

## MOOC 12 Combating Frailty and Sarcopenia

### Chapter 2: Nutrition intervention for frailty and sarcopenia

- Sarcopenia and physical frailty share many clinical features, including loss of muscle strength, functional decline, and body shrinking
- Similar nutritional strategies can be adopted for the management of sarcopenia and physical frailty

#### A. Preventing physical frailty and sarcopenia with nutrition

##### 1. Adequate energy intake

- Food consumed is metabolized to provide energy for organ function and muscle activity
- Insufficient energy intake → body fat and muscle are catabolized to provide energy
- How do I know if someone's energy intake is (in)adequate?
  - ✓ Any unintentional weight loss?
    - % weight change =  $(\text{current weight} - \text{previous weight}) / \text{current weight} \times 100$
    - >5% of usual body weight in one month or >10% over a period of six months or longer is considered as severe
    - Other visual signs: loose jewellery, baggy clothes, extra notch in belt, prominent bony features
  - ✓ At risk of undernutrition?
    - Mini-Nutritional Assessment Short-Form (MNA-SF): widely used tool to assess nutritional status for older adults
    - Actions:
      - Normal nutritional status (12-14 points): rescreen after an acute event or illness / once per year in community / every 3 months in institutions
      - At risk of malnutrition (8-11 points): no weight loss → close weight monitoring, rescreen every 3 months; weight loss → refer to dietitian for in-depth nutritional assessment and intervention
      - Malnourished (0-7 points): refer to dietitian for in-depth nutritional assessment and intervention
- Strategies to ensure adequate energy intake:
  - Encourage three meals regularly + snacks in between meals
  - Allow enough time for older adults to eat, offer encouragement
  - Follow healthy eating plate to achieve balanced diet

## 2. Optimal protein intake

- Protein is a major regulator of muscle protein metabolism
- Old muscle → reduced muscle protein synthesis (anabolic resistance) → requires larger amounts of amino acids to stimulate muscle anabolism
- Higher protein intake → overcome anabolic resistance
- Low protein intake → reductions in muscle protein synthesis
- Older adults need more dietary protein than do younger people (0.8-1.0g/kg BW/day)
- PROT-AGE Study Group: 1.0-1.2g/kg BW/day for healthy older adults to maintain physical function and muscle mass
- Older adults with severe kidney disease (GFR < 30 ml/min/1.73m<sup>2</sup>) who are not on dialysis are an exception to the high-protein rule; should consult healthcare professionals
  
- Protein-rich diet
  - 1 serving of protein food contains around 7g protein
    - = 1 tael (兩) of cooked skinless poultry, lean beef, pork and fish (=size of 1 table tennis ball or 1 Mahjong)
    - = 1 whole egg
    - = 1/3 piece of hard tofu
    - = 4 tablespoons cooked legumes
    - = 1 cup of cooked quinoa
    - = 1 cup of milk/calcium-fortified soy milk (240ml)
    - = 30g nuts (1 handful)
  - Wholegrains >> refined grains e.g. 1 bowl of brown rice (6g protein) vs. 1 bowl of white rice (4g protein)
  
- Consider a spread feeding pattern with at least 25-30g of dietary protein during the main meals (about the size of palm) → better than a single high-protein meal
  
- Examples to increase protein intake:  
Breakfast:  
Oats with plain → water a oats with milk and eggs  
Plain rice porridge + steamed rice roll 白粥+豬腸粉 → rice porridge with pork + steamed rice roll with dried prawns 瘦肉粥+蝦米腸  
Lunch:  
Choi sum with rice noodle in soup → choi sum shredded pork with rice noodle in soup  
Steamed chicken feet + custard bun 蒸鳳爪+奶皇包 → steamed dace fish ball, chicken bun and boiled vegetable 蒸鯪魚球, 雞包仔, 焗菜  
Dinner:  
Stir fry tri-colored capsicum, steamed pork rib, white rice → stir fry tri-colored capsicum, steamed salmon, white rice with quinoa

Snacks:

Plain roll 豬仔包 → atuna whole grain sandwich

Biscuit → a plain mixed nuts 無鹽非油炸果仁

Chinese dessert e.g. Soybean curd dessert, sesame dessert, mixed bean soup 喳咋

### 3. Vitamin D


- No specific intervention studies of the effect of vitamin D supplementation on prevention of physical frailty
- No specific guidelines are available regarding the optimal status of 25OHD and recommended dose of vitamin D supplementation to prevent frailty
- Evidence shows positive effect of daily doses of 800 IU or more on muscle strength and balance
- Recommended intake: 15 µg/600 IU (≤70y); 20 µg/800 IU (>70y)
- Sources: mostly from sunlight exposure (suggest 15-20 minutes per day)
- Food sources: egg yolk, oily fish (salmon, mackerel, tuna), portobello, fortified food such as milk, soymilk and breakfast cereals

### 4. Omega-3 fatty acid

- Anti-inflammatory properties
- Growing evidence for the beneficial effect of omega-3 supplementation - increase in muscle mass & improve in physical performance for the older adults, especially when >2 g/day of omega-3 and more than 6 months
- Exact dosage, frequency and use (alone or combined) in the treatment and prevention of sarcopenia/physical frailty still need further exploration
- General guideline: 2 servings (total ~240g) oily fish per week

### 5. Mediterranean diet

- Rich in vegetables, legumes, fruits, nuts, whole grains, olive oil; moderate intake of fish and seafood, poultry, eggs, dairy; rare intake of red meat, processed meat, and sweets
- Older adults with higher adherence to MedDiet were less likely to develop frailty and functional disability
- Evidence supports that high adherence to MedDiet reduces the risk of cognitive decline in non-demented older adults (beneficial to the cognitive aspect of frailty)
- Examples to incorporate MedDiet in HK food culture:
- Green leafy vegetable → 2-3 vegetables of different color per meal
- White rice/ bread → make at least half the grains as whole grains e.g. Add brown rice, quinoa, oats, barley, buckwheat, millet; wholegrain bread and pasta
- Cake/ egg tart → fruits or yoghurt as snacks
- Cracker → nuts as snacks
- Chinese restaurant: Steamed chicken feet/ pork rib → steamed dace fish ball (fish or seafood twice a week)

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## B. Reversing sarcopenia/physical frailty with nutrition


- Poor nutrition is related to the occurrence and deterioration of physical frailty
- Nutrition intervention as part of the management plan + collaboration with multidisciplinary teams involving geriatricians, physiotherapists, exercise physiologists, social workers, and occupational therapists, caregivers and the patients themselves

### 1. Maintain a desirable body weight

- BMI for Asian older adults
  - Older adults with higher body weight seem to be beneficial for those who are frail with or without chronic diseases
  - No specific guideline; Normal BMI: 18.5-22.9 for adults → 23.0-24.9 for older adults
  - <23 is considered as underweight for older adults vs. <18.5 for adults
  - If overweight/obese, any advice on weight loss should be carefully considered, as intentional weight loss is accompanied by muscle and bone loss
- Energy requirement: ESPEN recommends 30 kcal/kg body weight/day for older adults, adjusted for gender, nutritional status, disease state and physical activity
- Examine treatable causes of unintentional weight loss
  - MEALS-ON-WHEELS mnemonic
- Strategies to ensure adequate energy intake
  - Encourage three meals regularly + snacks in between meals
  - Allow enough time for older adults to eat, offer encouragement
  - Follow healthy eating plate to achieve balanced diet
  - How to deal with loss of appetite / early satiety?
    - Consider size, timing and frequency of meals (small frequent meals rather than large plates of food)
    - Nutritious snacks (every mouthful count)
    - Avoid fluid (e.g. soup, water, tea) before and during meals
    - Eat meat/vegetable and rice first → then soup
    - Use natural seasoning to enhance the flavor e.g. ginger, garlic, onion, mushroom, herbs...
    - Changes to enhance mealtime experience e.g. music, presentation of food (colorful!), increase food variety
    - Engage family carers as part of the nutrition care team
    - "social facilitation": tend to eat more when dining with others rather than alone
    - Try to be more physically active to stimulate appetite and help digestion

### 2. Optimal protein intake

- Recommendations from PROT-AGE Study Group:
  - 1.2-1.5g/kg body weight/day for older adults who are malnourished or at risk of developing further comorbidities
  - 2.0g/kg BW/day for older adults with severe illness, injury or marked malnutrition

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- Older adults with severe kidney disease (GFR<30 ml/min/1.73m<sup>2</sup>) who are not on dialysis are an exception to the high-protein rule; should consult healthcare professionals
- Protein-rich diet
  - Refer to previous section re: protein sources
  - Protein quality
    - Some studies showed beneficial effects of animal protein than plant protein on frailty outcomes
    - Animal-based protein has a higher content of branched-chain amino acids (particularly leucine)→eliciting higher muscle protein synthesis compared with plant-based protein
    - Animal foods are the primary source of high quality protein, therefore, be the preferred source for frail older adults
- Protein-energy/protein supplementation
  - Shown to increase physical performance and strength (gait/leg strength)
  - Consider when frail older adults report weight loss or undernutrition is diagnosed
  - Paired with a physical activity program to have an additive effect

### 3. Vitamin D

- Insufficient evidence to recommend a vitamin D supplementation regime to treat sarcopenia/physical frailty
- Supplementation in frail older adults has shown positive results in preventing falls
- No consensus regarding the optimal status of 25OHD and recommended dose of vitamin D supplementation to treat frailty
- Supplementation is not recommended for the treatment of sarcopenia/physical frailty unless vitamin D deficiency is present
- According to some scientific societies, a dose of 800-2000 IU per day should be given to frail elderly to reach the recommended minimal serum 25OHD level of 75 nmol/l
- Clinicians should use their judgement in prescribing vitamin D supplementation


### 4. Mediterranean diet

- Unknown effect for the treatment of already established frailty

### Case study 1

Mr. Chan 70 years old, 60 kg, 160 cm, 2 times Tai Chi per week, no chronic conditions

1. Is Mr. Chan overweight?
2. What is his daily protein requirement?
3. What is the minimum servings of protein food required to meet his protein requirement?
4. Try to plan the protein food by distributing the protein in three meals and snacks


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Ans:

1. BMI 23.4, normal for older adults. Mr. Chan is not overweight.
2.  $60 \text{ kg} \times 1-1.2 \text{ g/kg BW/d} = 60-72 \text{ g protein}$
3.  $60/7 = \sim 8.5$  portion of protein food
4. Breakfast: 2 P (1 egg x 1/3 can tuna 吞拿魚炒蛋)  
Lunch: 3 P (1 palm size pan-fried salmon)  
Snack: 0.5 P (1 bowl of home-made low sugar red bean dessert)  
Dinner: 3 P (1 tael prawns, 1/3 piece hard tofu + 1 tael minced pork 白焯蝦, 肉碎蒸豆腐)

Please revisit **MOOC 4 Demand on your CARE: Nutrition for Seniors, Eat Smart, Live Smart** for more information.


- The end of Chapter 2 -

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