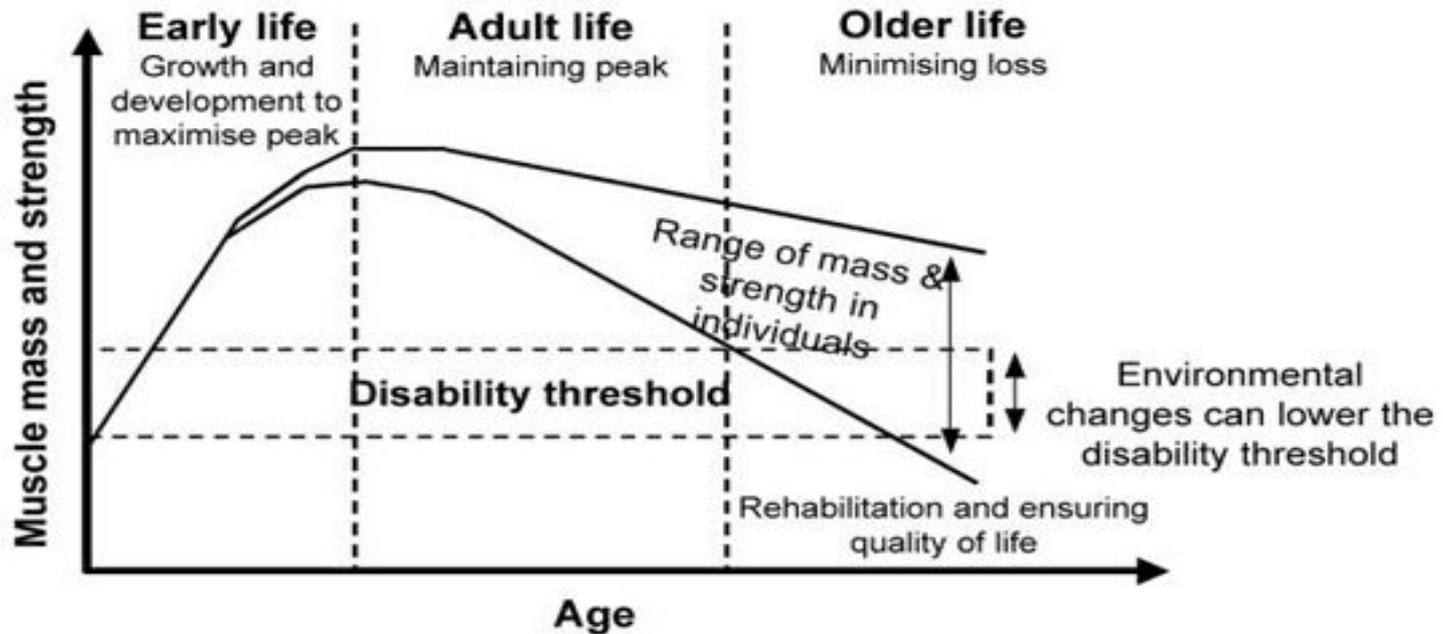
IOM (1991)

Aging

- *A natural decline in all physiological systems, particularly the neuromuscular function which is needed for maintaining necessary voluntary contractions for movement (Doherty, 2003).*
- **Sarcopenia: the age-related decline in skeletal muscle mass and function**
 - Approximately 45% of the U.S. population >65 years old is affected by sarcopenia.
 - The estimated direct healthcare cost attributable to sarcopenia in the United States in 2000 was \$18.5 billion (\$10.8 billion in men, \$7.7 billion in women).

Skeletal Muscle Changes with Aging → Muscular Atrophy

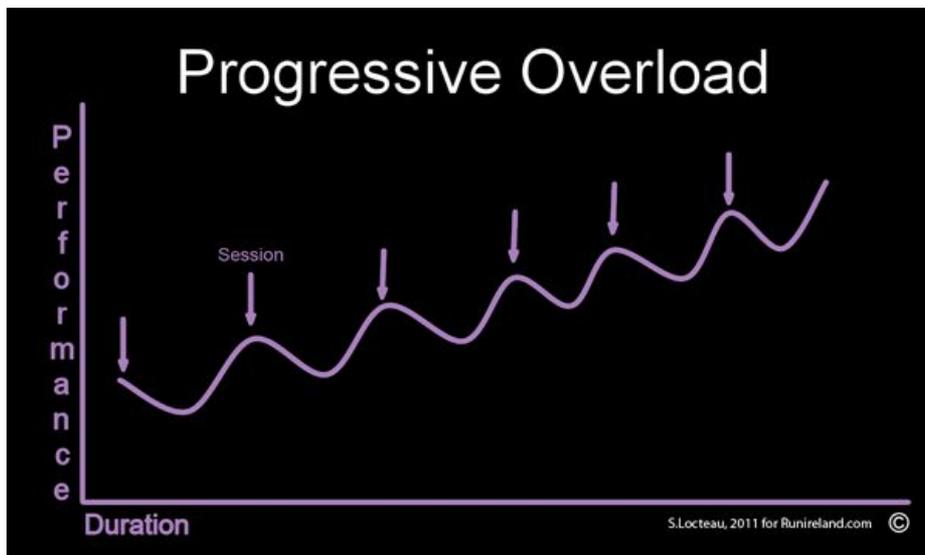
- Sarcopenia: slow decline of contractile proteins (Fielding, 2015).
- However, can be offset with the principle of progressive overload (Doherty 2003)



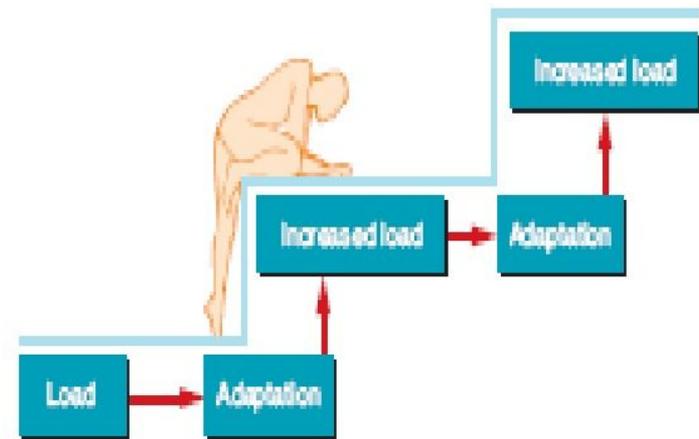
Modified WHO/HPS, Geneva 2000

Principle of Progressive Overload → Muscular Hypertrophy + strength

A gradual increase of stress placed on the body during exercise training that is beyond its current capabilities. This gradual increase in stress forces the body to continually try to adapt to the training program. (NSCA, 2013)



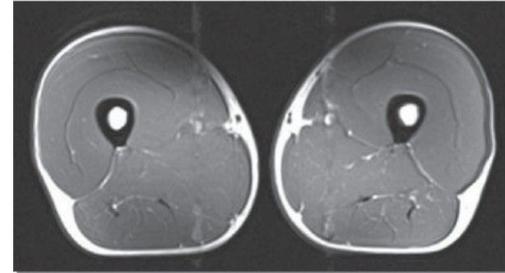
Progressive overload



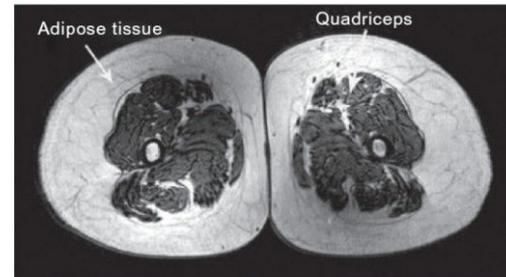
Physical Activity and Sarcopenia

- Counters muscle mass and strength loss in older adults
- Improves strength with appropriate stress (exercise/physical activity)
- Maintains functionality, the ability to participate in activities of daily living (and more!)

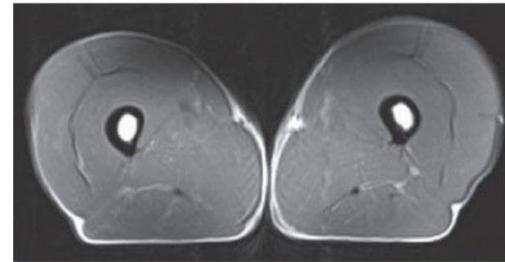
40-year-old triathlete



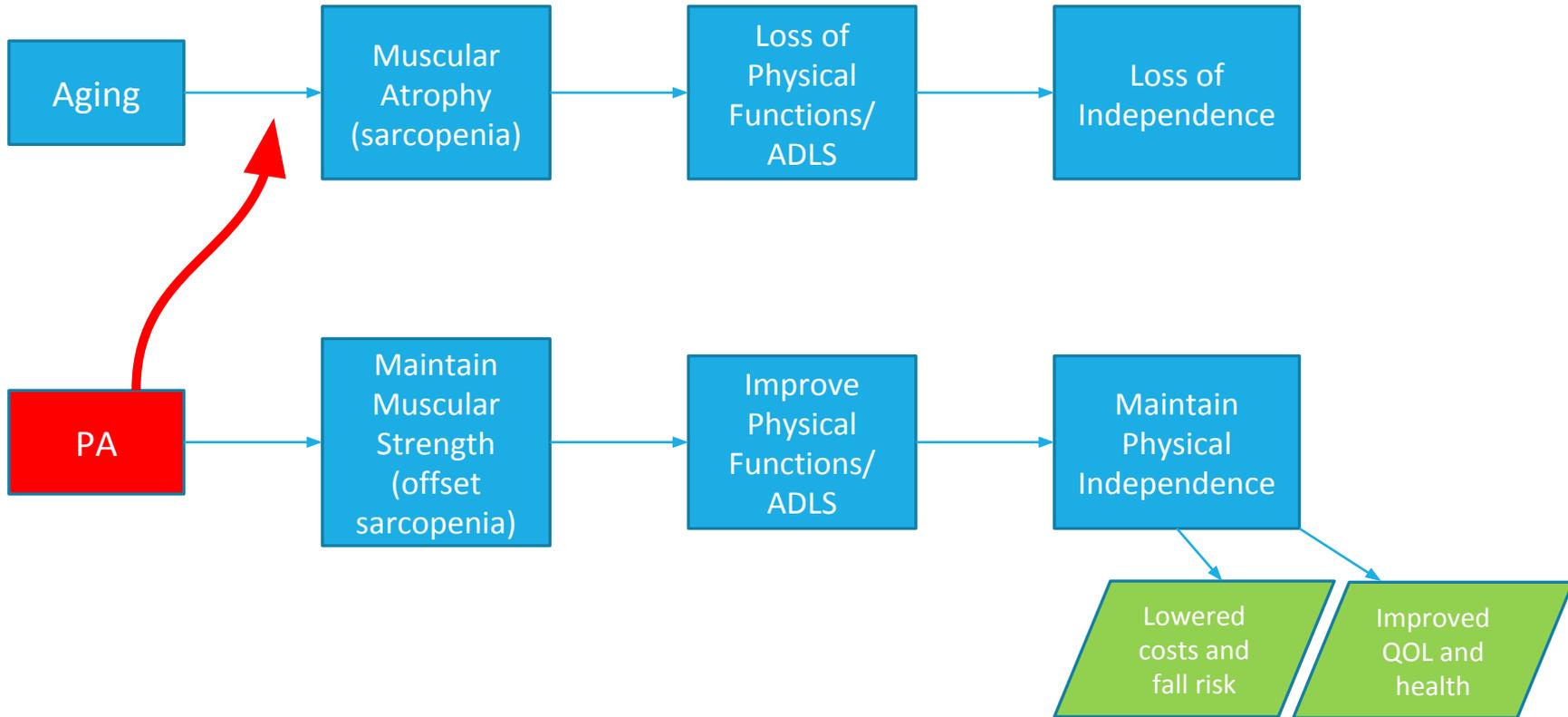
74-year-old sedentary man



70-year-old triathlete



ADLs and Physical Independence



Questions:

What questions do you have for me?

- Did you learn anything new?
- What might you do for physical activity?
- What barriers might there be?
- How might these barriers be overcome?

References

1. <http://www.who.int/ageing/projects/6.Role%20of%20physical%20activities%20in%20falls%20prevention.pdf>
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3. Madden KM, Ashe MC, Chase JM. Activity Profile and Energy Expenditure Among Active Older Adults, British Columbia, 2011–2012. *Prev Chronic Dis* 2015;12:150100. DOI: <http://dx.doi.org/10.5888/pcd12.150100>
4. Montero-Fernandez, N., & Serra-Rexach, J. A. (2013). Role of exercise on sarcopenia in the elderly. *European journal of physical and rehabilitation medicine*, 49(1), 131-143.
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7. White, S. M., Wojcicki, T. R., & McAuley, E. (2012). Social Cognitive Influences on Physical Activity Behavior in Middle-Aged and Older Adults. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 67B(1), 18–26. doi:10.1093/geronb/gbr064