

Sindrome da Fragilità e Sarcopenia

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Obiettivi formativi

- ✓ Conoscere la definizione di sindrome da fragilità e di sarcopenia
- ✓ Conoscere i meccanismi patogenetici
- ✓ Conoscere i fattori di rischio
- ✓ Conoscere le principali complicanze e manifestazioni cliniche
- ✓ Conoscere i principi di prevenzione e trattamento dietetico

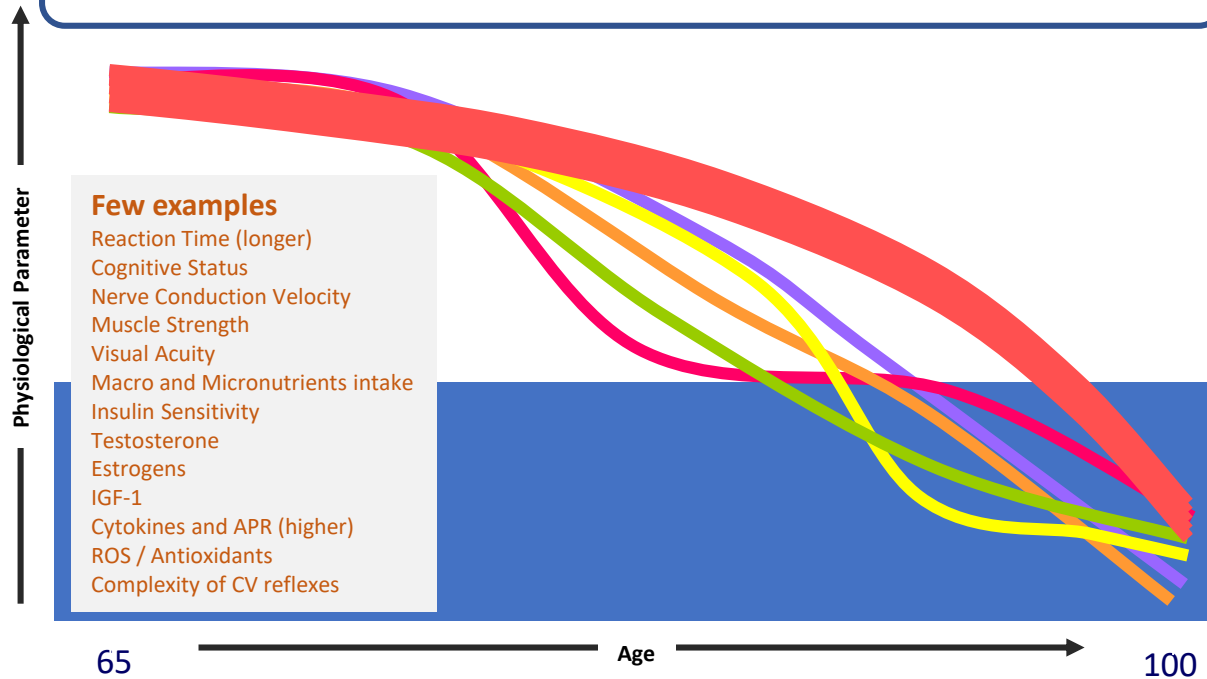
Summary from the American Geriatrics Society/NIA Research Conference on Frailty in Older Adults

“Uno stato di aumentata vulnerabilità allo stress dovuta a una riduzione età-correlata nella riserva fisiologica di molteplici sistemi fisiologici e in particolare il sistema neuromuscolare, metabolico, e immunitario”



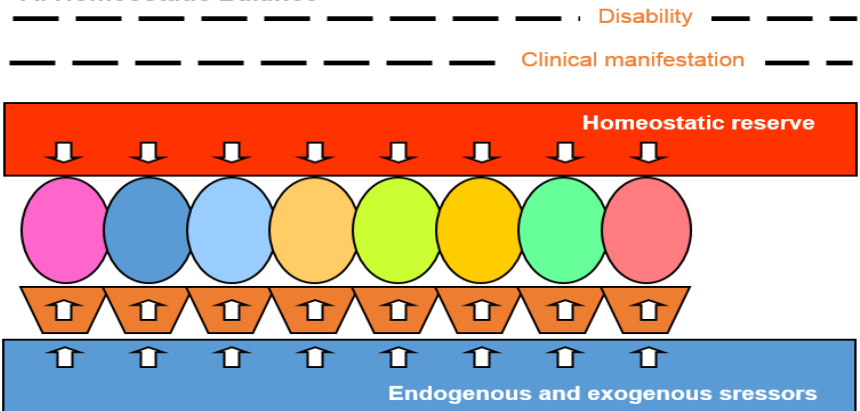
Invecchiamento e fragilità

Progressivo declino nell'integrità strutturale e funzionale che coinvolge simultaneamente diversi sistemi fisiologici

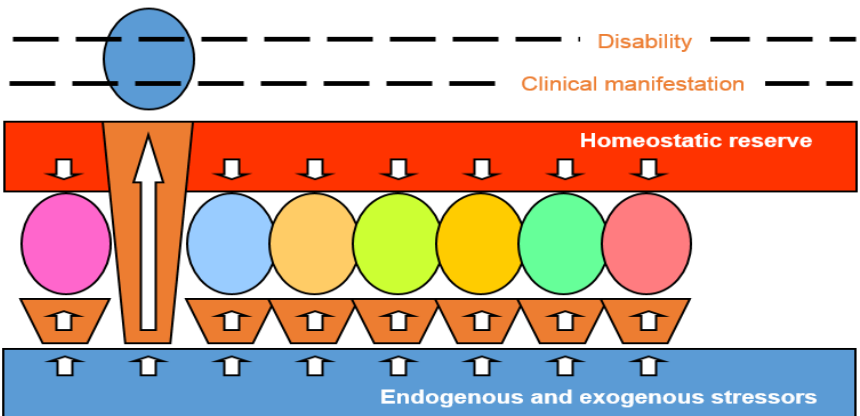


Fragilità come accelerato declino dell'integrità strutturale e funzionale che coinvolge simultaneamente più sistemi fisiologici

A. Homeostatic Balance

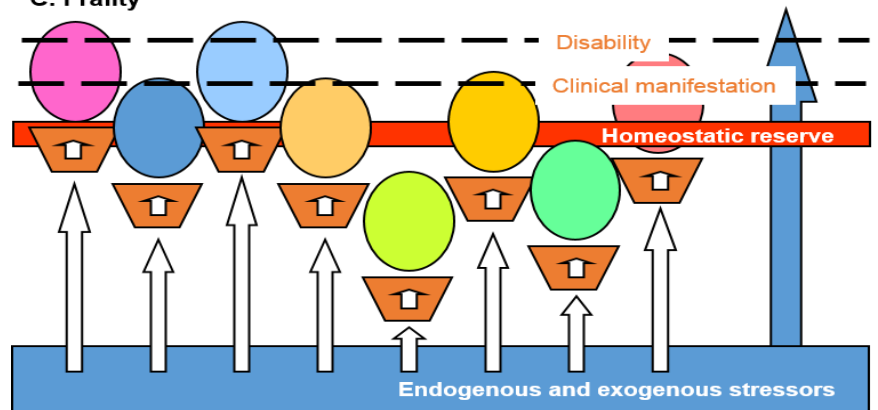


B. Model of disease in young/adults individuals

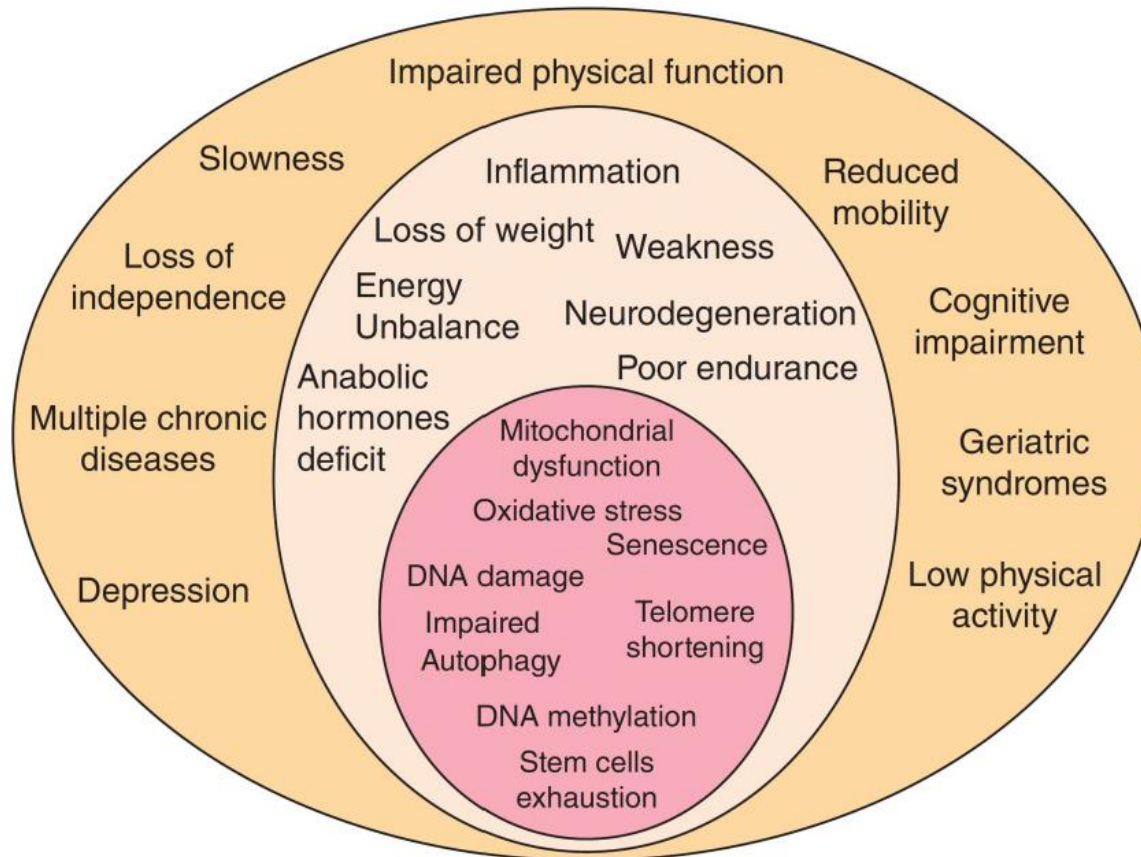


Fragilità come risultato
dell'alterazione dell'equilibrio
omeostatico

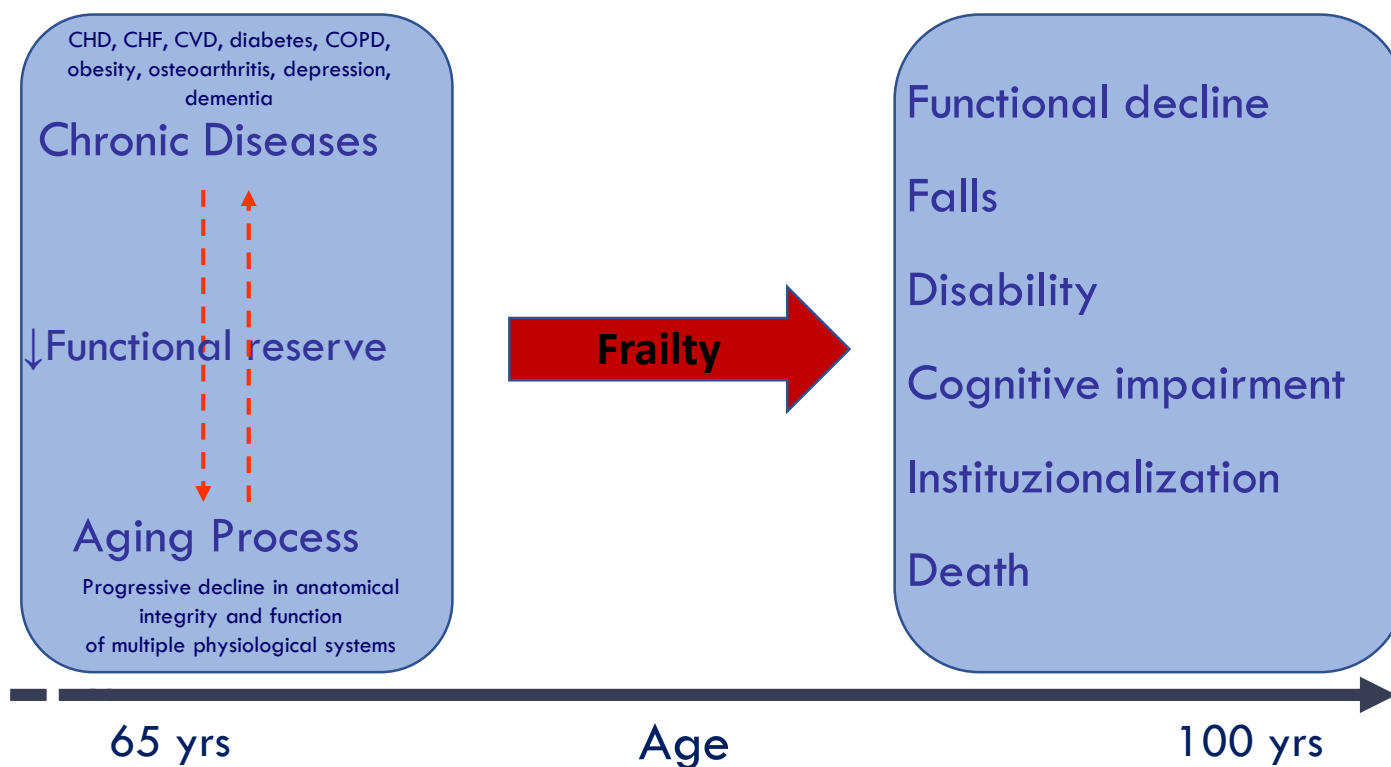
C. Frailty



Meccanismi biologici della fragilità



Interazione modificazioni età-correlate e malattie croniche nel determinismo della fragilità



Strumenti per la diagnosi di Fragilità

	Components	Frailty identification
Frailty Phenotype	Five criteria: weight loss, low physical activity, exhaustion, slowness, weakness	Frailty: ≥ 3 items, pre-frailty: 1-2 items, robust = 0 items
Frailty Index	30+ health deficits: scores range from 0 (no deficits) to 1 (all deficits)	Continuous score; suggested cutoff score for frailty >0.25
Clinical Frailty Scale	Visual chart for frailty with nine graded pictures: 1=very fit; 9=terminally ill	Frailty: score ≥ 5
FRAIL Scale	Five criteria self-reported by the subject: fatigue, poor resistance, ambulation, illnesses, loss of weight	Frailty: ≥ 3 items, pre-frailty: 1-2 items, robust = 0 items
Study of Osteoporotic Fractures frailty (SOF) Index	Three items: weight loss, exhaustion, unable to rise from a chair five times	Frailty: ≥ 2 items; pre-frailty: 1 item; robust: 0 items
Tilburg Frailty Indicator	15 self-reported items in three domains: physical, psychological, and social	Frailty: score ≥ 5
Groningen Frailty Indicator	15 self-reported items in four domains: physical, cognitive, social, psychological	Frailty: score ≥ 4
Edmonton Frailty Scale	Nine items: cognition, health (2 x), hospitalisation, social support, nutrition, mood, function, continence	Frailty: score ≥ 7
PRISMA-7	Seven self-reported items: age (>85 years), male, social support, and ADLs	Frailty: score ≥ 3
Multidimensional Prognostic Index	Eight items: comorbidity, nutrition, cognition, polypharmacy, pressure sore risk, living status, ADL, IADL	Frailty: score > 0.66 ; pre-frailty: score 0.34-0.66; robust: score <0.34
Hospital Frailty Risk Score	109 summed items from ICD-10 frailty-relevant codes from administrative hospital data. Also considered to be a case finding instrument.	Low risk: score <5 ; intermediate risk: score 5–15; high risk: score >15

Differenze concettuali negli strumenti per la definizione della fragilità

Physical Frailty

CHS (Fried)

SOFT

others

Defict accumulation Frailty

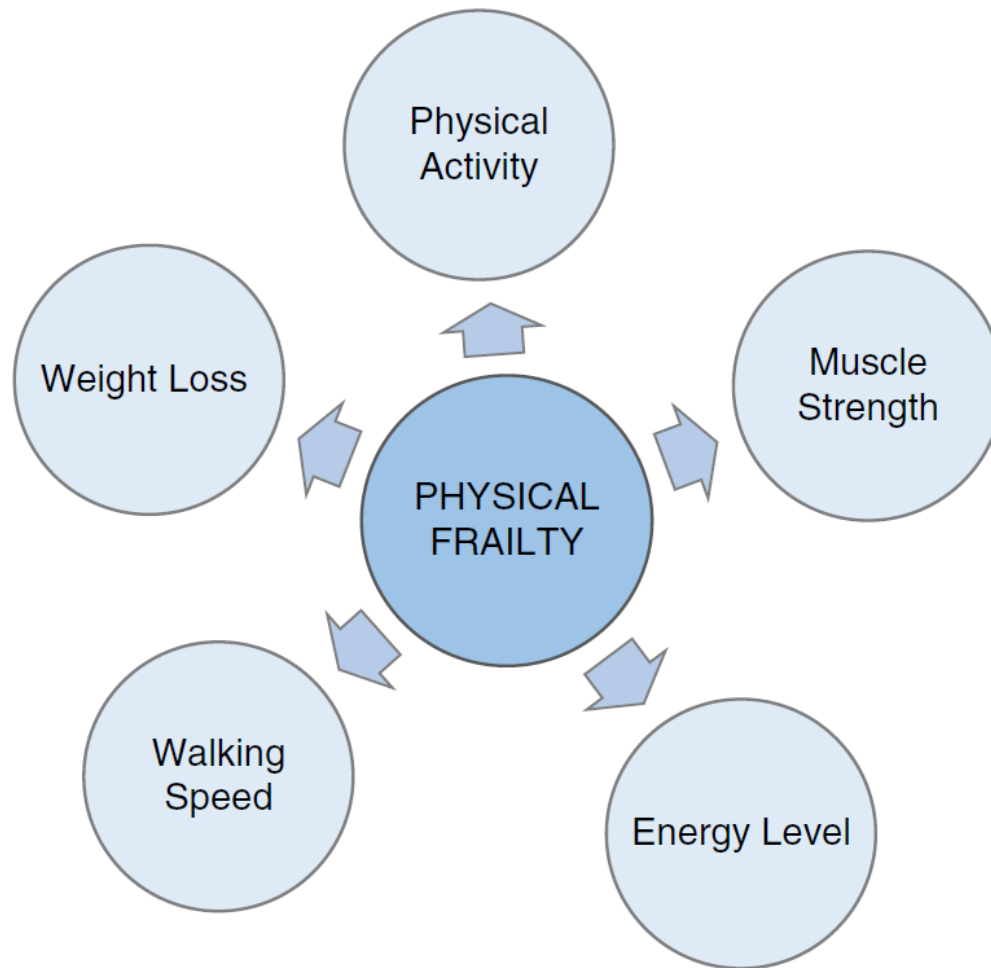
CSA Frailty Index

MPI

Silver code

others

Physical Frailty Phenotype



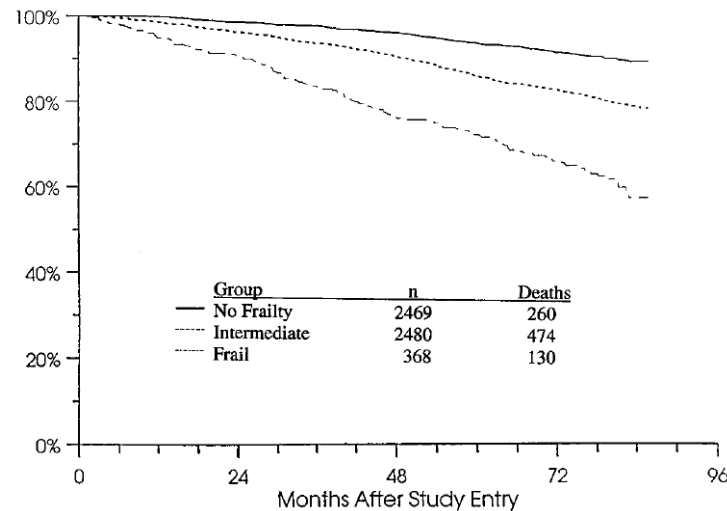
Fragilità:

presenza di 3 criteri

Pre-fragilità:

presenza di 2 criteri

Physical Frailty Phenotype: ruolo predittivo



Frailty Status at Baseline	(n)	Died		First Hospitalization		First Fall		Worsening ADL Disability		Worsening Mobility Disability	
		3 yr %	7 yr %	3 yr %	7 yr %	3 yr %	7 yr %	3 yr %	7 yr %	3 yr %	7 yr %
Not Frail	(2469)	3	12	33	79	15	27	8	23	23	41
Intermediate	(2480)	7	23	43	83	19	33	20	41	40	58
Frail	(368)	18	43	59	96	28	41	39	63	51	71
p [‡]		<.0001		<.0001		<.0001		<.0001		<.0001	

*7-year estimates are only available for the first cohort.

†Only those evaluable for frailty are included.

‡p value is based on the 2 degree of freedom log rank test using all available follow-up.

Clarification of conceptual frameworks: for commonly used Frailty models

Physical Frailty

CHS (Fried)

SOFT

others

Deficit accumulation Frailty

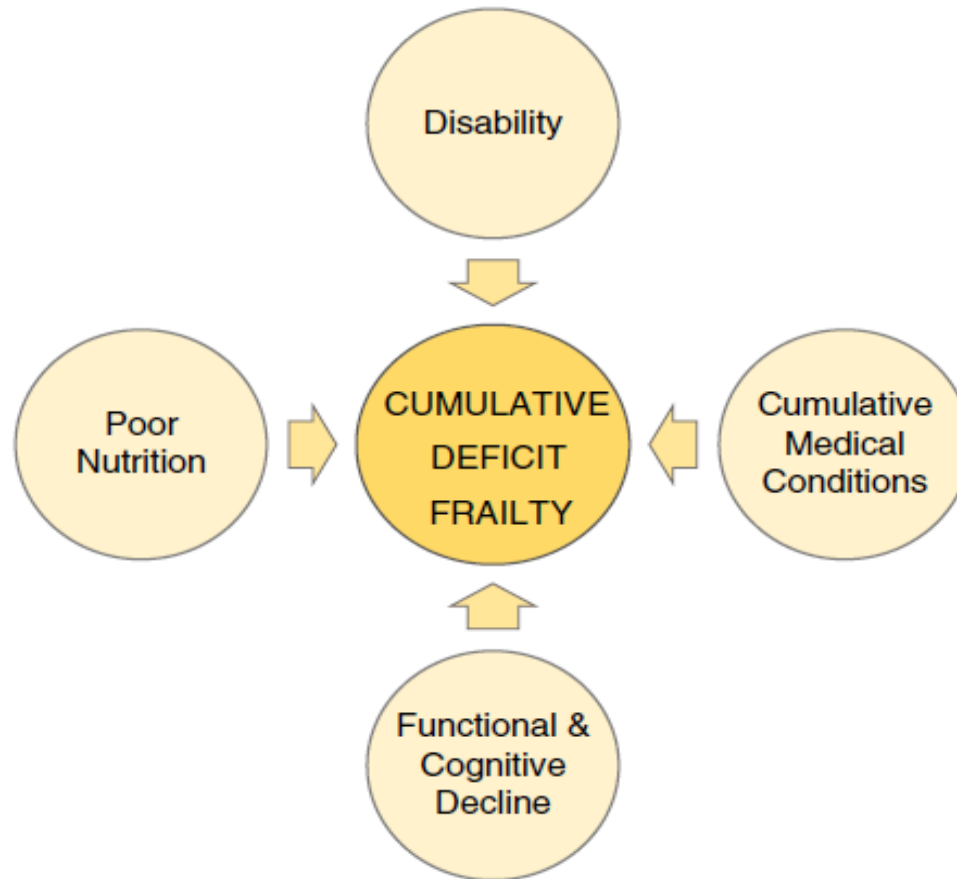
CSA Frailty Index

MPI

Silver code

others

Deficit accumulation: Frailty Index



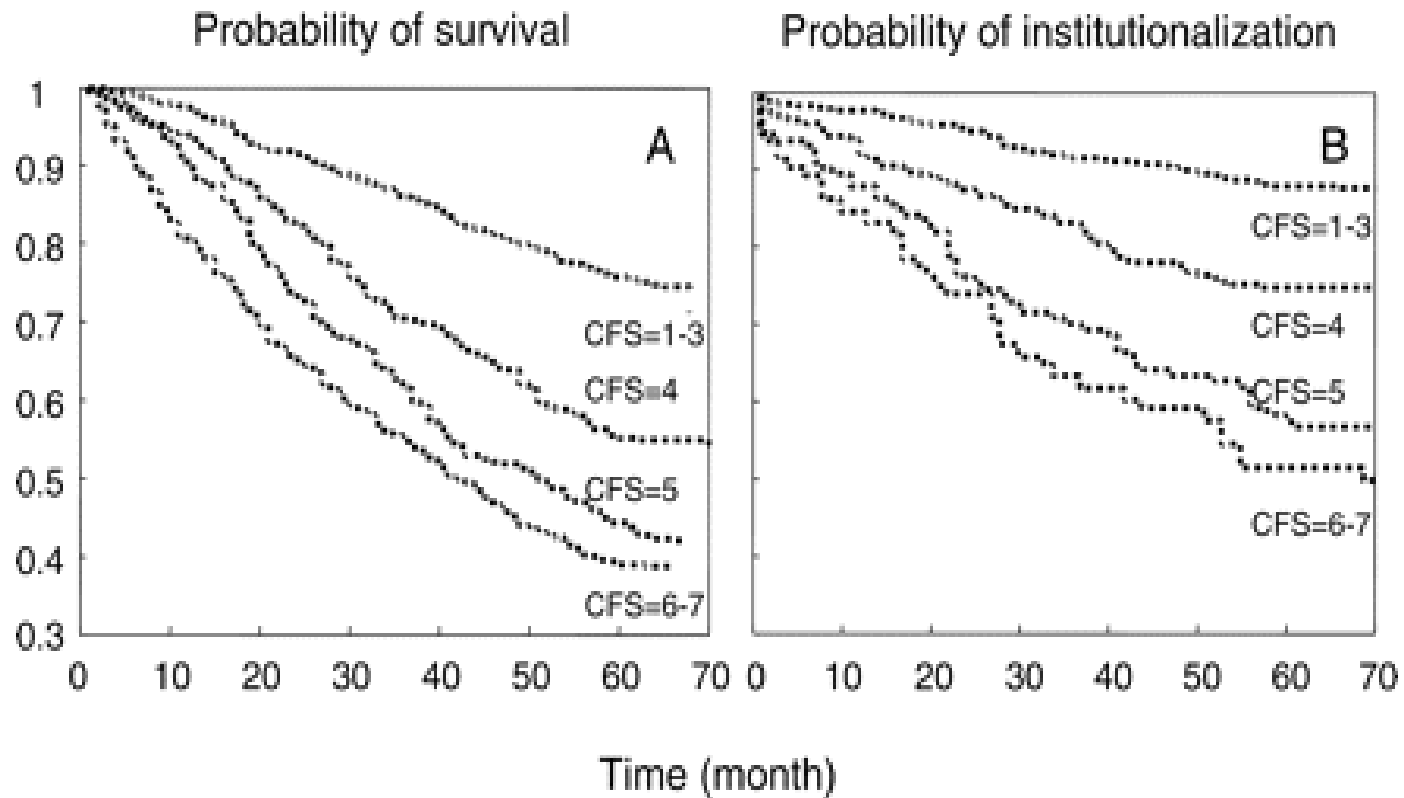
Appendix 1: List of variables used by the Canadian Study of Health and Aging to construct the 70-item CSHA Frailty Index

- | | | |
|---|------------------------------------|--------------------------------|
| • Changes in everyday activities | • Mood problems | • Seizures, partial complex |
| • Head and neck problems | • Feeling sad, blue, depressed | • Seizures, generalized |
| • Poor muscle tone in neck | • History of depressed mood | • Syncope or blackouts |
| • Bradykinesia, facial | • Tiredness all the time | • Headache |
| • Problems getting dressed | • Depression (clinical impression) | • Cerebrovascular problems |
| • Problems with bathing | • Sleep changes | • History of stroke |
| • Problems carrying out personal grooming | • Restlessness | • History of diabetes mellitus |
| • Urinary incontinence | • Memory changes | • Arterial hypertension |

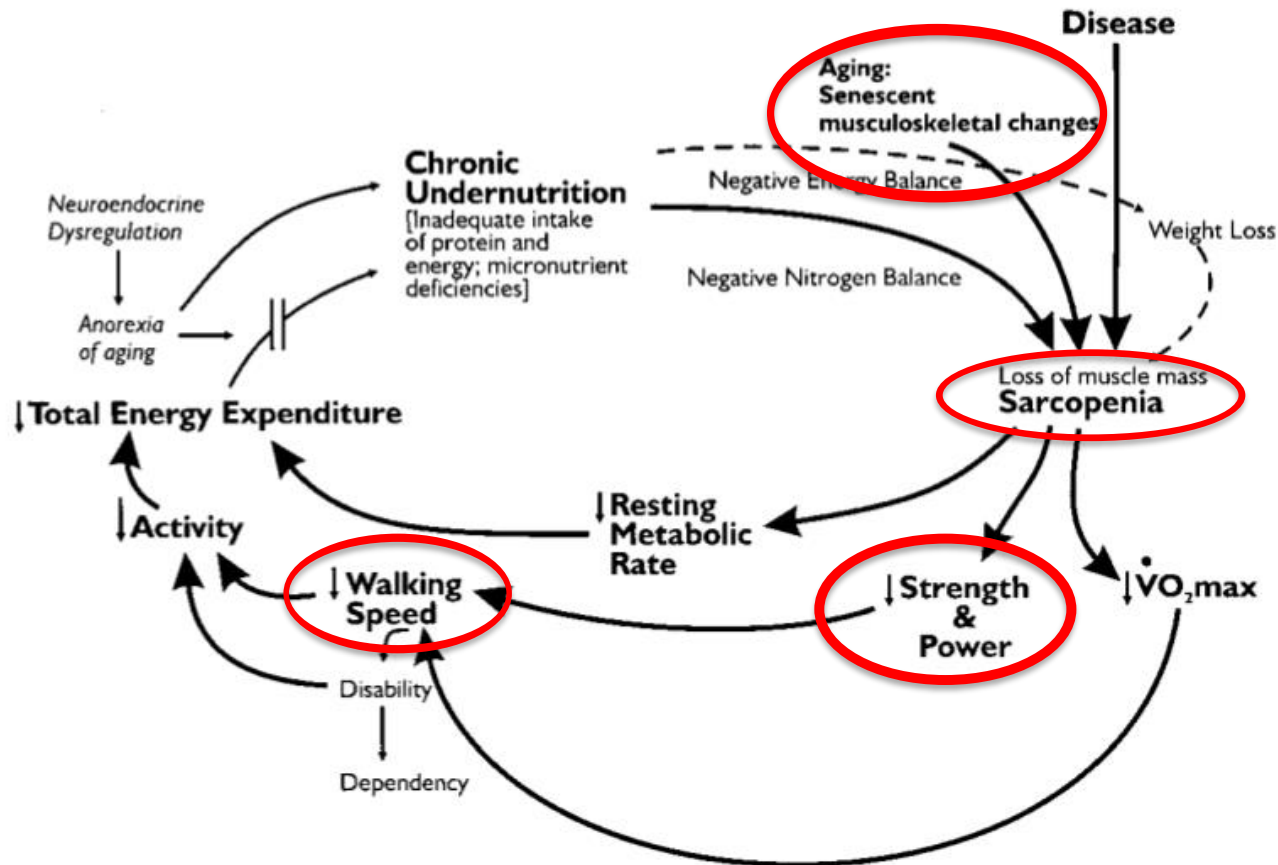
Rapporto tra il numero di deficit riscontrati e il numero di condizioni considerate

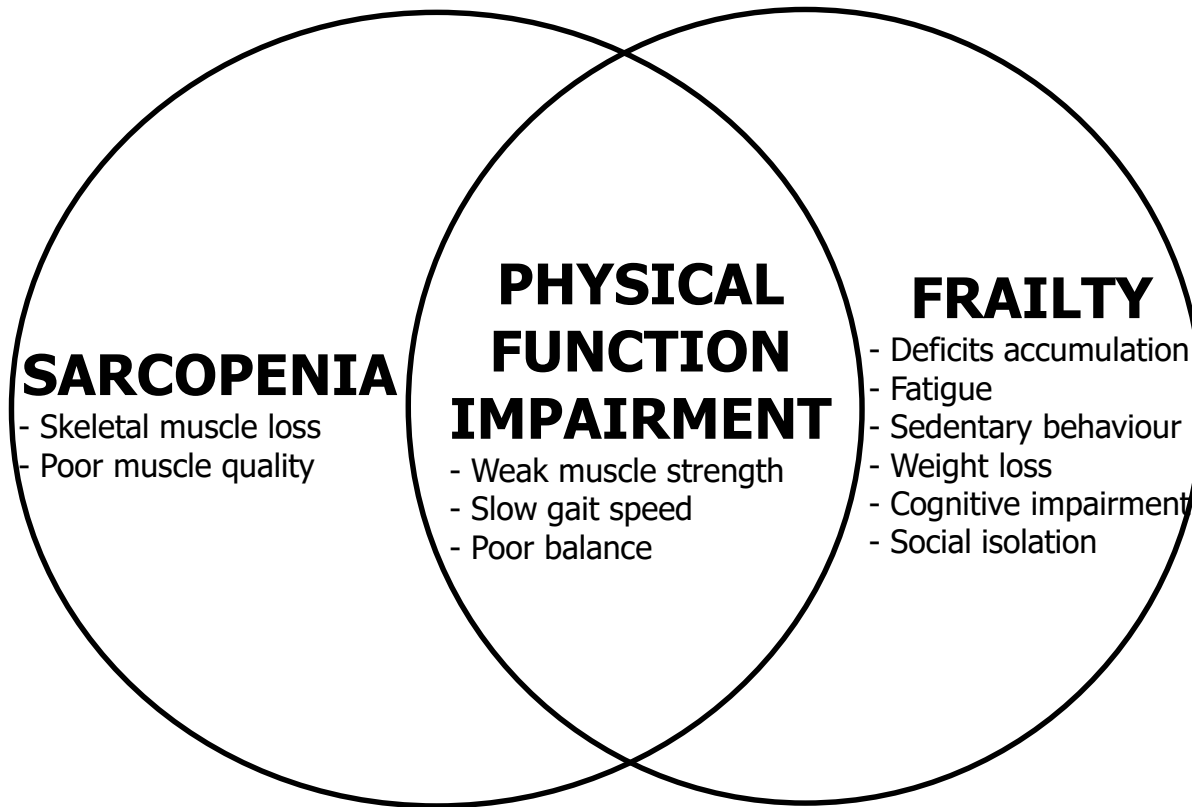
- | | | |
|-----------------------------|---|--------------------------------------|
| • Sucking problems | • Paranoid features | • Lung problems |
| • Problems going out alone | • History relevant to cognitive impairment or loss | • Respiratory problems |
| • Impaired mobility | • Family history relevant to cognitive impairment or loss | • History of thyroid disease |
| • Musculoskeletal problems | • Impaired vibration | • Thyroid problems |
| • Bradykinesia of the limbs | • Tremor at rest | • Skin problems |
| • Poor muscle tone in limbs | • Postural tremor | • Malignant disease |
| • Poor limb coordination | • Intention tremor | • Breast problems |
| • Poor coordination, trunk | • History of Parkinson's disease | • Abdominal problems |
| • Poor standing posture | • Family history of degenerative disease | • Presence of snout reflex |
| • Irregular gait pattern | | • Presence of the palmomental reflex |
| • Falls | | • Other medical history |

Kaplan–Meier medium-term survival curves for individuals with different values



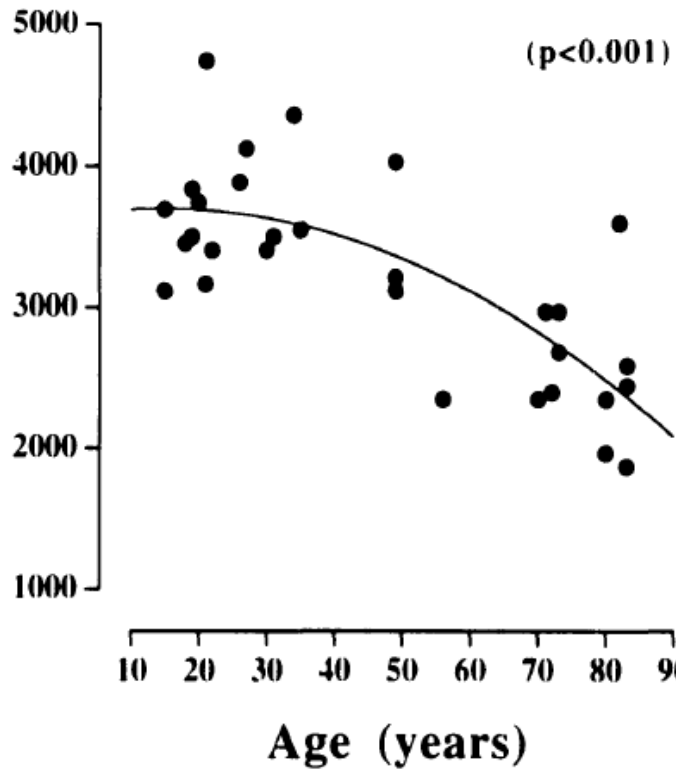
Il ciclo della Fragilità



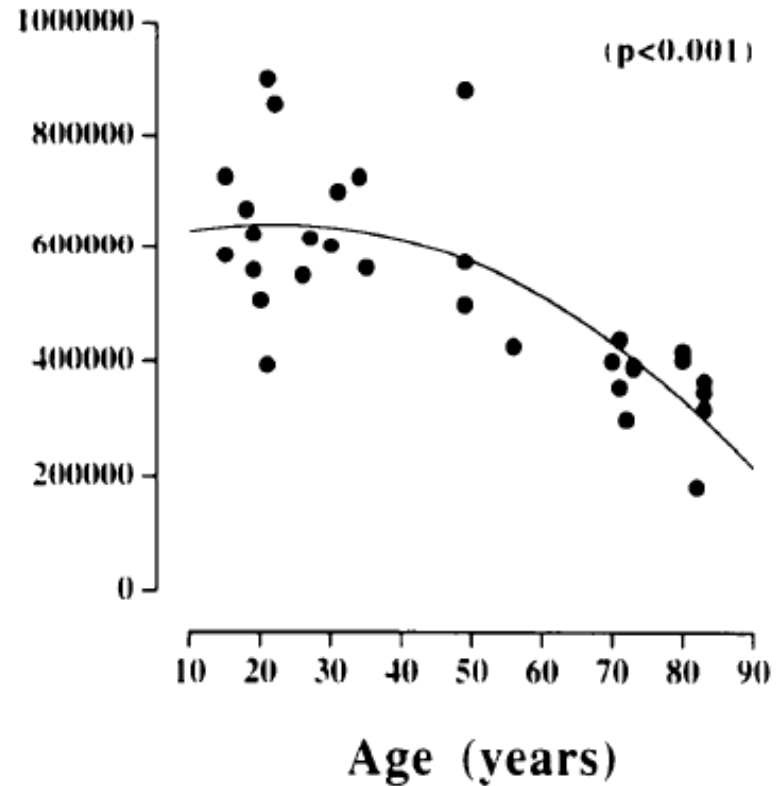


Relazione tra età e modificazione della muscolatura scheletrica

Muscle cross sectional area (mm²)



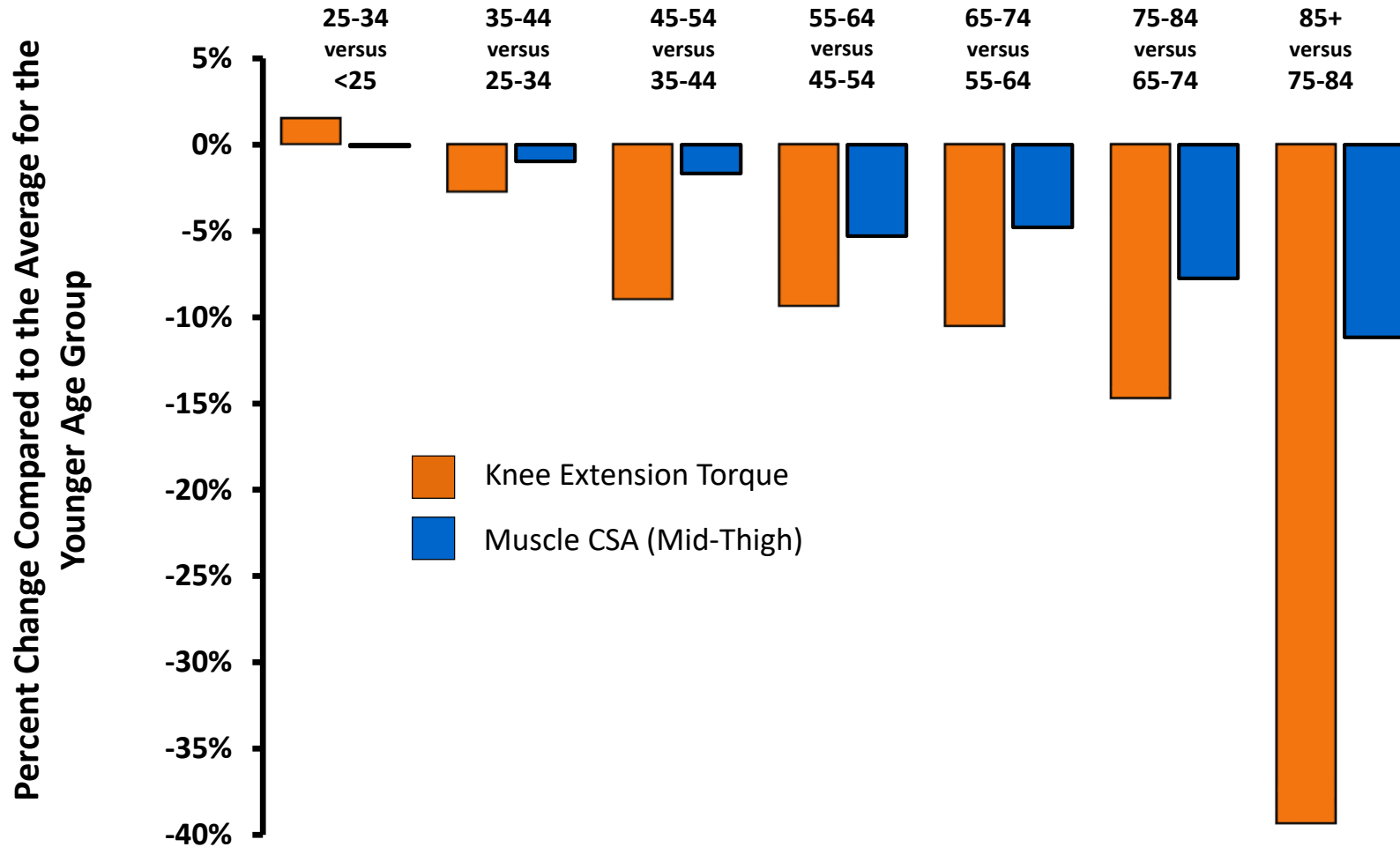
Total number of fibers



Relazione tra età e modificazione della massa e forza muscolare

Muscle

Strength/ Mass Ratio in BLSA Participants 60-70 yrs Old



Sarcopenia: Diverse definizioni

- 2014 – **FNIH Sarcopenia Project**: ...limitazione funzionale in presenza di riduzione di debolezza (ridotta forza) come conseguenza di ridotta massa muscolare...
- 2018- **European Working Group on Sarcopenia in Older People** disordine progressivo e generalizzato della muscolatura scheletrica che si associa ad una aumentato rischio di eventi clinici avversi quali cadute, fratture, disabilità e morte

**S
A
R
C
O
P
E
N
I
A**

PROBABILE



**Ridotta forza
muscolare**

+

CERTA



**Ridotta
qualità e quantità di
massa muscolare**

+

SEVERA

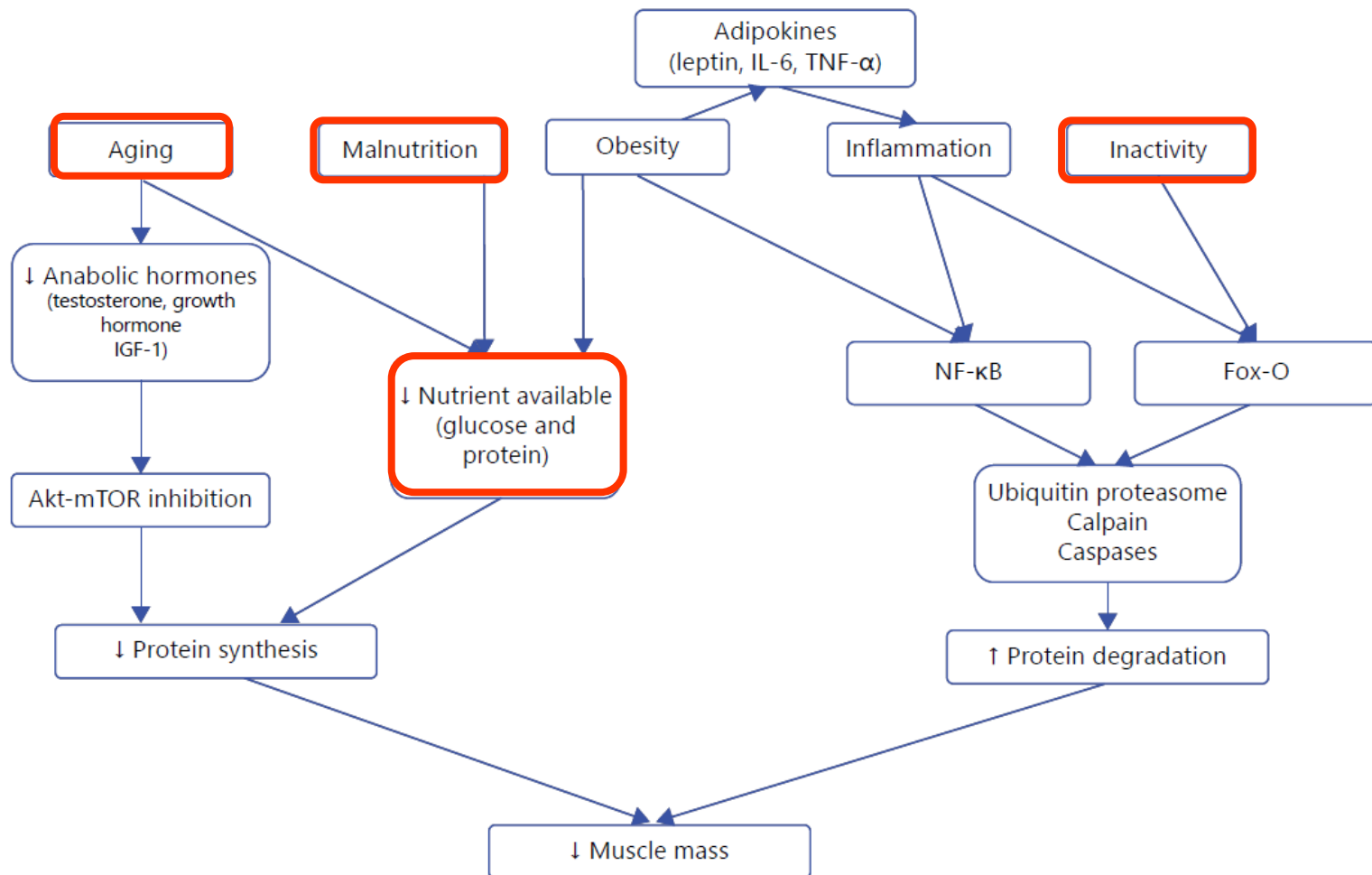


**Ridotta
performance
fisica**

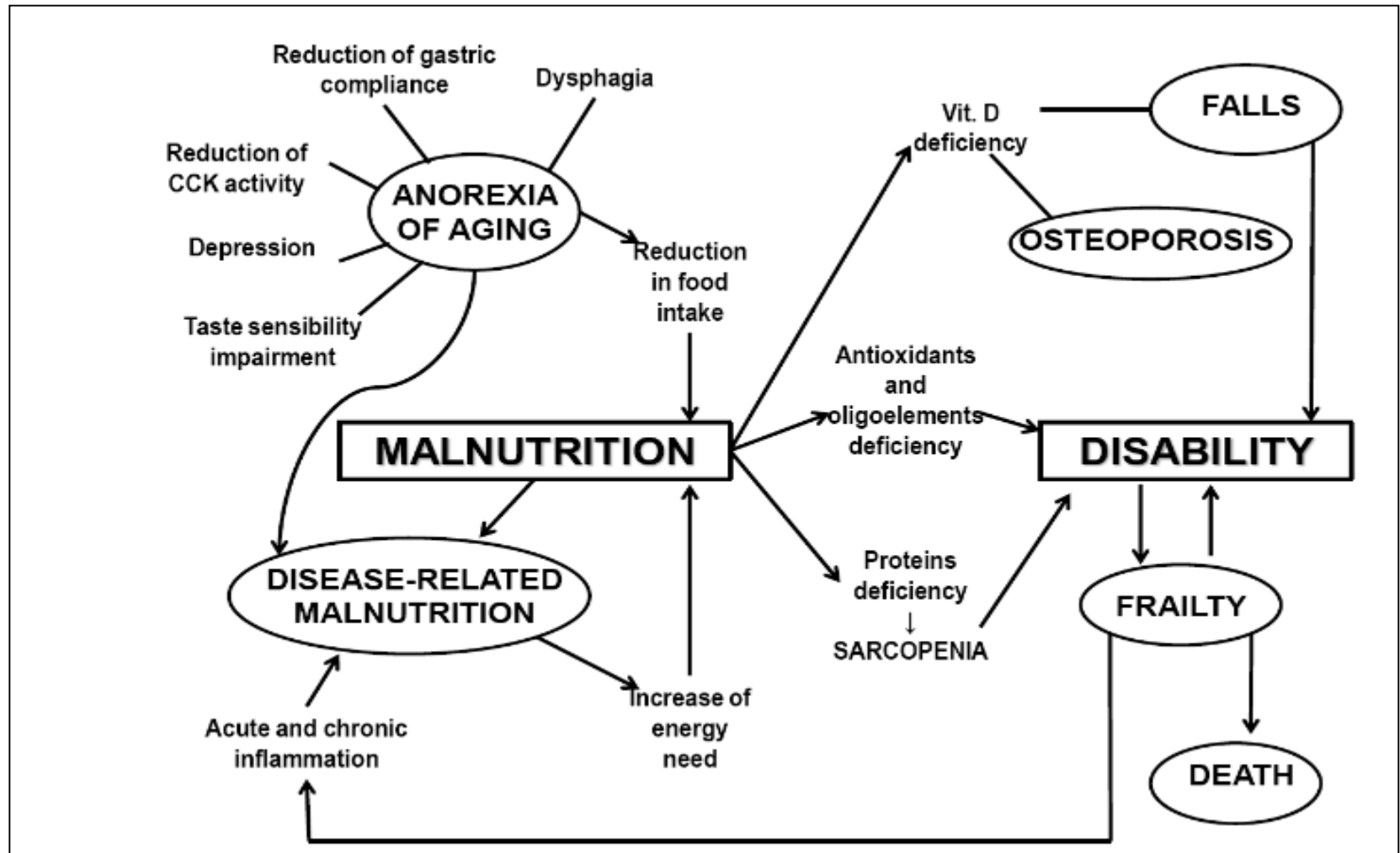
Prevalenza di Sarcopenia in Ospedale in base ai criteri EWGSOP

Author	Setting	N	Age(yrs)	Prevalence
Gariballa, 2013	Geriatrics	432	≥65	10%
Rossi, 2014	Geriatrics	119	807	25%
Sousa, 2014	Geriatrics	608	≥18 (f)	5-38%
			≥18 (m)	5-41%
Vetrano, 2014	Geriatr. & Int. Med.	770	≥65	28%
Smoliner, 2014	Geriatrics	198	≥65	25%
González-Montalvo, 2015	Orthogeriatrics	479	85±7	17.1%
Martinez, 2015	Mixed	110	≥60	21.8%
Cerri AP, 2015	Geriatrics	103	≥65	21.4%
Bianchi L, 2017	Geriatr. & Int. Med.	655	≥65	36.4%

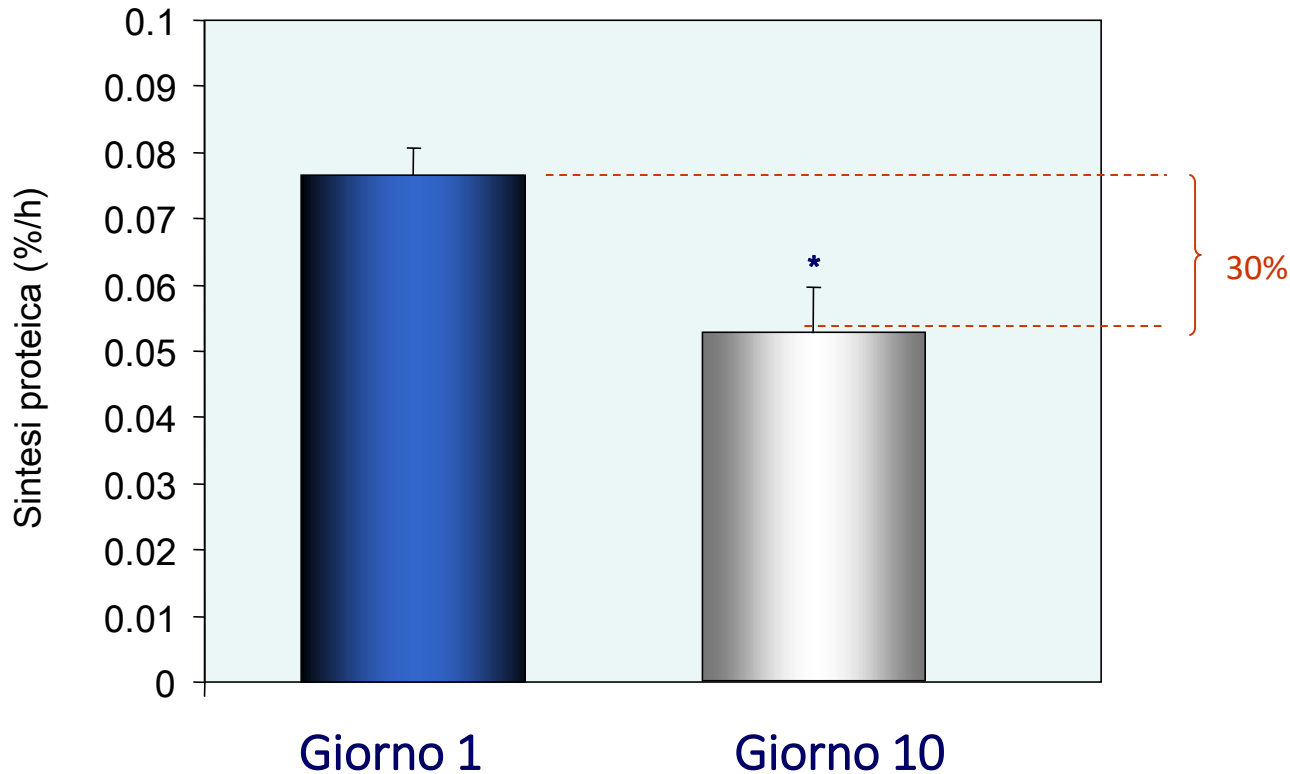
Eziologia e Patogenesi della sarcopenia



Anorexia, malnutrizione e sarcopenia



Inattività fisica e sintesi proteica nell'anziano



Sintesi proteica nelle 24 h durante 10 gg di inattività fisica
(stable isotope methodology)

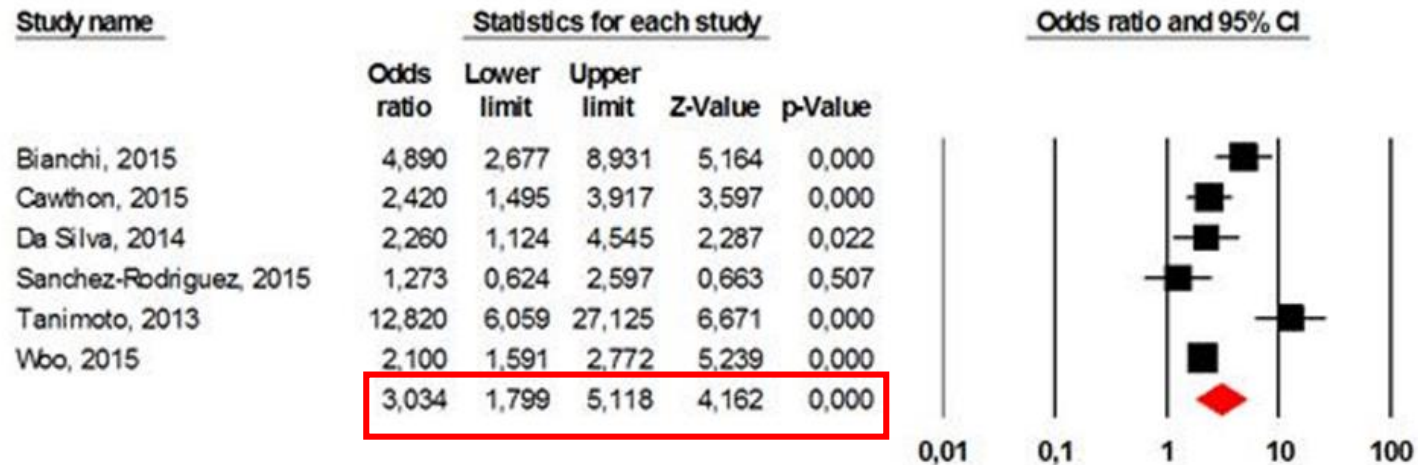
Kortebein, P. et al. JAMA 2007

Inattività fisica e sintesi proteica nell'anziano

Table. Effects of 10 Days of Bed Rest in Older Adults

	No. of Participants (N = 12)*	Mean (95% Confidence Interval)			P Value
		Bed Rest		Change	
		Before	After		
Muscle fractional synthetic rate, % per h†	10	0.077 (0.059 to 0.095)	0.051 (0.035 to 0.067)	-0.027 (-0.007 to -0.047)	.02
% Change				-30.0 (-7.0 to -54.0)	
DEXA lean mass, kg‡	10				
Whole body		48.05 (40.61 to 55.49)	46.51 (39.57 to 53.45)	-1.50 (-0.62 to -2.48)	.004
% Change				-3.2 (-1.4 to -5.0)	
Lower Extremity		15.01 (12.41 to 17.61)	14.06 (11.85 to 16.27)	-0.95 (-0.42 to -1.48)	.003
% Change				-6.3 (-3.1 to -9.5)	
Isokinetic muscle strength, Nm per s§	11	120 (96 to 145)	101 (81 to 121)	-19 (-11 to -30)	.001
% Change				-15.6 (-8.0 to -23.1)	

Sarcopenia declino funzionale in soggetti anziani residenti in comunità: Revisione sistematica e meta-analisi



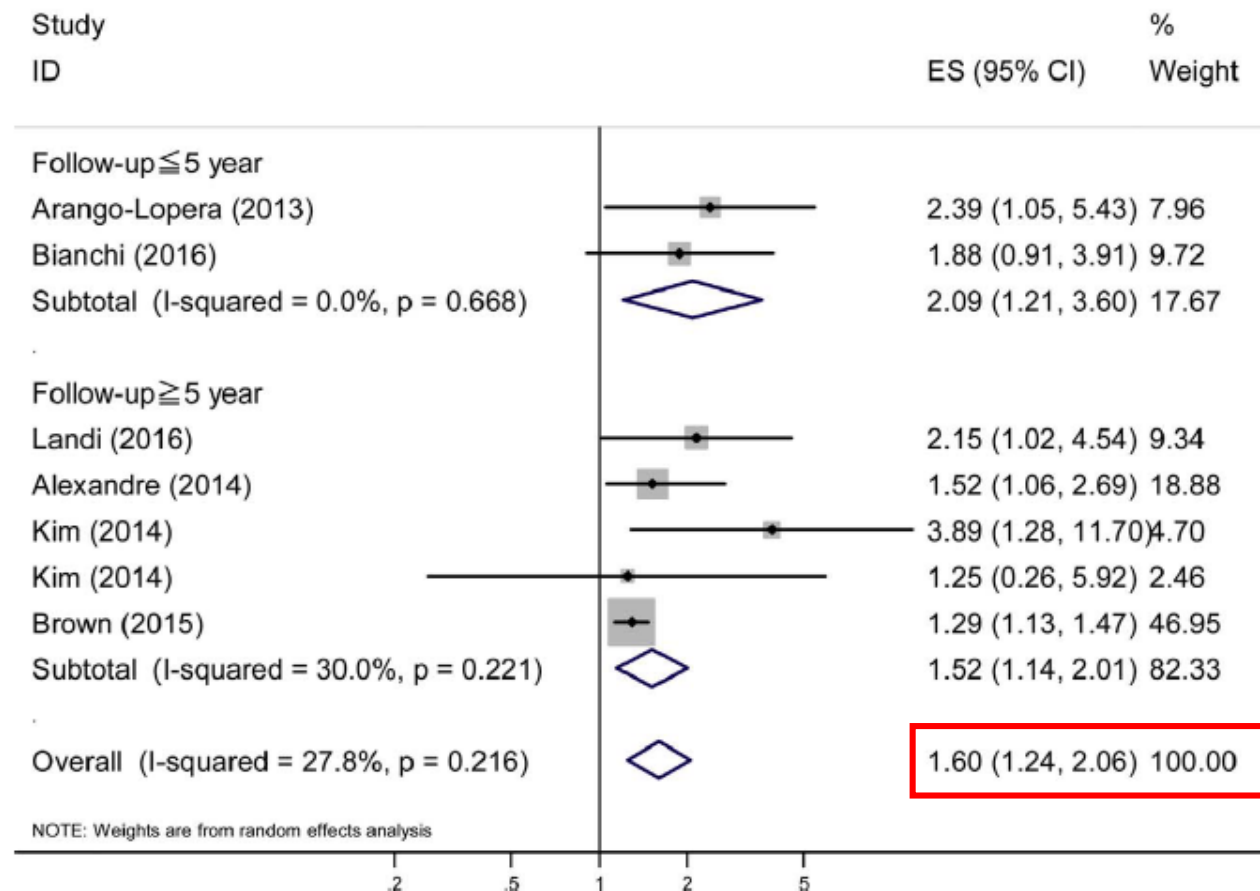
2B. Functional disability and sarcopenia

Heterogeneity Q-value 27.99; df(Q) 5; p-value <0.001; I² 82.1.

* Only the OR reported in the Cawthon et al. study was age-adjusted. All other ORs were crude

Sarcopenia mortalità per tutte le cause in soggetti anziani residenti in comunità

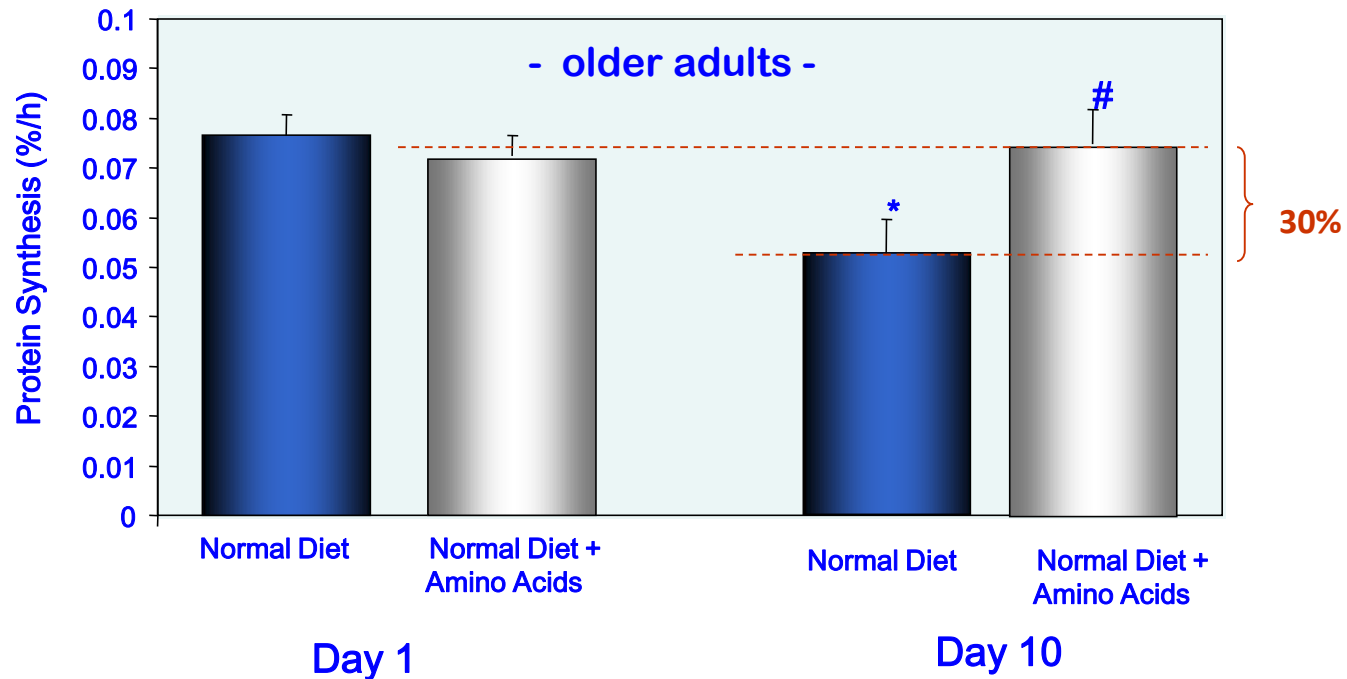
Revisione sistematica e meta-analisi



Opzioni terapeutiche per la prevenzione e il trattamento della sarcopenia

Intervento	Effetti	Effetti collaterali
Farmaci	Nessun farmaco approvato	
Supplementazione proteica → Aminoacidi essenziali	↑ massa muscolare ↑ forza muscolare se associata ad esercizio fisico con	Lieve aumento creatininemia
Esercizio fisico → contro resistenza → aerobico	↑ massa, forza e potenza muscolare ↑ velocità del cammino e qualità della vita. Effetto minore sulla forza muscolare	Cadute e lesioni muscolari

Le proteine della dieta attenuano la riduzione della sintesi proteica dovuta all'inattività fisica



Esercizio fisico di resistenza + proteine

