

Nutrizione, malnutrizione e sarcopenia: il diabetico anziano

Efisio Cossu



Nutrizione

Negli anziani dovrebbero essere valutati periodicamente l'apporto alimentare, lo stato nutrizionale e l'idratazione, fornendo indicazioni per una terapia nutrizionale adeguata allo stato socioeconomico e culturale, consigli sul contenuto della dieta e sui potenziali benefici derivanti da una riduzione ponderale. Dovrà sempre essere valutato anche il rischio di una malnutrizione calorico-proteica, condizione assai frequente nella persona anziana. *VI B*

Il BMI è inadatto a valutare lo stato nutrizionale dell'anziano in quanto lo sovrastima e un BMI stabile in un anziano, la cui statura si riduce, rischia di mascherare una malnutrizione. *IV B*

Nell'anziano, come nell'adulto, l'obesità è patogena ma la morbilità, la disabilità e la mortalità sono correlate alla circonferenza addominale e non al BMI. La circonferenza addominale è meno condizionata dalla statura e correla con l'obesità viscerale e con il rischio cardiometabolico a essa legato. *IV B*

AMD-SID; Standard italiani per la cura del diabete mellito 2018

Nutrizione



Un **intervento multidisciplinare** migliora significativamente il controllo glicemico in pazienti diabetici di mezza età e anziani.

Indispensabile il **controllo delle comorbilità** e di tutti i fattori di rischio cardiovascolare.

Sono da **evitare le diete eccessivamente ipocaloriche** che possono contribuire a compromettere lo stato nutrizionale nelle persone anziane.

AMD-SID; Standard italiani per la cura del diabete mellito 2018

Il rischio di **grave ipoglicemia**, potenzialmente fatale, **raddoppia** nel grande anziano che assume farmaci per il diabete e politerapie.

Doubova S 2007 - Rizvi AA 2007

Terapia nutrizionale

Una appropriata alimentazione è un requisito essenziale per **conservare un buono stato di salute** in tutte le età e specialmente in età avanzata.

L'alimentazione ideale va adeguata alla condizione reale in cui la persona anziana si trova e ai supporti sui quali può contare, pertanto va **individualizzata** con una anamnesi completa con l'intervento di personale qualificato.



La Terapia Medica Nutrizionale nel Diabete Mellito

Le persone anziane con diabete si possono dividere in due gruppi:
1. Le **persone con diabete divenute anziane**;
2. Le **persone anziane divenute diabetiche**.

Il primo gruppo è costituito da persone con diabete tipo 1 e tipo 2 divenute anziane che quindi, convivendo da più o meno lungo tempo con il diabete, si sono **"abituate" alla loro condizione**.

Il secondo gruppo, quello delle persone divenute diabetiche dopo i sessantacinque anni, è quello che pone più problemi dal punto di vista terapeutico e gestionale in quanto rende necessaria la **modifica di abitudini di vita ed alimentari spesso inveterate**.

Più che la "compliance", in questo tipo di persone, è necessario ottenere la "concordance" concordando appunto con loro l'intervento terapeutico e dietetico.

Introito calorico e distribuzione macronutrienti

Oltre i 40 anni di età, il fabbisogno calorico si **riduce gradualmente** di circa il 5% per decade sino ai 60 anni d'età, di circa il 10% dai 60 ai 70 anni e di un ulteriore 10% dopo i 70 anni.

Non è quindi opportuno scendere al disotto delle 1300-1400 kcal nelle donne e delle 1500-1600 kcal negli uomini.

Introito calorico giornaliero minimo	1500-1600 kcal ♂ 1300-1400 kcal ♀
Carboidrati	45-60%
Proteine	15-20%
Lipidi	25-35%



Carboidrati



Preferire i **carboidrati complessi**, possibilmente a basso indice e carico glicemico.

Più della metà della alimentazione deve essere costituita da pane, pasta, patate e frutta.

Consumare con **moderazione i frutti particolarmente dolci** (es: uva, fichi, banane).

Preferire frutti con minor contenuto glucidico (es mele, pere, agrumi).

Eliminare alimenti e bevande ad alto contenuto di mono e disaccaridi (es: saccarosio).



Lipidi

Per quanto riguarda i lipidi, questi devono essere rappresentati soprattutto da grassi mono- e polinsaturi di origine vegetale, mentre vanno ridotti quelli saturi di origine animale.





Proteine



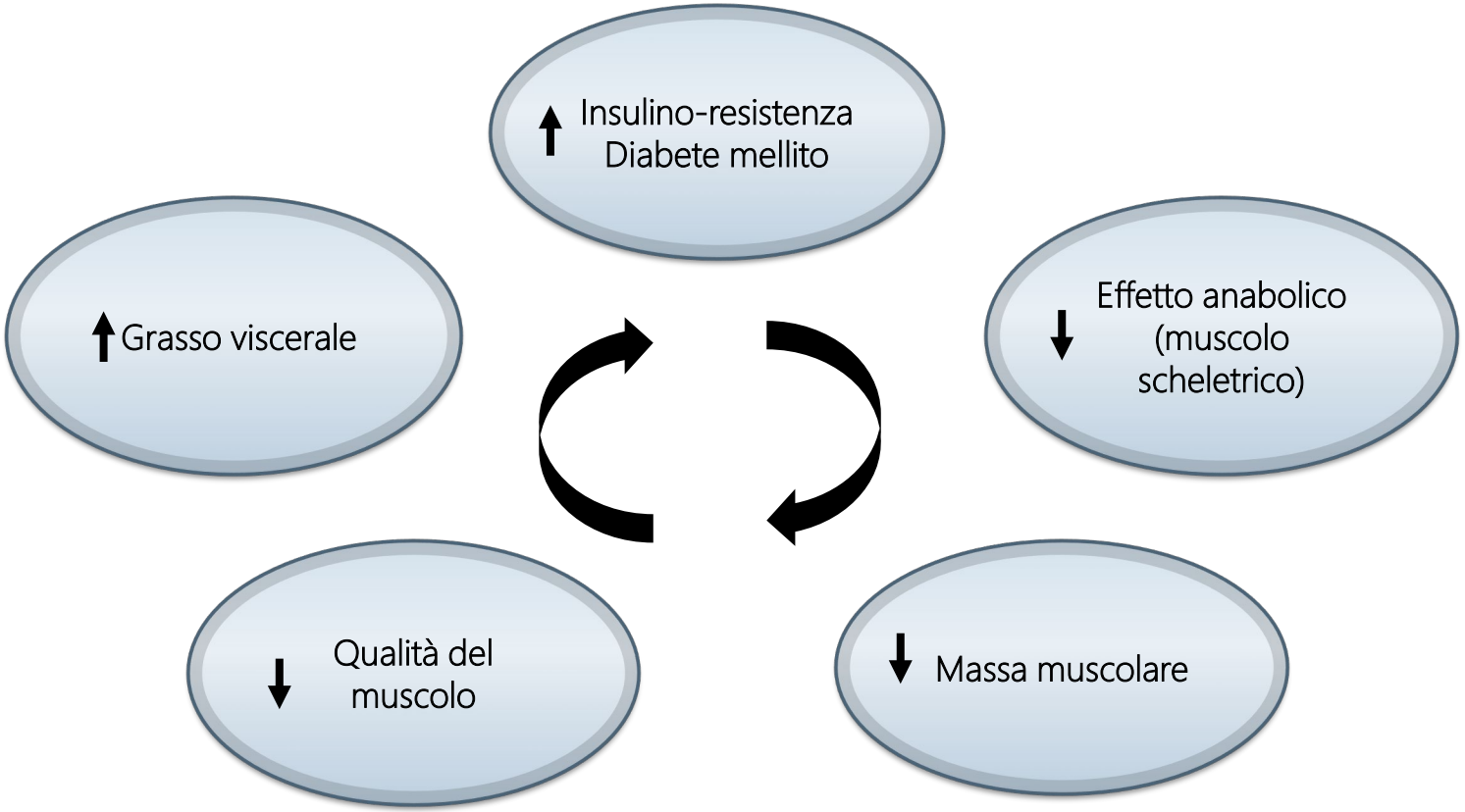
Recommended to help maintain lean body mass and function	1,0 - 1,2 g/kg/die
Exercise or acute illness	1,2 - 1,5 g/kg/die
Severe kidney disease (eGFR<30 mL/min/1.73 m^2)	≤ 0,8 g/kg/die
Severe illness or marked malnutrition	≤ 2,0 g/kg/die

Il loro apporto andrebbe **incrementato** rispetto a quanto previsto normalmente nelle persone diabetiche adulte. Questo soprattutto per **favorire l'anabolismo proteico** a livello muscolare e per **ridurre la progressiva perdita di massa muscolare**; la riduzione del patrimonio proteico totale contribuisce ad incrementare la fragilità, a ritardare i processi di cicatrizzazione e a ridurre le funzioni immunitarie.

Bauer J, Biolo G, Cederholm T, et al. Evidence-based recommendations for optimal dietary protein intake in older people: a position paper from the PROTAGE Study Group. J Am Med Dir Assoc 2013

Yang Y, Breen L, Burd NA, et al. Resistance exercise enhances myofibrillar protein synthesis with graded intakes of whey protein in older men. Br J Nutr 2012

Invecchiamento



Ahmed H. Abdelhafiz et Al, "Diabetes, Nutrition, and Exercise", Clin Geriatr Med – (2015)

Diabetogenic effects and diabetes phenotype of aging

Diabetogenic effects
(increased insulin resistance and decreased insulin secretion)

Increased visceral body fat
Reduced skeletal muscle mass
Decreased beta-cell function
Reduced beta-cell mass
Mitochondrial dysfunction
Increased inflammatory markers
Altered lipid metabolism



Diabetes phenotype (frailty and disability)

Multiple comorbidities
Geriatric syndromes
Physical inactivity
Malnutrition
Sarcopenia
Poor muscle quality
Weight loss

Ahmed H. Abdelhafiz et Al, "Diabetes, Nutrition, and Exercise", Clin Geriatr Med – (2015)

Esercizio fisico

Aerobic exercise

- Recruitment of large groups of muscles
- Includes activities such as walking, cycling, swimming, or jogging (**may not be suitable for all older people** because of the high prevalence of comorbidities such as arthritis, cardiovascular disease, peripheral vascular disease, neuropathy, and poor mobility)





Resistance exercise

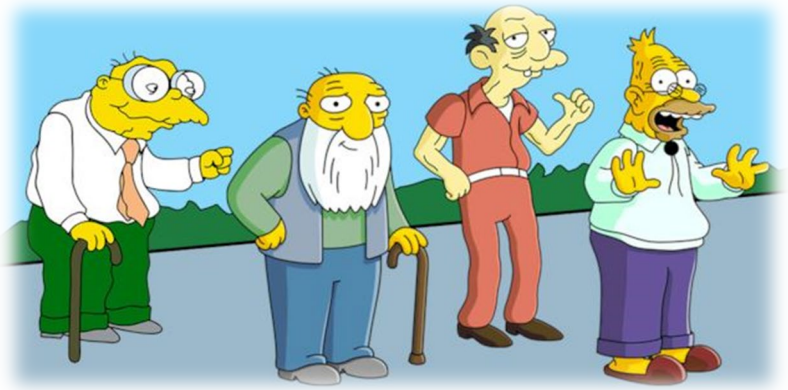
- Recruitment of single muscle group (Use of muscular strength to lift a weight or to move a load)
- **It may be a safer alternative for these patients**.

Ahmed H. Abdelhafiz et Al, "Diabetes, Nutrition, and Exercise", Clin Geriatr Med – (2015)

	Aerobic	Resistance
Muscles involved	Large groups of muscle contracting continuously	One group of muscle contracting intermittently
Examples	Walking and jogging	Lifting or moving load
Metabolic effects		
Improved insulin sensitivity	++	++
Increase glucose uptake	++	++
Improves lipid profile	++	++
Blood pressure control	++	++
Improves aerobic capacity	+++	+
Body composition effects		
Reduction of body fats	++	+
Increase muscle mass	+	+++
Increase muscle strength	+	+++
Duration	Long	Short
Suitability	Reasonably fit persons	Persons with comorbidities or poor mobility
Overall improvement	Improves stamina	Improves force

Ahmed H. Abdelhafiz et Al, "Diabetes, Nutrition, and Exercise", Clin Geriatr Med – (2015)

Esercizio fisico



The choice of exercise type for older people with diabetes may be decided **according to comorbidities, personal preference, or available resources**.

Resistance training improves muscle quality, resulting in:

- ✓ **skeletal muscle fiber hypertrophy**;
- ✓ significant **reduction of HbA1c** (0.3%) compared with no exercise (but similar to aerobic exercise);
- ✓ improvements in glycemic control.

Irvine C, Taylor NF. Progressive resistance exercise improves glycaemic control in people with type 2 diabetes mellitus: a systematic review. Aust J Physiother 2009
Ahmed H. Abdelhafiz et Al, "Diabetes, Nutrition, and Exercise", Clin Geriatr Med – (2015)

Exercise and nutrition

The nutrition-exercise interaction is **equally useful in overweight or obese individuals** (weight loss) as well as **frail individuals** (increasing muscle mass).

Protein intake and exercise **reduce muscle protein breakdown** and result in **muscular hypertrophy**

BUT

Diet quality alone was not enough to preserve muscle strength in a secondary analysis of the longitudinal observational NuAge study.

Irvine C, Taylor NF. Progressive resistance exercise improves glycaemic control in people with type 2 diabetes mellitus: a systematic review. Aust J Physiother 2009;
Ahmed H. Abdelhafiz et Al, "Diabetes, Nutrition, and Exercise", Clin Geriatr Med – (2015)
Rahi B, Morais JA, Dionne IJ, et al. The combined effects of diet quality and physical activity on maintenance of muscle strength among diabetic older adults from the NuAge cohort. Exp Gerontol 2014

Contents lists available at ScienceDirect

Experimental Gerontology

journal homepage: www.elsevier.com/locate/expgero

The combined effects of diet quality and physical activity on maintenance of muscle strength among diabetic older adults from the NuAge cohort

Berna Rahi [a], José A. Morais [b], Isabelle J. Dionne [c,d], Pierrette Gaudreau [e,f], Hélène Payette [d,g], Bryna Shatenstein [a,h,*]

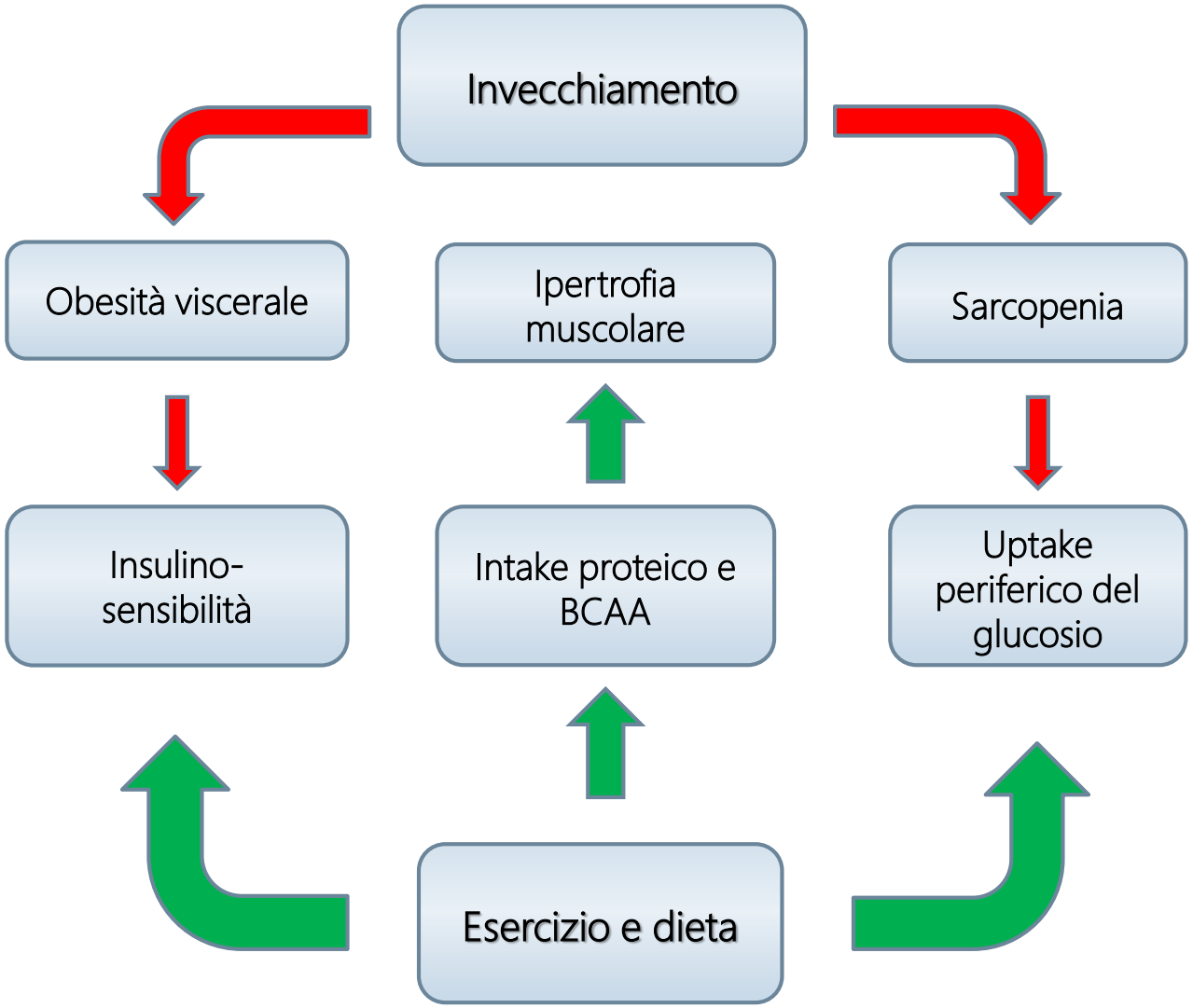
A B S T R A C T

Diabetic older adults are at a higher risk of muscle strength (MS) decline than their non-diabetic counterparts. Adequate protein and energy intakes and physical activity (PA) may preserve MS during aging. However, the role of diet quality (DQ) in MS maintenance is still unknown. This study aimed to determine the association between DQ – alone or combined with PA – and changes in MS over 3 years in diabetic participants aged 67 to 84 years at recruitment in a secondary analysis of the longitudinal observational NuAge study. Changes in handgrip, knee extensor and elbow flexor strengths were calculated as the difference between recruitment (T1) and after 3 years (T4) in 156 diabetic older adults. Baseline DQ was calculated from 3 non-consecutive 24-hour dietary recalls collected at T1 using the validated Canadian Healthy Eating Index (C-HEI). Change in PA was calculated from Physical Activity Scale for the Elderly (PASE) as PASE T4 − PASE T1. Four combinations of variables were created: C-HEI < 70 with PASE change either < or > median and C-HEI ≥ 70 with PASE change either < or > median. The association between these four categories and MS maintenance was evaluated using General Linear Modeling (GLM). Analyses were stratified by sex and controlled for covariates. Baseline DQ alone was not associated with MS maintenance. Baseline DQ combined with PASE change showed associations with crude and baseline adjusted handgrip strength ($p = 0.031$, $p = 0.018$) and crude and baseline adjusted elbow flexor change ($p = 0.028$, $p = 0.017$) in males only; no significant results were found for knee extensor strength in either males or females. While findings for females were inconclusive, results demonstrate that better adherence to dietary guidelines combined with a more active lifestyle may prevent MS decline among diabetic older males. Additional research is needed on a larger sample since generalization of these results is limited by the small sample size.

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Better adherence to dietary guidelines combined with a more active lifestyle may **prevent muscle strength decline** among diabetic older males.

Diabete, nutrizione ed esercizio



Ahmed H. Abdelhafiz et Al, "Diabetes, Nutrition, and Exercise", Clin Geriatr Med – 2015

Goals of nutrition and exercise in older people with diabetes



- Maintain **good quality of life**
- **Avoidance of malnutrition**
- Maintenance of **healthy body weight**
- To maintain **good metabolic profile**
- Maintenance of **hydration**
- Maintenance of **skeletal muscle mass**
- Improve **muscle quality**
- Improve overall **physical function**
- **Reduction of visceral fat and insulin resistance**
- Avoidance of **hypoglycemia**



Ahmed H. Abdelhafiz et Al, "Diabetes, Nutrition, and Exercise", Clin Geriatr Med – 2015

Malnutrition

Diagnosis

Malnutrition is defined by ASPEN (American Society for Parenteral and Enteral Nutrition) with ≥2 of following characteristics:

1. Insufficient energy intake
2. Weight loss
3. Loss of muscle mass
4. Loss of subcutaneous fat
5. Localized or generalized fluid accumulation that may mask weight loss
6. Diminished functional status as measured by handgrip strength



Weight loss clinically significant with a decrease of baseline body weight of:

- ≥ 2% in one month;
- ≥ 5% in three months;
- ≥ 10% in six months.

UpToDate – Apr 26, 2018

Screening tools

Data la complessità dell'intervento assistenziale i centri specialistici di diabetologia dovrebbero implementare **strumenti di *assessment* geriatrico** di semplice esecuzione nella routine clinica.

Felace G. 2017

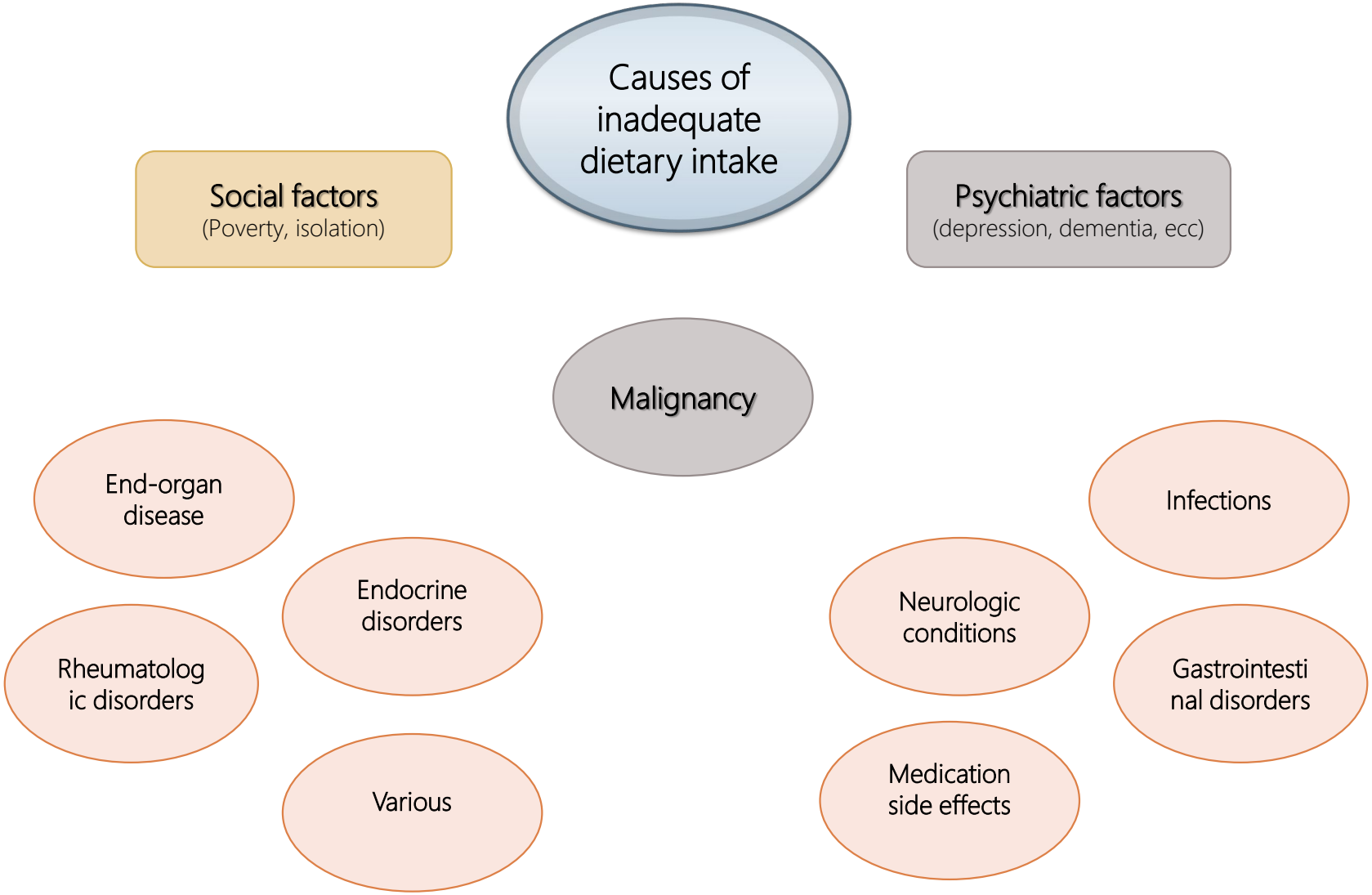
Nell'anziano con diabete è preferibile utilizzare una valutazione nutrizionale più approfondita utilizzando il Mini-Nutritional Assessment (MNA). Il test è in grado di identificare i soggetti malnutriti e quelli a rischio di malnutrizione fornendo l'indicazione a un intervento nutrizionale. ***IV B***

Mini Nutritional Assessment (MNA)	Mini Nutritional Assessment-Short Form (MNA-SF)
• Widely validated • Predictive of poor outcomes • Global assessment and subjective perception of health • Questions specific to diet • Series of body measurements • Identifies patients malnourished and those at risk of malnutrition	• Six questions from the full MNA • Calf circumference if BMI is not available • A validation study demonstrated good sensitivity compared with the full MNA

Sensitivity >83%

Specificity >90%

Charlton KE, Kolbe-Alexander TL, Nel JH. The MNA, but not the DETERMINE, screening tool is a valid indicator of nutritional status in elderly Africans. Nutrition 2007;
Vellas B, Guigoz Y, Garry PJ, et al. The Mini Nutritional Assessment (MNA) and its use in grading the nutritional state of elderly patients. Nutrition 1999;
MNA Mini nutritional assessment. Available at: www.mna-elderly.com (Accessed on November 11, 2010).
Kaiser MJ, Bauer JM, Ramsch C, et al. Validation of the Mini Nutritional Assessment short-form (MNA-SF): a practical tool for identification of nutritional status. J Nutr Health Aging 2009Nilsson PM 2008 - Zeanandin G 2012



UpToDate – Apr 26, 2018

Micronutrient deficiencies in older adults



Vitamin B12 deficiency

- The prevalence between 10 and 20%.
- Potentially significant effects of vitamin B12 deficiency on the **nervous system**
- Patients **over 51 years** should take supplements containing vitamin B12, or eat fortified food products
- For B12 deficiency by malabsorption, therapy with 1000 mcg/die of oral crystalline cyanocobalamin may correct serum vitamin B12 levels and yield adequate hematological responses.

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Micronutrient deficiencies in older adults

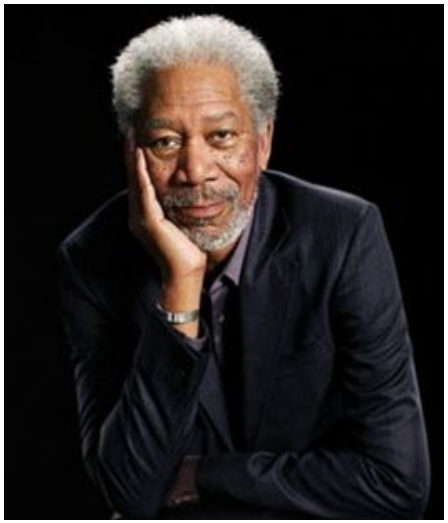
Vitamin D deficiency

Epidemiology

Screening for vitamin D levels in asymptomatic adults to improve health outcomes lacks sufficient evidence (US Preventive Services Task Force) but monitoring of serum levels of 25-hydroxyvitamin D is recommended for those at high risk (Goal levels ≥30 ng/mL).

Causes

- Lack of sun exposure
- Impaired skin synthesis of pre-vitamin D
- Decreased hydroxylation in the kidney with advancing age
- Dietary vitamin D intake is often low in older subjects.



Higher risk for vitamin D deficiency in older people:

- Institutionalized
- Homebound
- Limited sun exposure
- Obesity
- Dark skin
- Osteoporosis
- Malabsorption

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Micronutrient deficiencies in older adults

Vitamin D deficiency

Effects

Low vitamin D has been linked with **muscle weakness**, **functional impairment**, **depression**, and **increased risk of falls and fractures**, increased prevalence of **diabetes**, **hypertension**, **hyperlipidemia**, **peripheral vascular disease**, increased **all-cause mortality** as well as **cardiovascular disease-related mortality** and **cancer mortality**, greater risk of future nursing home admission.

Therapy	
Serum 25-OH vit D levels	Vit D3 supplementation
20-30 ng/mL	600-800 IU daily
10-20 ng/mL	800-1000 IU daily
<10 ng/mL (Severe deficiency)	50.000 IU once per week for 6-8 weeks, and then 800 IU daily

Monitoring

After approximately **three months** of therapy a repeat serum 25(OH)D level should be obtained to assure obtaining the goal serum 25(OH)D level.

UpToDate – Apr 26, 2018

Sarcopenia

Dal greco sarx= carne + penìa= perdita

The term sarcopenia has been defined by several working groups, including:	**Group**
1. Low skeletal muscle mass, with either low muscle strength (e.g., handgrip) or low muscle performance (e.g., walking speed or muscle power); if all three conditions are present, severe sarcopenia may be diagnosed.[a]	European Working Group on Sarcopenia in Older People
2. The presence of low skeletal muscle mass and low muscle strength (assessed by walking speed).	European Society for Clinical Nutrition and Metabolism Special Interest Groups
3. The presence of low skeletal muscle mass and low muscle function (assessed by walking speed) and sarcopenia may be associated with muscle mass loss alone or in combination with increased fat mass.	International Working Group on Sarcopenia

[a] Only the European Working Group on Sarcopenia in Older People consensus has a broader definition of sarcopenia and provides a classification of a severe condition if all three symptoms are present.

Cruz-Jentoft AJ et Al, Sarcopenia: European consensus on definition and diagnosis: report of the European working group on sarcopenia in older people. Age Ageing 2010;.
.Muscaritoli M et Al, Consensus definition of sarcopenia, cachexia and pre-cachexia: joint document elaborated by special interest groups (SIG) "cachexia-anorexia in chronic wasting diseases" and "nutrition in geriatrics". Clin Nutr 2010;.
Fielding RA et Al, Sarcopenia: an undiagnosed condition in older adults—current consensus definition: prevalence, etiology, and consequences. International working group on Sarcopenia. J Am Med Dir Assoc 2011.

Sarcopenia

Sindrome caratterizzata da **perdita progressiva e generalizzata di massa e forza muscolare** associata a un rischio aumentato di esiti sfavorevoli quali disabilità fisica e ridotta qualità di vita.

Epidemiologia

La prevalenza della sarcopenia aumenta con l'età fino ad interessare il 50% degli ultraottantenni (Morley JE 2008).

Prevenzione

Non sono ancora chiari il possibile ruolo della nutrizione nella prevenzione e nel trattamento della sarcopenia e la necessità di supplementare la dieta dell'anziano con micronutrienti, in particolare calcio, vitamina B12 e vitamina D.

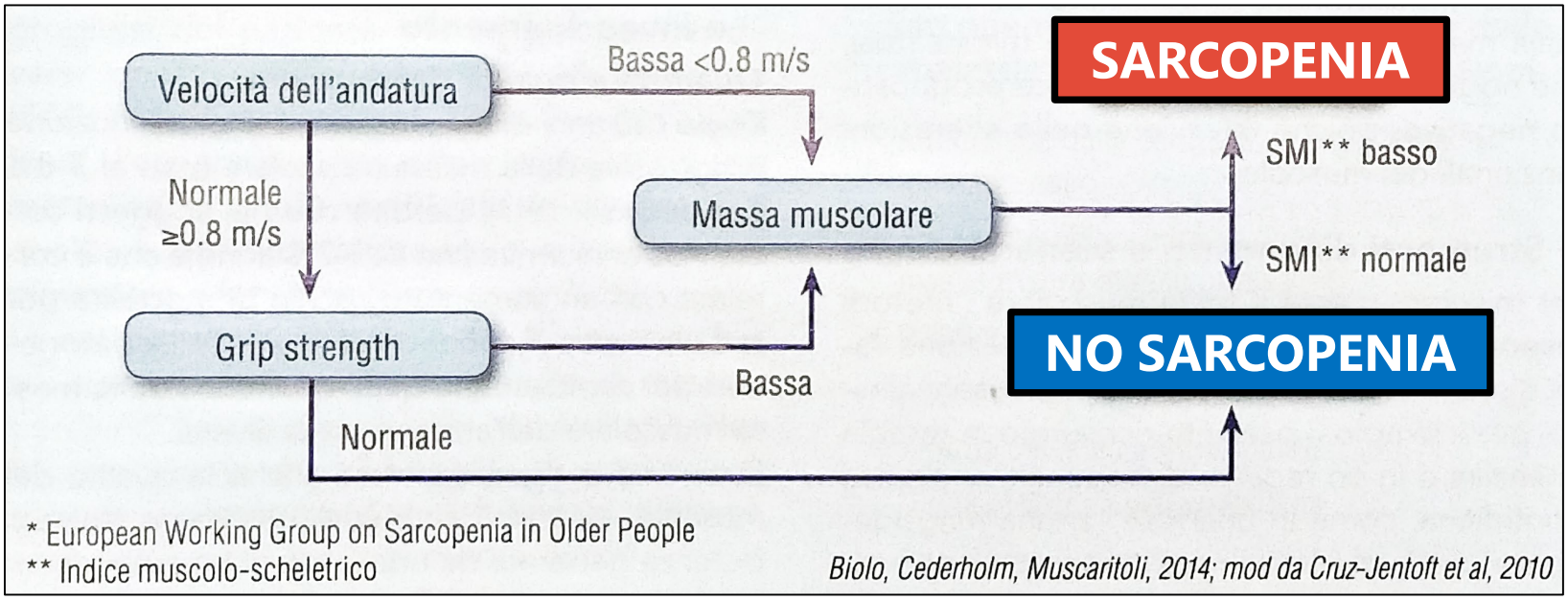
Terapia

In condizioni di magrezza patologica si raccomanda di:

- incrementare l'apporto calorico giornaliero (+20-30% rispetto a fabbisogno basale);
- incrementare la "densità nutrizionale" degli alimenti (latte in polvere, olio d'oliva, uova, noci) e associare spuntini durante la giornata;
- utilizzare in pazienti selezionati integratori liquidi (proteico-energetici) (Ritchie C 2016).

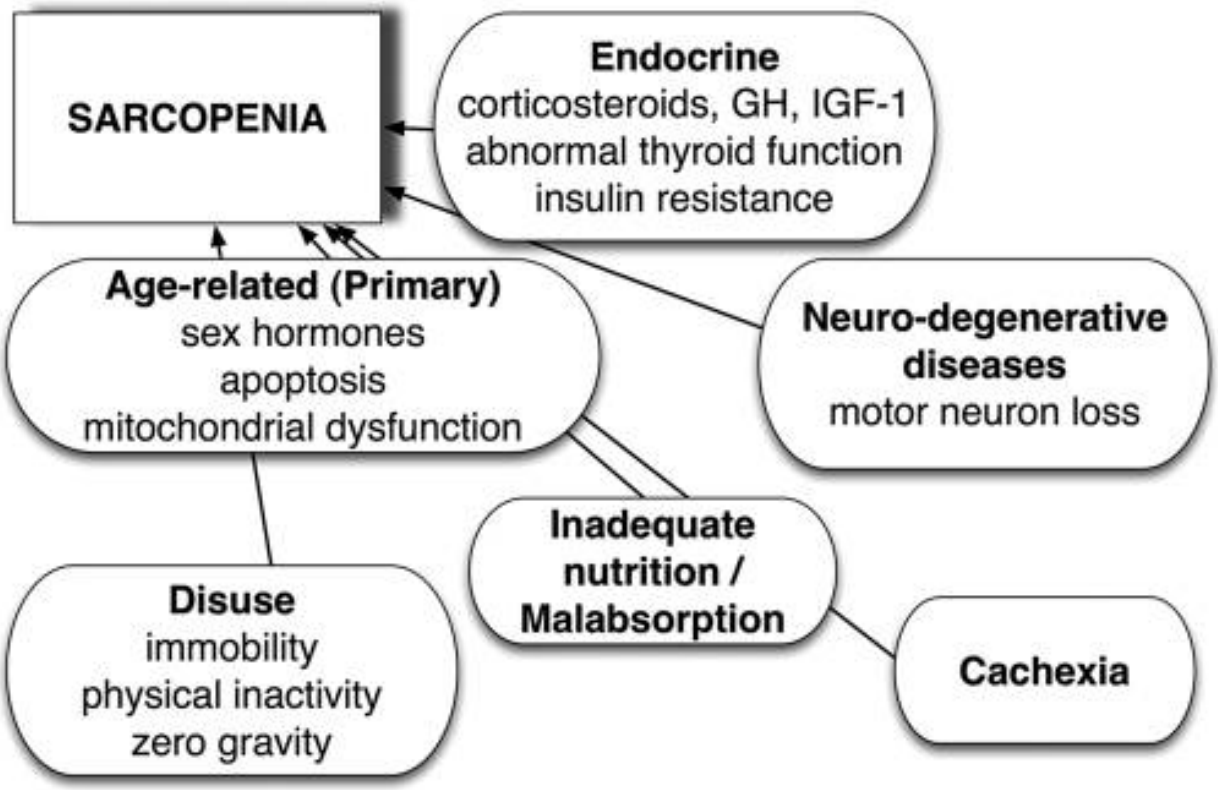
Definizione di sarcopenia: criteri di EWGSOP

(European Working Group on Sarcopenia in Older People)



Mechanisms





Sarcopenia: European consensus on definition and diagnosis Report of the European Working Group on Sarcopenia in Older People Alfonso J. et Al, Age Ageing. 2010 Jul

Sarcopenia and frailty phenotypes

Sarcopenia:

1. Low muscle mass
2. Low muscle strength
3. Low performance

- **Pre-sarcopenia**: Low muscle mass, normal strength and performance
- **Sarcopenia**: Low muscle mass, low strength or low performance
- **Severe sarcopenia**: Low muscle mass, strength and performance

Frailty:

1. Slow gait speed
2. Muscle weakness
3. Decreased physical activities
4. Exhaustion
5. Unintentional weight loss

- Robust: Absence of criteria
- Pre-frail: Presence of 1–2 criteria
- Frail: Presence of ≥3 criteria

AJ Sinclair, Journal of Diabetes and Its Complications 2017

Geriatrics Gerontology INTERNATIONAL
Medline Indexed
Geriatr Gerontol Int 2018; **18 (Suppl. 1)**: *23–27*

Prevention of sarcopenia

Masafumi Kuzuya,[1] Ken Sugimoto,[2] Takao Suzuki,[3] Yuya Watanabe,[4] Kiyotaka Kamibayashi,[4] Toshiyuki Kurihara,[5] Masahiro Fujimoto[5] and Hidenori Arai[6]

[1]Department of Community Healthcare and Geriatrics, Nagoya University School of Medicine, Nagoya, [2]Department of Geriatric Medicine, Osaka University School of Medicine, Suita, [3]Research Institute for Gerontology, J. F. Oberlin University, Tokyo, [4]Faculty of Health and Sports Science, Doshisha University, Kyoto, [5]College of Sport and Health Science, Hikone, Ritsumeikan University Shiga, and [6]National Center for Geriatrics and Gerontology, Obu, Japan

CQ1: Can sarcopenia be prevented by diet and proper nutrition?

Statement

- **Proper nutritional intake, especially protein intake of ≥1.0 g/kg of bodyweight per day (assuming appropriate bodyweight), might be effective for preventing the development of sarcopenia, and is therefore recommended (evidence level: low; recommendation level: strong)**

Geriatrics Gerontology INTERNATIONAL
Medline Indexed
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CQ2: Can sarcopenia be prevented by exercise?

Statement

- **Regular exercise and increased physical activity might prevent the onset of sarcopenia. Therefore, regular exercise and an active lifestyle are recommended (evidence level: low; recommendation level: strong)**

Geriatrics Gerontology INTERNATIONAL Medline Indexed

Geriatr Gerontol Int 2018; **18 (Suppl. 1)**: *23–27*

Prevention of sarcopenia

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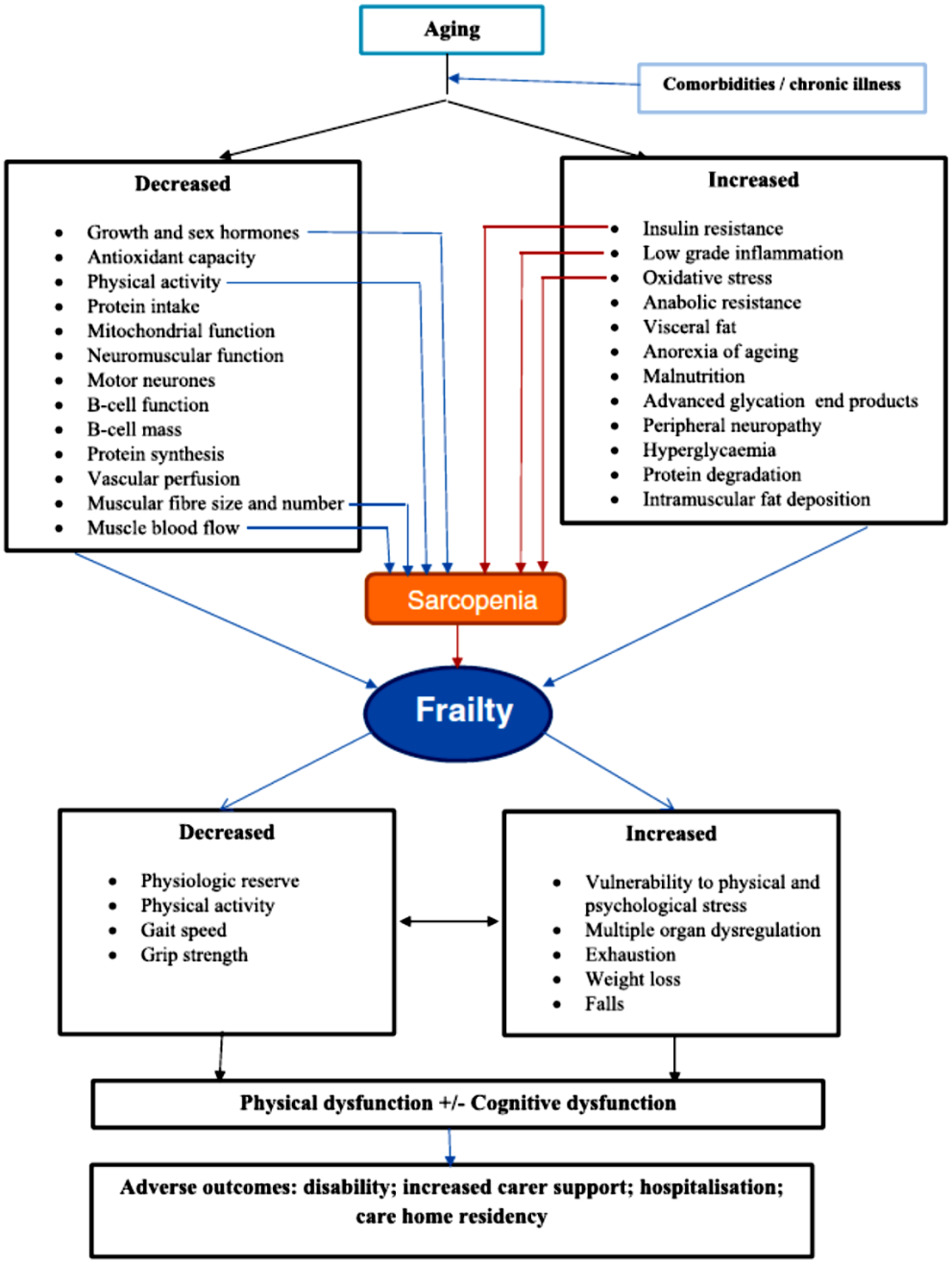
[1]Department of Community Healthcare and Geriatrics, Nagoya University School of Medicine, Nagoya, [2]Department of Geriatric Medicine, Osaka University School of Medicine, Suita, [3]Research Institute for Gerontology, J. F. Oberlin University, Tokyo, [4]Faculty of Health and Sports Science, Doshisha University, Kyoto, [5]College of Sport and Health Science, Hikone, Ritsumeikan University Shiga, and [6]National Center for Geriatrics and Gerontology, Obu, Japan

CQ3: Can interventions for non-communicable diseases prevent sarcopenia?

Statement

- **Although therapeutic drugs for hypertension, diabetes, dyslipidemia and androgen drugs, as well as exercise/nutrition management for diabetes, chronic kidney disease (CKD), chronic heart failure and liver failure (liver cirrhosis) might prevent the development of sarcopenia, no definite conclusion has been reached currently. (evidence level: low, recommendation level: weak)**

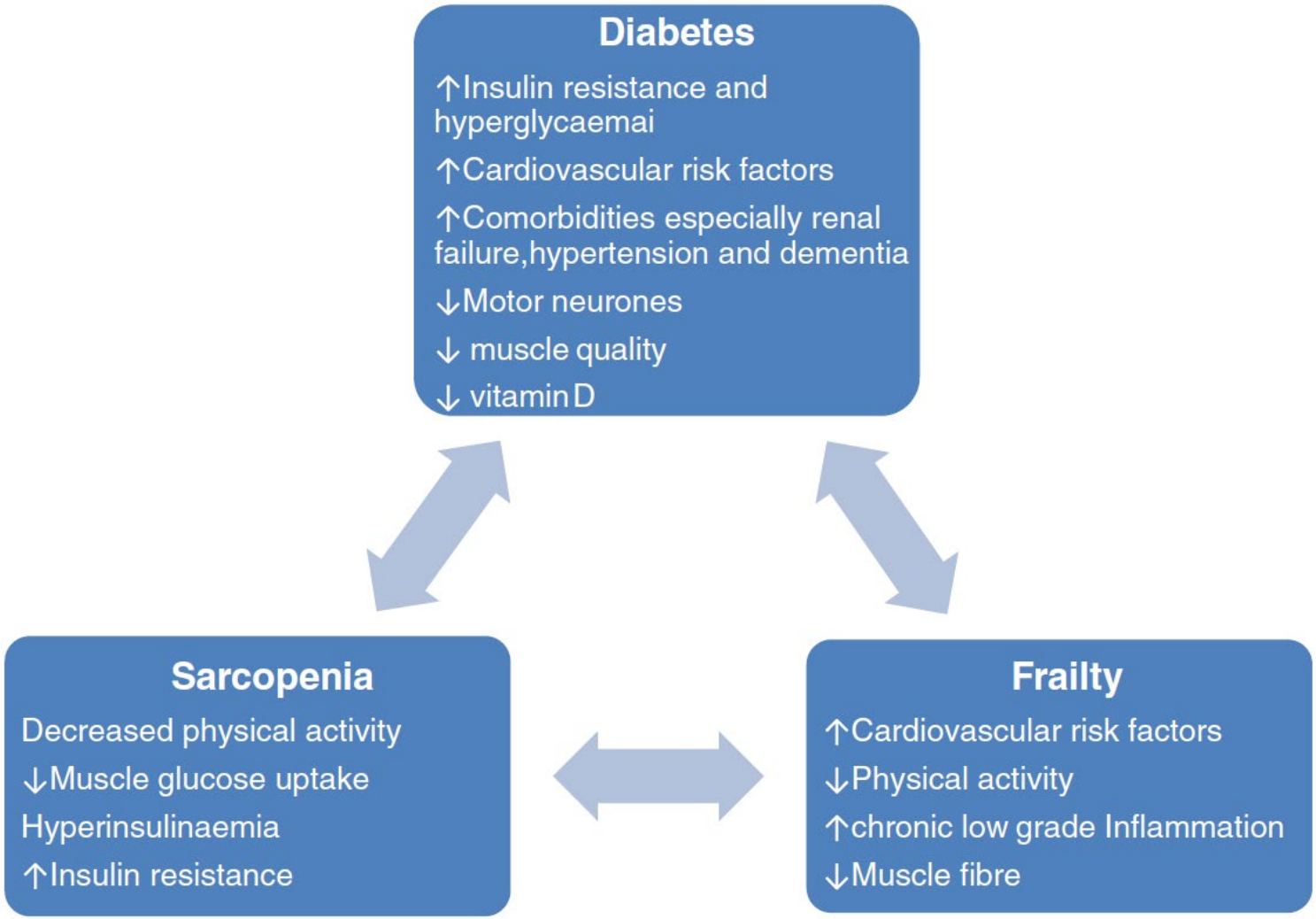
Pathogenesis of frailty and sarcopenia and the path to disability.





A.J. Sinclair et al. / Journal of Diabetes and Its Complications 31 (2017) 1465–1473

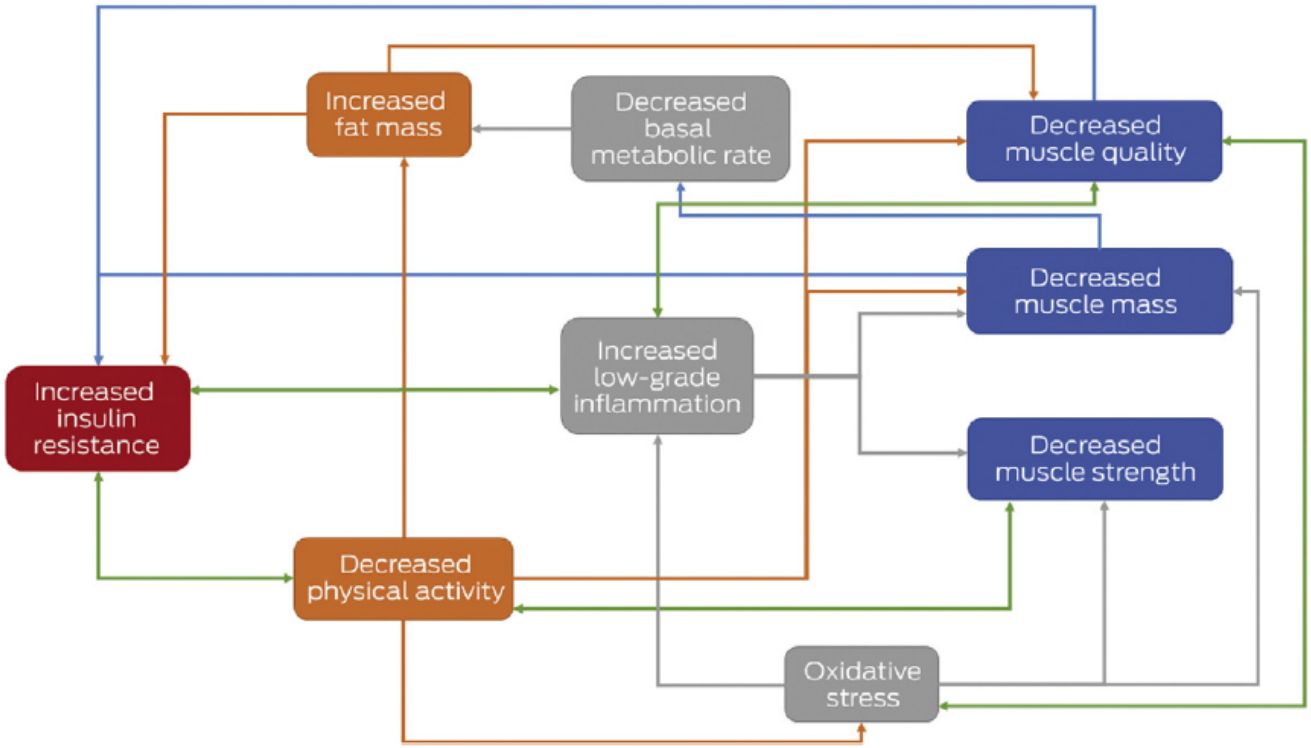
Triad of interrelationships between sarcopenia, frailty and diabetes



AJ Sinclair, Journal of Diabetes and Its Complications 2017

Sarcopenia: a potential cause and consequence of type 2 diabetes in Australia's ageing population?
David Scott, Barbara de Courten, Peter R Ebeling

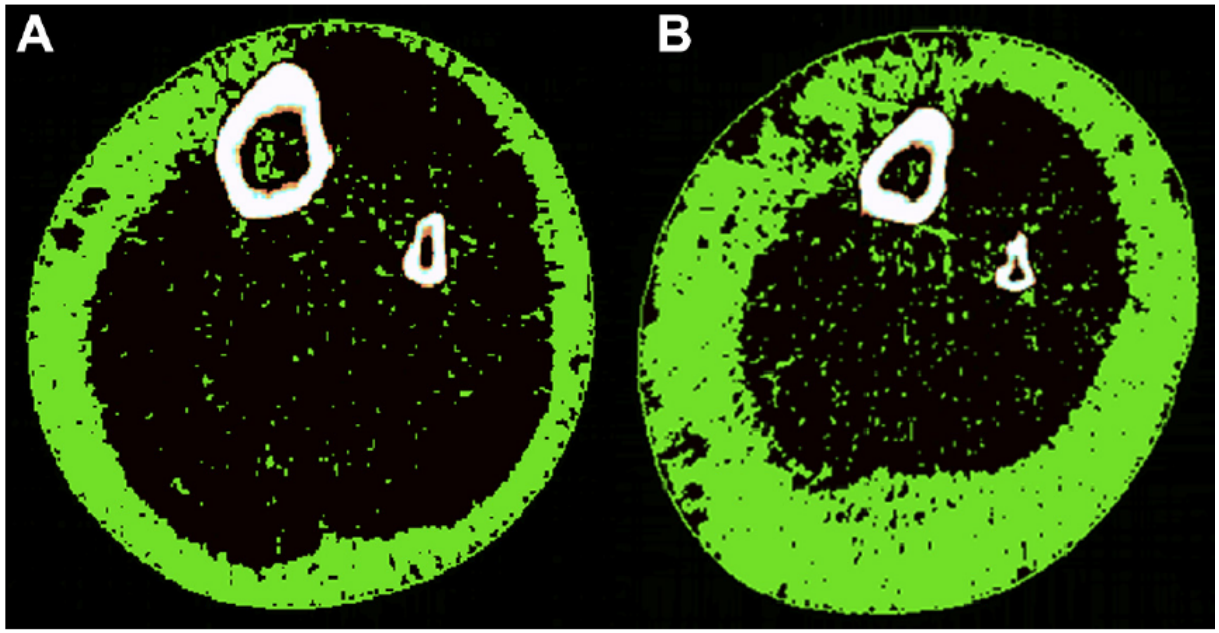
Potential pathways by which sarcopenia contributes to insulin resistance in ageing



Legend

- Blue boxes: components of sarcopenia
- Green arrows: possible bidirectional relationships between sarcopenia and T2DM

Transverse peripheral quantitative computed tomography images of the mid-calf highlighting IMAT in age- and BMI-matched obese older women (A) without and (B) with type 2 diabetes



BMI = body mass index. IMAT = intramuscular and intermuscular adipose tissue. * IMAT is indicated by the green pixels located in the black muscle compartment. Both women had a BMI o 35 kg/m^2 and were aged 75 years, but the woman with type 2 diabetes (***B***) had greater subcutaneous fat, a smaller muscle cross-sectional area (649 *v* 752 cm) and twice as much IMAT (28.5 *v* 14 cm) as the woman without type 2 diabetes (***A***). The woman with type 2 diabetes alsc had poor muscle function, meeting the European Working Group on Sarcopenia in Older People definition of sarcopenia (gait speed $\leq$ 0.8 m/s and hand grip strength < 20 kg). ◆

Obesità Sarcopenica

I criteri per la definizione di SO non sono ancora standardizzati.
Può essere definita da **presenza di sarcopenia** (massa muscolare scheletrica appendicolare aggiustata per altezza al quadrato inferiore a 2 DS rispetto alla media di un gruppo di riferimento di soggetti giovani sani) **e quantità di massa grassa** (percentuale corporea di massa grassa maggiore del 27% negli uomini e 38% nelle donne) **o da alti valori di BMI**.

Indipendentemente dalla definizione utilizzata, la prevalenza **aumenta ad ogni decade di età**.

Il dibattito è ancora aperto principalmente in quanto fattori quali la **qualità del muscolo**, gli **indici di distribuzione adiposa**, e la valutazione della **deposizione di grasso ectopico** non sono considerati in tale definizione.

Soggetti affetti da SO presentano un **maggior rischio** di limitazione funzionale, disabilità, fragilità, peggior qualità di vita, ospedalizzazioni più prolungate, e più **alta mortalità** rispetto a soggetti o solo sarcopenici o solo obesi.

ADI-SIO. Standard Italiani per la Cura dell'Obesità 2016-2017

È espressione della combinazione fra di loro di più fattori eziologici e patogenetici: una condizione di **malnutrizione proteica** in soggetti sovrappeso od obesi, **l'inattività fisica**, un **eccesso nell'introito energetico**, **l'insulino-resistenza**, l'incrementata produzione da parte del tessuto adiposo di **citochine proinfiammatorie** che sostengono una infiammazione di basso grado.

Gruppo di studio ADI-AMD-SID "Nutrizione e diabete" 2013-2014

TAKE HOME MESSAGES

- Considerare la **complessità** del paziente anziano diabetico (**team multidisciplinare**)
- Tenere conto del **background** socio-economico e culturale
- Valutazione dello **stato nutrizionale**
- Implementare **educazione nutrizionale**
- **Evitare ipoglicemie**
- Identificare precocemente e ridurre i fattori di rischio della **malnutrizione**

Il Dott. Efisio Cossu, dichiara di NON aver ricevuto negli ultimi due anni compensi o finanziamenti da Aziende Farmaceutiche e/o Diagnostiche

Dichiara altresì il proprio impegno ad astenersi, nell'ambito dell'evento, dal nominare, in qualsivoglia modo o forma, aziende farmaceutiche e/o denominazione commerciale e di non fare pubblicità di qualsiasi tipo relativamente a specifici prodotti di interesse sanitario (farmaci, strumenti, dispositivi medico-chirurgici, ecc.).

Grazie per l'attenzione

