

Sarkopenie und Frailty

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Übersicht

Sarkopenie

Was ist Sarkopenie / Relevanz?

Wie viele sind betroffen / aktuelle Forschung?

Ist Knochendichte allein nicht ausreichend in der Risikoabschätzung
Frakturen im Alter?

Wie messen?

Forschungsansätze

Prävention

Frailty versus Healthy Aging



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Definition Sarkopenia

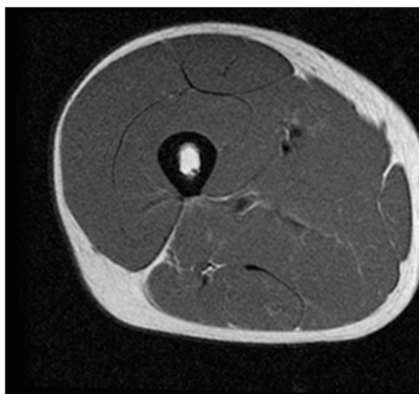
The loss of skeletal muscle mass and strength (quality) with advancing age

SARCOPENIA is a word coined from Greek by Irwin H. Rosenberg in 1988

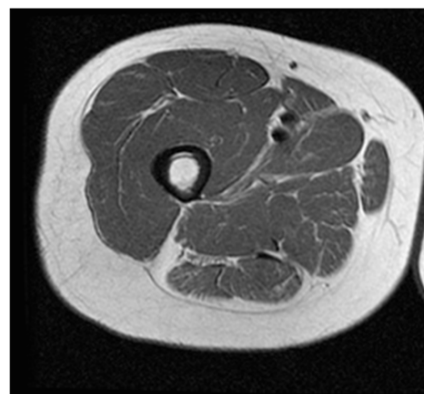
Sarx means flesh and *penia* means loss



Sarkopenia



Young man
25 yrs

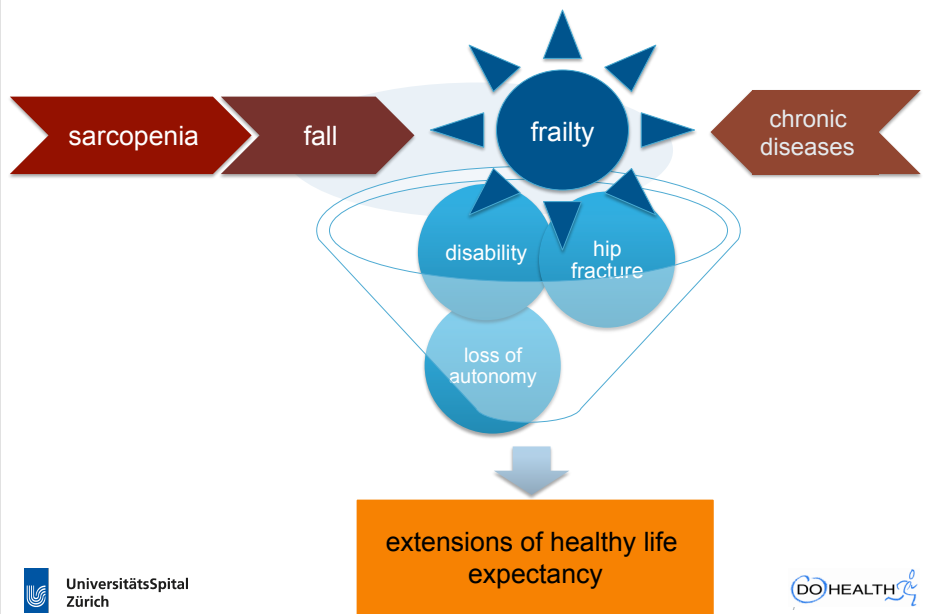


Older man with sarcopenia
85 yrs

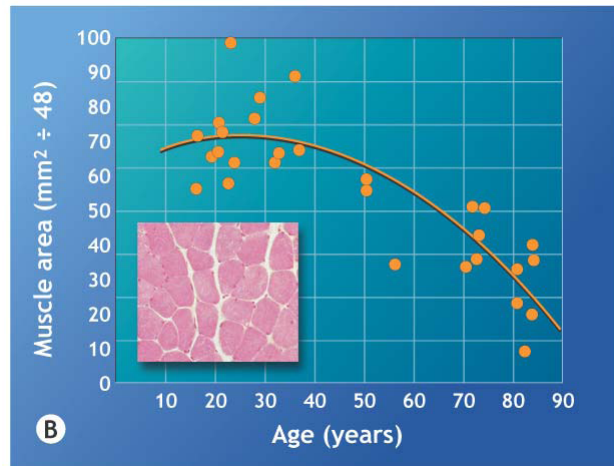
Why is sarcopenia a concern?

- Muscle wasting is directly related to strength and function
- Physical function declines with age, and often limits independence
- Muscle weakness contributes to falls, and falls are the primary risk factor for hip fractures

Broad concept



Loss of muscle mass with age



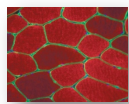
Loss in muscle mass:

0.5 to 1% / year
after age 25

1-2% / year
after age 50

Lexell et al. *J. Neurol. Sci.* 84:275, 1988.

Importance of Muscle Mass



Needed for performance + ADL

– loss of muscle mass (sarcopenia) directly linked to weakness, functional impairment, falls, frailty, fractures

Bischoff-Ferrari HA. Relevance of vitamin D in muscle health. Rev Endocr Metab Disord. 2012

Needed for whole body protein metabolism

– muscle protein is principal reservoir to replace blood amino acids in the fasting state

Wolfe RR. Am J Clin Nutr 2006

Needed to clear glucose from plasma to maintain normal glucose concentrations

– “insulin resistance” first sign of Type II diabetes

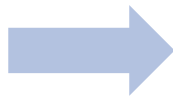
Reaven GM. Annu Rev Nutr 2005

Prevalence Sarcopenia

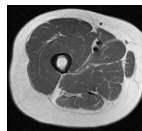
We lack an international accepted definition!!

2 main concepts:

- A) DEXA low appendicular muscle mass (Baumgartner) alone
- B) Combination DEXA low appendicular muscle mass plus low gait speed (< 1 m/s; < 0.8 m/s; low grip strength) + (Fielding, European Task Force)



depending on definition, 8 to 50% of seniors age 80+ are affected



Comparative performance of current definitions of sarcopenia against the prospective incidence of falls among community-dwelling seniors age 65 and older

Bischoff-Ferrari HA, Orav JE, Kanis JA, Rizzoli R, Schlögl M, Staehelin HB, Willett WC, Dawson-Hughes B

OP International 2015

9 Operational definitions of sarcopenia

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	ALM	TBLM	Fat mass	Grip Strength	Gait Speed
Baumgartner	✓				
Delmonico I	✓				
Delmonico II	✓		✓		
Cruz-Jentoft	✓			✓	✓
Fielding	✓				✓
Morley	✓				✓
Muscaritoli		✓			✓
Studenski I	✓				
Studenski II	✓			✓	



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Study description

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Study Population (Boston STOP-IT Trial):

- 445 seniors (mean age 71 years, 45% men) living in the community
- followed with a detailed fall assessment for 3 years
- 231 fell, sustaining 514 falls, over the 3-year follow-up



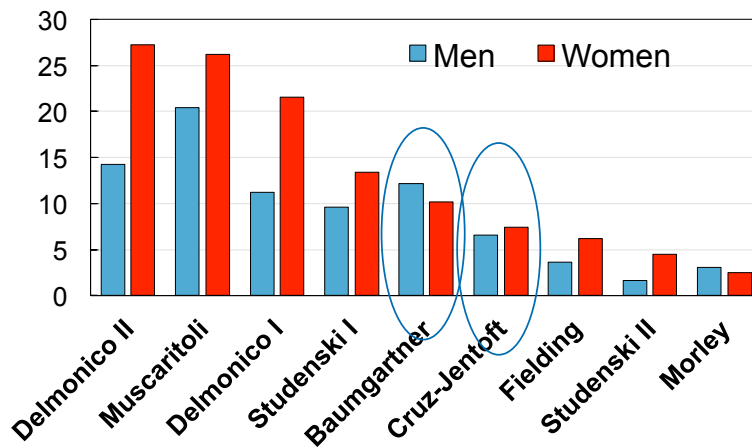
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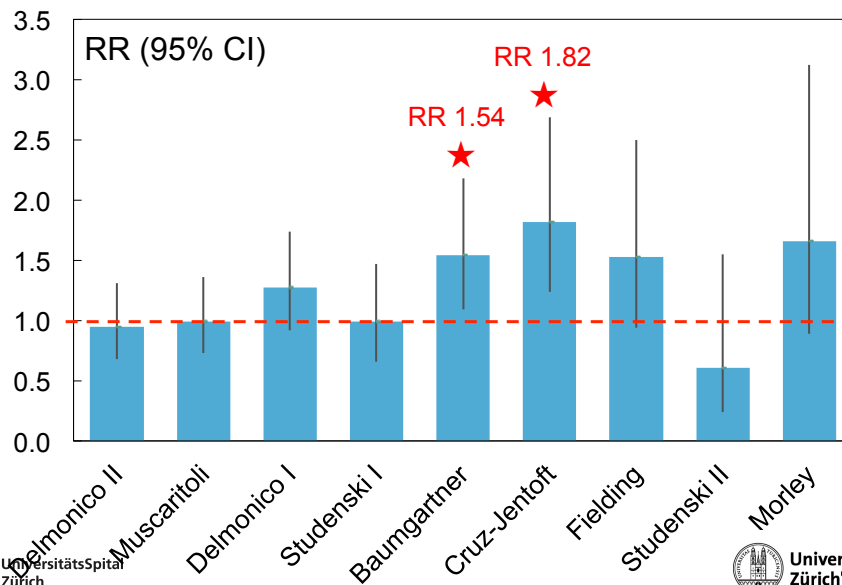
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Results Prevalence of Sarcopenia varied between definitions

Prevalence (%)



Results prospective rate of falls in sarcopenic versus non-sarcopenic individuals



Summary

With the same cut-off for low appendicular lean mass, the additional requirement of decreased function in the Cruz-Jentoft definition

- increased the prediction of the rate of falls among sarcopenic individuals from an odds ratio of 1.54 (Baumgartner) to 1.82 (Cruz-Jentoft)
- but also reduced the respective prevalence of sarcopenia from 11% (Baumgartner) to 7.1% (Cruz-Jentoft)

Mass alone may depict earlier disease stage and allow early treatment.

Mass alone does not depend on test person or the motivation of the patient.

Is bone density enough to target for fracture prevention at higher age?



Facts on Fracture Epidemiology

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- At age 50, every 2nd women and every 5th man will sustain an osteoporotic fracture in their remaining life time
- Starting at age 75, the most frequent fractures are hip fractures – which are the most severe fractures and cause 54% of all OP-related costs
- 75% of all OP-related fractures are among seniors age 75+
- Falls are the most important risk75+

Effective prevention of fractures 75+
requires support of bone and muscle health

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Significance of falls

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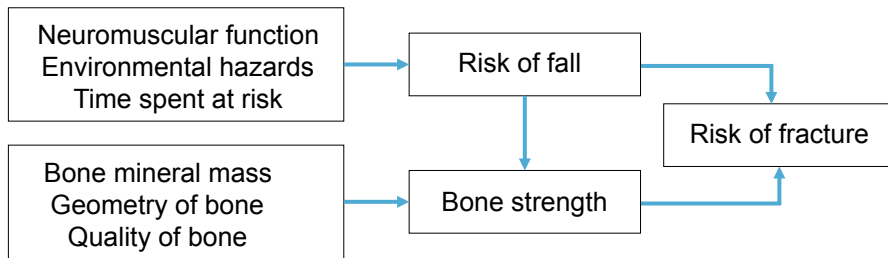
- 40% of nursing home admissions are due to a fall
- 9% of all falls result in emergency room visits
- 5-6% of falls result in a fracture (1-2% are hip fractures) --- risk is 3.5-fold increased risk for repeat fallers
- 30% of older individuals develop fear of falling after a fall resulting in decreased quality of life and decreased mobility

Bischoff-Ferrari HA; Fall Prevention, Primer of Metabolic Bone Disease 2014.
Bischoff-Ferrari HA. Relevance of vitamin D in muscle health. Rev Endocr Metab
Disord. 2012.

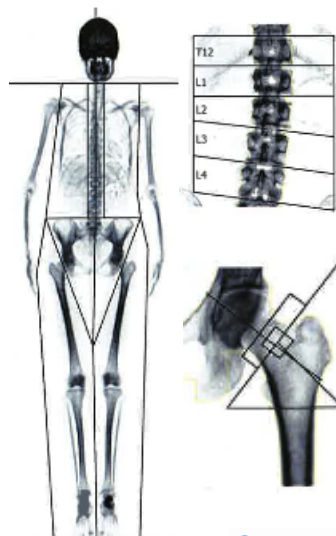
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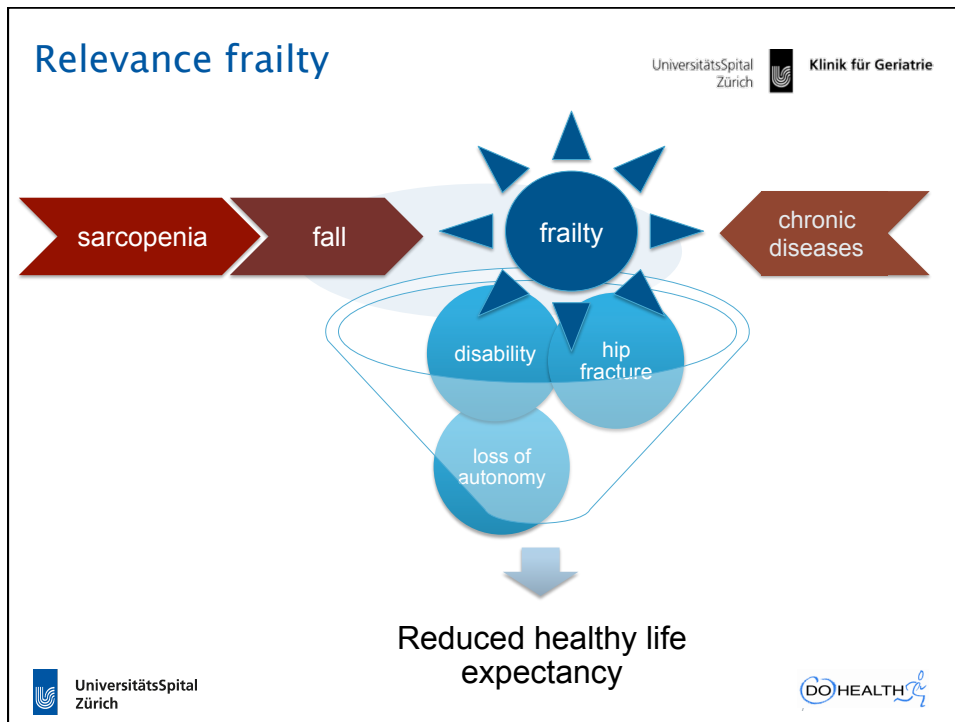
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Mechanistics of fractures in seniors age 65+



Diagnostic shift from Bone Density alone to





Frailty = Biologic Vulnerability

– what does it mean?

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Impaired organ function

- thinning of the skin / gastric lining
- increased satiety – slower emptying of the stomach
- impaired kidney function
- reduced respiratory function
- osteoporosis, sarcopenia
- reduced cognitive function
- impaired heart and vascular function
- impaired vision and hearing

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Frailty = Biologic Vulnerability

- what does it mean?

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Reduced reserves

- reduced respiratory and cardio-vascular reserves
- impaired immunity
- neuro-degenerative changes
- malnutrition



slow wound healing / rapid progression / atypical symptoms



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Frailty = Biologic Vulnerability

- often linked with Geriatric syndroms

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- Gait impairment / falls
- Disability
- Malnutrition
- Cognitive impairment
- Incontinence
- Skin ulcers



- Affect outcome independent of acute medical condition and its treatment
- Contribute to extended stays in acute care
- Directly correlate with "loss of autonomy"

*Geriatric Syndromes: Clinical, Research and Policy Implications of a core geriatric concept.
Inouye KS et al. JAGS 2007*



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Age or frailty? – Geriatric Assessment











The geriatric assessment is an evidence-based multidimensional diagnostic concept to assess the functional reserves of a senior patient at multiple levels and in a standardized way:

- Multi-organ health
- Nutrition
- Funktion (gait, ADL)
- Cognition / Social



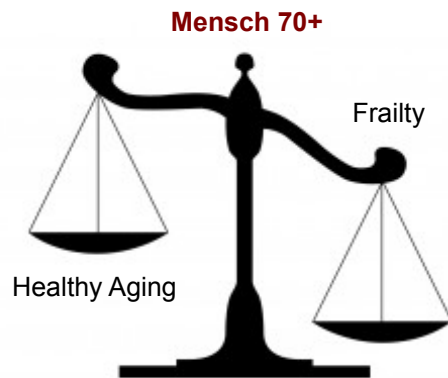
Goal: initiate an integrated and targeted treatment plan to support and maintain autonomy after discharge from acute care

Frailty Index im Assessment Centre Klinik Geriatrie USZ

Test	Ergebnis	Was bedeutet das? Referenzen									
<p>Frailty Index nach Fried</p> <p>1. Unbeabsichtigter Gewichtsverlust von > 4.5 kg im Verlauf des letzten Jahres</p> <p><input type="radio"/> Ja <input type="radio"/> Nein</p> <p>2. Griffkraft vermindert ($\sigma \leq 64$ kPa, $\text{♀} \leq 42$ kPa)</p> <p><input type="radio"/> Ja <input type="radio"/> Nein</p> <p>3. * Gefühle allgemeine Erschöpfung</p> <p><input type="radio"/> Ja <input type="radio"/> Nein</p> <p>4. Ganggeschwindigkeit < 1.0 m/s (mit/ohne Gehhilfe)</p> <p><input type="radio"/> Ja <input type="radio"/> Nein</p> <p>5. 6-Minuten Gangtest < 300 m (mit/ohne Gehhilfe)</p> <p><input type="radio"/> Ja <input type="radio"/> Nein</p>	 <p>* Allgemeine Erschöpfung Eine Aussagen wird vorgelesen: "In der letzten Woche, war alles was ich unternommen habe eine Anstrengung"</p> <p>Wie oft haben Sie sich so gefühlt: 0 = selten oder überhaupt nicht (weniger als einen Tag) 1 = manchmal (ein bis zwei Tage lang) 2 = öfters (drei bis vier Tage lang) 3 = meistens, die ganze Zeit (fünf und mehr Tage lang)</p> <p>"2" or "3" = "Ja"</p>	<table border="1"> <tr> <td></td> <td>3+ Pkt</td> <td>Frailty</td> </tr> <tr> <td></td> <td>1-2 Pkt</td> <td>Pre-Frail</td> </tr> <tr> <td></td> <td>0 Pkt.</td> <td>normal</td> </tr> </table> <p>Fried L. Frailty in older adults. Evidence for a phenotype. J of Gerontology. 56 (3) 146-156.</p>		3+ Pkt	Frailty		1-2 Pkt	Pre-Frail		0 Pkt.	normal
	3+ Pkt	Frailty									
	1-2 Pkt	Pre-Frail									
	0 Pkt.	normal									

Ziel: Prävention Frailty - Verlängerung der gesunden Lebenserwartung

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Wissenschaftlicher Ausblick 1

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THEME [HEALTH.2011.2.2.2-1]
[Investigator-driven clinical trials for therapeutic interventions in elderly populations]

Proposal no: 278588-2
Principal Investigator (sponsor):
Prof. Heike A. Bischoff-Ferrari, MD, DrPH
Centre on Aging and Mobility
University of Zurich
Gloriastrasse 25
8091 Zurich, Switzerland



DO-HEALTH untersucht Effekt von 3 Strategien auf
Sarkopenie, Stürze, Frailty

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Vielen Dank

