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COMMON CHALLENGES CONDUCTING NFPE: FOCUS ON ELDERLY

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Interactive Nutrition Seminars, LLC

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Speaker



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Objectives

- 1**
Describe
 - Describe the conditions of sarcopenia and sarcopenic obesity in the elderly as they relate to malnutrition.
- 2**
Discuss
 - Discuss physical frailty in the elderly and its association with malnutrition.
- 3**
Identify
 - Identify the challenges when conducting a NFPE for inpatient and outpatient elderly patients.

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Malnutrition & the Elderly

- In 2018, 52 million people (~16%) ≥ 65 years of age in U.S. ¹
- Malnutrition occurs in ~14 million (27.4%) of all elderly. ²
- Prevalence of hospitalized malnutrition is 15-60%. ³
- The estimated annual cost of disease-associated malnutrition in older adults in the US is \$51.3 Billion. ⁴

1 https://www.census.gov/library/stories/2019/12/by_2030-all-baby-boomers-will-be-age-65-or-older.html Accessed 11/14/20.
2 Drey M, et al. Dtsch Med Wochenschr. 2011;136:176-178.
3 <http://clinicaltrials.gov/ct2/show/NCT02508974> Accessed 11/17/20.
4 Snider JT, et al. JPEN. 2014; 38:77S-85S.

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Academy/ASPEN 6 Characteristics

- Insufficient Energy Intake
- Weight Loss
- Loss of Muscle Mass
- Loss of Subcutaneous Fat
- Fluid Accumulation
- Diminished Functional Status

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Academy/ASPEN 6 Characteristics

- Insufficient Energy Intake
- Weight Loss
- Loss of muscle mass **2 or more recommended for diagnosis**
- Loss of Subcutaneous Fat
- Fluid Accumulation
- Diminished Functional Status

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Why are the elderly at risk for malnutrition?

- **Disease/Disability**
 - DM, heart disease, lung disease, HTN, stroke, osteoporosis...
 - 29.4% are physically active¹
 - 17.6% exercise¹
- **Poor nutritional intake**
 - Decreased sense of taste or smell
 - Chewing/Swallowing problems
- **Dementia/Confusion**
- **Depression/Loneliness**
- **Limited Income**

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¹ https://www.americashealthrankings.org/explore/senior/measure/obesity_sr/state/ALL/ Accessed 11/17/20.



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Overlapping Conditions

- › **Malnutrition** – deficiency or excess in energy, protein or other nutrients leading to adverse effects in body composition with diminished function.
 - Unintentional weight loss, low energy intake, reduced muscle mass and fat loss. May be associated with inflammation.
- › **Cachexia** – wt loss & decreased muscle mass due to disease; associated with inflammation & catabolism.
- › **Sarcopenia** – loss of muscle strength & mass leading to poor physical performance; fat loss & inflammation less relevant.
- › **Physical Frailty** - unintentional wt loss, exhaustion, weakness, slow gait speed, low physical activity; inflammation more relevant.

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Cruz-Jentoft AJ, et al. Lancet. 2019;393:2636-2646.



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Operational Definition of Sarcopenia ICD-10: M62.84

"A muscle disease with low muscle strength and low lean muscle mass and/or poor physical performance associated with adverse outcomes such as falls, fractures, physical disability and mortality."¹

- › Primary Sarcopenia related to aging²
- › More focused on muscle strength & mass²
- › Direct U.S. healthcare costs of sarcopenia are estimated at over \$18 billion a year³

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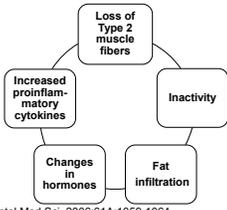
¹ Cruz-Jentoft AJ, et al. Age and Aging. 2019;48:16-31
² Cederholm T. Nestlé Nutr Inst Workshop Ser. 2015; 83:59-69.
³ <https://www.aginginmotion.org/about-the-issue/> Accessed 11/22/20.



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What Happens to Muscle with Aging?

- › Aging disturbs homeostasis of skeletal muscle.
- › Loss of muscle strength is more rapid than loss of muscle mass.
- › Loss of muscle mass is not only cause of decreased muscle strength:



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Goodpaster BH, et al. J Gerontol Med Sci. 2006;61A:1059-1064.
 Cruz-Jentoft AJ, et al. Lancet 2019;393:2636-2646.



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Criteria Identifying Sarcopenia

- › Loss of Muscle Strength
- › Loss of Muscle Quantity/Quality (mass)
- › Low Physical Performance – Inability to carry out physical tasks to function independently.
- › Biomarkers for sarcopenia not yet available in clinical practice.

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Cruz-Jentoft AJ, et al. Age and Aging. 2010;39:412-423.
 Cruz-Jentoft AJ, et al. Age and Aging. 2019;48:16-31.



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Determining Muscle Function & Mass

MUSCLE FUNCTION (Strength)

- **Hand Grip Strength** – Weak grip strengths: <16 kg force for women; <27 kg force for men.
- **Manual Muscle Testing** – Evaluates muscle group function from upper & lower body against manual resistance.
- **Gait Speed** – Disabled walking speed: <0.8 meters/sec.
- **Timed Get-up & Go Test** – Low performance: >20 secs.
- **Stair Climb**

MUSCLE MASS (Quantity/Quality)

- **DXA** – Dual-energy X-ray absorptiometry
- **BIA** – Bioelectrical impedance analysis
- **CT** – Computed tomography scan
- **MRI** – Magnetic Resonance Imaging
- **US** – Ultrasound
- **Palpation**
- **Visual Inspection**

Cruz-Jentoft AL, et al. *Age & Aging*. 2019;48:16-31.
Middleton A, et al. *J Aging & Physical Activity*. 2015;23:314-322.

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Bedside Ultrasound: Assessing Lean Muscle Mass Changes

- › 52 ICU patients and 15 healthy controls.
- › Measured quadriceps muscle layer thickness (QMLT) at enrollment & 1-2 times over 10 days.

Location	Average QMLT Loss per Day	P value
Midpoint from anterior superior iliac spine & patella	3.2% ± 3.8%	0.001
One-third distance above patella	2.9% ± 5.7%	0.001

- › No significant QMLT change was found in HCs.

Bury C, et al. *JPN*. 2021;45(2):394-402.

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Prevalence of Sarcopenia

Work Group/Study	Prevalence
European Working Group on Sarcopenia/Asian Working Group on Sarcopenia ¹	12.9%
International Working Group on Sarcopenia ¹	9.9%
Foundation for the National Institutes of Health ¹	18.6%
Cerri, et al. ²	21.4%

1 Mayhew AJ, et al. *Age Ageing*. 2019;48:48-56.
2 Cerri AP, et al. *Clin Nutr*. 2015;34:745-751.

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Treatment of Sarcopenia

- › Adequate protein intake (1–1.5 gm/kg)
 - High protein oral supplements
- › Vitamin D – builds muscle mass
 - Check serum 25(OH) Vitamin D levels and supplement if low
- › Omega 3 fatty acids – may increase muscle mass & function in elderly
- › No specific drugs have been approved for treatment
 - Many trials have been done with hormones, androgen steroids, human monoclonal antibody

Cruz-Jentoft AJ, et al. *Lancet*. 2019;393:2636-2646.

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Case Study

› 83 year old female was admitted for a shoulder fracture from a fall. Medical h/o: atrial fib, heart failure, DM, HTN. She does little activity at home & lives with one of her daughters. The Physical Therapist tests the patient's HGS and gait speed which are below normal for her age. The DXA scan shows low lean muscle mass.

› Does this patient have ...?

- A. Probable sarcopenia
- B. Confirmed sarcopenia
- C. Severe sarcopenia

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Definition of Sarcopenic Obesity

Reduced lean muscle mass, and low muscular strength, or low physical performance when accompanied by high fat mass.

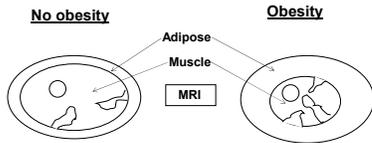
- › Caused by: Aging, Sedentary lifestyle, Unhealthy dietary habits, increasing mortality.
- › Incidence of obesity in ≥65 years is 28.9%.
- › Sarcopenic obesity is significantly associated with CVD.
- › Increased risk for unidentified malnutrition.
- › Treatment: weight loss & adequate protein intake combined with exercise

Fukuda T, et al. *Cardiovasc Diabetol*. 2018;17:55-66.
Choi KM. *Korean J Inter Med*. 2016 Nov; 31(6): 1054–1060.
<https://www.cancer.gov/about-cancer/treatment/side-effects/appetite-loss/nutrition-hp-pdq> Accessed 11/17/20.
https://www.americashealthrankings.org/explore/senior/measure/obesity_sr/state/ALL/ Accessed 11/17/20.

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Criteria Identifying Sarcopenic Obesity

- Requires direct measurement for accuracy (DXA, BIA, CT, MRI).
- Men >25% body fat
- Women >35% body fat



Batsis JA, et al. Nat Rev Endocrinol. 2018;14:513-537.



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Prevalence of Sarcopenic Obesity

- › 12.6% in men
- › 33.5% in women
- › Rates increased with age, reaching:
 - 48.0% in females } >80 years of age
 - 27.5% in males }

Batsis JA, et al. Nat Rev Endocrinol. 2018;14:513-537.



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Question

- › Which of the following is not associated with sarcopenic obesity?
 - A. Reduced lean muscle mass and strength
 - B. Rates of sarcopenic obesity decrease with age
 - C. Infiltration of fat into muscle
 - D. Poor diet habits

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Definition of Frailty ICD-10: R54

› A clinical state or condition in which the individual is vulnerable to adverse health outcomes or dying when exposed to a stressor.

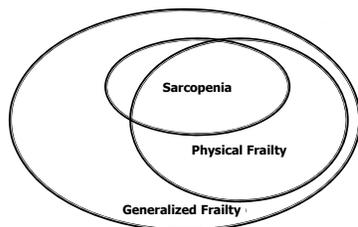
Physical Frailty

› A medical syndrome with multiple causes and contributors characterized by diminished strength, endurance, & reduced physiologic function that increases an individual's vulnerability for developing increased dependency and/or death.

Morley, et al. J Am Med Dir Assn. 2013;14:392-397.



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- › Sarcopenia is a substrate of physical frailty.
- › Frailty concentrates on weight loss & weakness. ²
- › Sarcopenia concentrates on loss of muscle strength & mass. ²

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1 Cruz-Jentoft AJ, et al. Lancet. 2019;393:2636-2646.
2 Cederholm T. Nestle Nutr Inst Workshop Ser. 2015; 83:59-69.



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Frailty & Malnutrition

- › Both have same characteristics:
 - Weight loss
 - Poor nutritional intake
 - Decreased body mass (muscle, fat)
 - Diminished function (weakness)

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Dietitian Survey

- › Web-based survey of dietitians (10% RDN's completed survey; N=903).
- › To identify opportunities & challenges related to Malnutrition & Frailty.
- › 64% worked with patients ≥65 yrs of age.
- › 90% were unfamiliar with frailty screening tools.
- › 68% agreed that RDNs should play role in screening for Frailty.

Weiler M, et al. Nutrition Today.2020;50:244-253.



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Associations of Frailty

- › Functional decline (weakness, exhaustion)
- › Loss of independence
- › Deterioration of health status, falls, delirium or acute confusion
- › Increased risk of hospitalization & ultimately death

Cederholm T. Nestle Nutr Inst Workshop Ser. 2015; 83:59-69.
 Bandeau-Roche K, et al. J Gerontol A Biol Sci Med Sci.2015;70:1427-1434.
 Morley, et al. J Am Med Dir Asso. 2013;14:392-397.
 Cruz-Jentoft AJ, et al. Lancet.2019;393:2636-2646.
 Artaza-Artabe I et al. Maturitas. 2016;93:89-99.



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Criteria for Screening for Frailty

- › All persons ≥70 yrs old or if ≥5% weight loss occurred, should be screened for frailty.
- › Over a dozen instruments to screen for Frailty:
 - Cardiovascular Health Study Frailty Screening Measure
 - Clinical Frailty Scale
 - FRAIL Scale
 - F = fatigue
 - R = resistance; inability to climb 1 flight of stairs.
 - A = aerobic; inability to walk 1 block
 - I = illnesses (>5)
 - L = loss of weight (≥5%)

Morley, et al. J Am Med Dir Asso. 2013;14:392-397.

Afflato J. Can J Cardiol. 2016;32:1051-1055.

<https://frailtyscience.org/frailty-assessment-instruments> Accessed 11/16/20.



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Two Clinical Tools to Define Physical Frailty

Deficit Model ¹	Physical Phenotype ²
Frail Index = Number of health deficits/Number of health deficits measured. › Scale range: 0-1 › Higher number equates to greater incidence of frailty.	Makes up 5 components: (wt loss, exhaustion, weakness, slowness, reduced physical activity). › Scale range: 0-5 › Robust: 0 › Pre-frail: 1-2 › Frail: ≥3

<https://frailtyscience.org/frailty-assessment-instruments> Accessed 11/16/20

¹ Rookwood K, et al. J Gerontol A Biol Sci Med Sci. 2007;62:722-727.
² Fried LP, et al. J Gerontol A Biol Sci Med Sci. 2001;56:146-156.

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Comparing the Physical Phenotype to the Deficit Model (Frail Index)

	SAVR (Mean±SD)	TAVR (Mean±SD)	P value
N	91	137	
Age	77.8±5.3	84.5±5.8	<0.001
Gait Speed (m/sec)	0.9±0.3	0.6±0.2	<0.001
Grip Strength (kg)	25.0±1.0	16.8±0.7	<0.001
Physical Phenotype	37.9%	84.6%	<0.001
Deficit Model (Frail Index)	0.24±0.11	0.37±0.11	<0.001

- › Over all phenotype for frailty was 65%
- › Pre-frail – 35%
- › Frail Index was better predictor of pre-op risk, recovery & death.

Shi S, et al. J Gerontol A Biol Sci Med Sci.2019; 74:1249–1256.



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Prevalence of Frailty

	Robust	Pre-frail	Frail
Community dwelling	39.2 %	45.5 %	15.3 %
Nursing home	19.8 %	50.7 %	29.5 %
Men	43.8 %	43.3 %	12.9 %
Women	35.6 %	47.2 %	17.2 %
65-69 yrs	44.2 %	45.1%	10.7 %
75-79 yrs	29.3 %	50.6%	20.1%
85-89 yrs	13.4 %	48.7 %	37.9 %

Bandeau-Roche K, et al. J Gerontol A Biol Sci Med Sci.2015;70:1427-1434.



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Treatment for Frailty

› Frailty can be prevented and is reversible:

- Calorie & protein support
 - Nutritional supplementation
- Vitamin D - builds muscle mass
 - Check serum 25(OH) Vitamin D levels and supplement if low.
- Physical activity – exercise improves walking speed, stair climbing, balance.
- Reduction of polypharmacy
 - Reduce inappropriate medications.

Dietitians can make a difference

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Case Study

› A 77 year old male is seen in the outpatient clinic with a h/o heart failure, HTN, prostate cancer, & COPD. He reports a 10lb wt loss (6%) over the past month after his hip surgery. His 25-OH Vit D level is 29 ng/mL.

What is the best nutrition recommendation?

- A. Be screened for frailty, start a multi-vitamin, begin exercising 15 – 20 mins 3 days per week.
- B. Be screened for frailty, start 2000 IU oral Vitamin D/day and a high calorie, high protein oral nutrition supplement BID.
- C. Be screened for frailty, start 10,000 IU Vitamin D/day, eat small frequent meals.

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CHALLENGES WHEN CONDUCTING A NFPE IN THE ELDERLY

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Common Challenges when Conducting a NFPE in the Elderly

- Loss of lean muscle mass & muscle strength in the aging process limits participation in the exam.
- Excess adipose tissue limits observation and palpation of underlying muscle mass.
- Hospitalized patient more challenging.

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Dietitian's Role

- › Determine the Etiology first.
 - **Inflammation** is associated with muscle loss, strength, & function and is less relevant in **Sarcopenia**.
 - This needs to be considered during the NPFE.
- › Identify % weight loss and energy intake over time.
- › Perform a NFPE on every elderly patient that is screened for moderate to high malnutrition risk.
- › Document the nutrition diagnosis in the medical record and discuss with the primary physician.
 - Their documentation counts, not the dietitian's.

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Hospitalized Elderly Patient

Easiest to palpate depletion of the temporalis muscle & orbital fat.



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Hospitalized Elderly Patient

Easier to palpate depletion of Pectoral & Deltoid muscles; but more difficult to pinch midline rib area for fat loss.



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Hospitalized Elderly Patient



Easier to pinch skin for depletion of fat in the Triceps area.

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Hospitalized Elderly Patient



If pt can lean forward, can palpate depletion of Trapezius & Latissimus Dorsi muscles, but area more difficult to complete

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Hospitalized Elderly Patient



Easier to palpate muscle loss of Interosseous muscle.

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Hospitalized Elderly Patient

Easier to palpate muscle loss of Quadriceps and Gastrocnemius Muscles unless adipose or fluid accumulation present.



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Challenge in Conducting NFPE in Sarcopenic Obesity

- › Excess adipose tissue limits observation & palpation of underlying muscle mass.
- › Assess for changes over time ~ upper body may show changes quicker than lower body.

Weiler M, et al. *Nutrition Today*;2020;50:244-253.
Choi KM. *Korean J Inter Med*. 2016 Nov; 31(6):1054-1060.

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Challenge in Conducting NFPE in Sarcopenic Obesity

- › Muscle mass depletion difficult to assess with obesity.
- › Try palpating upper body muscle/fat:

- Temples
- Orbital
- Clavicle
- Shoulders
- Triceps
- Hands



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Assessing Functional Status in Elderly

- › HGS – validated tool

- If dynamometer not available or feasible, ask patient about activities of daily living:
 - Bathing
 - Dressing
 - Cooking
 - Feeding
 - Cleaning
 - Shopping

- › Manual Muscle Testing – evaluates muscle group function from upper & lower body against manual resistance.

Dowhan L, et al. JPEN. 2016;40:951-958.
Russell MK. Nutr Clin Prac. 2015;30:211-218.

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HANDS ON NFPE IN OUTPATIENT SETTING

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Case Study

87 year old female admitted for TAVR for aortic stenosis.

PMH: significant cardiac hx with complete heart block, pacemaker placement, preserved EF heart failure, severe tricuspid regurgitation, Afib, severe pulmonary HTN, pleural effusion, HTN, DM, hypothyroid.

Meds: Coumadin, FeSO₄ 325 mg, SSI.

Weight: 61 kg (dry weight)
UBW: 70 kg
Height: 155 cm
BMI: 25.4 kg/m²

Labs:

Alb: 2.9 g/dL
CRP: 3 mg/L
H/H: 11 g/dL / 27%
Glu: 145 mg/dL
25-hydroxy Vit D: 26 ng/mL

Diet Order: Heart Healthy with high calorie, high protein supplement TID.

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Case Study – NFPE

- › Energy intake: Fair intake for past 2 mos ($\leq 75\%$ for ≥ 1 month). Not a big eater. NKFA. Did not take an oral nutritional supplement (ONS) PTA.
- › Weight loss: Lost 19% over past 2 mos, some of which was related to fluid loss from thoracentesis). Currently, 13% below UBW.
- › Fluid accumulation: No edema
- › Functional status - able to bathe, cook, and do light house work.

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Case Study – NFPE

- › Muscle Mass:

- Temporalis – moderate depletion
- Pectoralis (Clavicles) – moderate depletion
- Deltoids (Shoulders) – severe depletion
- Latissimus dorsi/Trapezius (Scapulas) – moderate depletion
- Interosseous (Hands) – severe depletion
- Gastrocnemius (Calves) – moderate depletion
- Quadriceps (Thigh) – unable to assess

- › Subcutaneous Fat:

- Orbitals – moderate depletion
- Triceps – moderate depletion
- Mid axillary – unable to assess

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Case Study – NFPE

› **Physical Therapist assessed:**

- HGS – 12 kg force
- Gait speed – 0.6 meters/second

› **Muscle Mass** – DXA scan completed showing decline in lean muscle mass.

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Case Study

› What is this patient's nutritional diagnosis?

- A. Severe PCM of Acute Illness due to moderate loss of muscle & fat stores and 13% wt loss over 2 mos.
- B. Severe PCM of Chronic Illness due to moderate loss of muscle & fat stores and 13% wt loss over 2 mos.
- C. Severe PCM of Acute Illness due to $\leq 75\%$ energy intake for 2 mos, 13% wt loss over 2 mos.

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Malnutrition: Acute Illness or Injury with Severe Inflammation

	Non-severe/Moderate	Severe
Insufficient energy intake	<75% for >7 days	$\leq 50\%$ for ≥ 5 days
Unintentional weight Loss	1-2% in 1 week 5% in 1 month 7.5% in 3 months	>2% in 1 week >5% in 1 month >7.5% in 3 months
Loss of subcutaneous fat	Mild loss	Moderate loss
Loss of muscle mass	Mild loss	Moderate loss
Fluid accumulation	Mild generalized or localized fluid collection	Moderate-severe generalized or localized fluid collection
Diminished functional capacity	No change	Decline in physical function

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Case Study

› Based on this patient's diagnoses, age, malnutrition, DXA scan and Physical Therapy assessment, does this pt most likely have...

- A. Malnutrition and Frailty
- B. Malnutrition only
- C. Malnutrition and Sarcopenia

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Case Study – D/C Plan

True or False:

Educate on high calorie and protein diet with ONS supplement TID.

Start on 2000 IU oral Vitamin D gel caps daily.

Follow up in outpatient clinic in 2 weeks.

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Conclusions

- › Malnutrition, Sarcopenia, & Frailty are overlapping conditions which make it challenging to conduct a NFPE in the elderly.
- › Sarcopenia Obesity limits observation & palpation of underlying muscle mass.
- › Every elderly patient at nutrition risk should be evaluated for malnutrition using the NFPE.
- › Dietitians can find nutritional interventions that can prevent or delay malnutrition, loss of muscle strength & mass to:
 - Improve the health of the elderly
 - Decrease LOS
 - Reduce readmissions & health care costs
 - Reduce falls, fractures and loss of independence

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Questions?

ACCESS MALNUTRITION RESOURCES at
<https://www.nestlemedicalhub.com/therapeutic-areas/malnutrition/studies>

Visit MyCE at
MyCEducation.com
Offering CE to dietitians and nurses

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