

*Measured using a hand-held dynamometer that the patient squeezes as hard as they can for at least 3 seconds three separate times with each hand with a 15 second break in between each squeeze. An average score is then calculated using the measurements from both hands. The averages of each hand are compared to the age-sex-hand normal references range, with minus two standard deviations (-2SD) considered reduced grip strength.

Appendix 2. Nutritional Risk Screening(NRS 2002) - initial screening³⁴

Step 1: Initial Screening	Yes	No
BMI <20.5 kg/m ² ?		
Has the patient lost weight within the past 3 months?		
Has the patient had decreased dietary intake in the last week?		
Is the patient severely ill?		
Yes: If the answer is “Yes” to any question, then a final screening is performed. No: If the answer is “No” to all questions above, the patient is rescreened at weekly intervals.		

Appendix 3. Nutritional Risk Screening(NRS 2002) – final screening³⁴

Step 2: Final Screening		
Score	Impaired Nutritional Status	Severity of Disease
0 = Absent	Normal nutritional status	Normal nutritional requirements
1 = Mild	Weight loss >5% in 3 months OR Food intake <50-75% of normal in the prior week	Hip fracture Patients with chronic diseases(cirrhosis, COPD, hemodialysis, diabetes, oncology)
2 = Moderate	Weight loss >5% in 2 months OR BMI 18.5-20.5 kg/m ² and impaired general condition OR Food intake 25-60% of normal in the prior week	Major abdominal surgery Stroke Severe pneumonia Hematologic malignancy
3 = Severe	Weight loss >5% in 1 month OR BMI <15 kg/m ² and impaired general condition OR Food intake 0-25% of normal in the prior week	Head injury Bone marrow transplant ICU patients(APACHE >10)
Score ≥3: the patient is started on a nutritional care plan. Score <3: the patient is rescreened at weekly intervals. *if the patient is ≥70 years, one point is added to the total score		
APACHE, Acute Physiology and Chronic Health Evaluation; BMI, body mass index; COPD, chronic obstructive pulmonary disease; ICU, intensive care unit.		

Appendix 4. Initial Screening in Mini Nutritional Assessment(MNA) for the elderly³⁴

Question	Score
Has dietary intake decreased in the past 3 months secondary to loss of appetite, digestive issues, chewing or swallowing difficulties?	0 = severe decrease in food intake 1 = moderate decrease in food intake 2 = no decrease in dietary intake
Any involuntary weight loss over the past 3 months?	0 = weight loss > 3kg(6.6lbs) 1 = does not know 2 = weight loss between 1-3kg(2.2-6.6 lbs) 3 = no weight loss
Current mobility?	0 = bed bound or chair bound 1 = able to get out of bed/chair, but does not go out 2 = does go out
Any physical stress or acute disease in the past 3 months?	0 = yes 2 = no
Any neuropsychological problems?	0 = severe dementia or depression 1 = mild dementia 2 = no physiological issues
Body Mass Index(BMI)(weight in kg)/(height in m) ²	0 = BMI <19 1 = BMI 19 to <21 2 = BMI 21 to <23 3 = BMI ≥23
Screening score (max = 14 points) 12-14 points: Normal nutritional status(no need to complement assessment) 0-11 points: At risk of malnutrition or possibly malnourished(continue assessment)	

Appendix 5. The Patient-Generated Subjective Global Assessment Short Form (PG-SGA SF)⁴⁰

1. Weight

Summary of current and recent weight:

- I currently weight about ____kg
- I am about ____cm tall
- One month ago I weighed about ____kg
- Six months ago I weighed about ____kg

During the past two weeks my weight has:

- ☐ Decreased (1 point)
- ☐ Not changed (0 points)
- ☐ Increased (0 points)

2. Food Intake

As compared to normal intake, my food intake during the past month is:

- ☐ Unchanged (0 points)
- ☐ More than usual (0 points)
- ☐ Less than usual (1 points)

I am now taking:

- ☐ Normal food but less than normal amount (1 point)
- ☐ Little solid food (2 points)
- ☐ Only liquids (3 points)
- ☐ Only nutritional supplements (3 points)
- ☐ Very little of anything (4 points)
- ☐ Only tube feedings or via vein (0 points)

3. Symptoms

I have had the following issues that have kept me from eating enough during the past 2 weeks (check all that apply):

- ☐ No problems eating (0 points)
- ☐ No appetite (3 points)
- ☐ Nausea (1 points)
- ☐ Vomiting (3 points)
- ☐ Diarrhea (3 points)
- ☐ Constipation (1 point)
- ☐ Dry mouth (1 point)
- ☐ Mouth sores (2 points)

- ☐ Smells bother me (1 point)
- ☐ Things taste funny to me or have no taste at all (1 point)
- ☐ Feel full quickly (1 point)
- ☐ Difficulty swallowing (2 points)
- ☐ Fatigue (1 point)
- ☐ Pain; where? _____ (3 points)
- ☐ *Other _____ (1 point)

* Examples: financial situation, depression

4. Activities and Function

I would generally rate my activity over the past month as:

- ☐ Normal with no limitations (0 points)
- ☐ Not my normal self, but able to be up and about with relatively normal activities (1 point)
- ☐ Not feeling up to most things, but in bed or a chair less than half of the day (2 points)
- ☐ Able to do little activity and spend most of the day in bed or in a chair (3 points)
- ☐ Essentially bed ridden/rarely out of bed (3 points)

Total Score From 1-4: ☐

Appendix 6. The SARC-F Questionnaire⁵²

Strength: How much difficulty do you have in lifting and carrying 10 pounds?

- **None: 0 points**
- **Some: 1 point**
- **A lot or unable: 2 points**

Assistance in walking: How much difficulty do you have walking across a room?

- **None: 0 points**
- **Some: 1 point**
- **A lot, use aids, or unable: 2 points**

Rise from a chair: How much difficulty do you have transferring from a chair or bed?

- **None: 0 points**
- **Some: 1 point**
- **A lot or unable without help: 2 points**

Climb stairs: How much difficulty do you have climbing a flight of 10 stairs?

- **None: 0 points**
- **Some: 1 point**
- **A lot or unable: 2 points**

Falls: How many times have you fallen in the past year?

- **None: 0 points**
- **less than three falls: 1 point**
- **Four or more falls: 2 points**

A SARC-F score of ≥ 4 best predicts the need for a more comprehensive sarcopenia evaluation

Appendix 7. Contents of commercial nutritional formulas afforded to the interventional cohorts for some of the studies included in **Table 5**.

Contents of the oral Commercial formula used by Gonçalves et al.⁴⁴ (2020) started 5 days preoperatively and continued 5 days postoperatively TID and Alito and de Aguilar-Nascimento et al.⁶⁷ (2016) started 5 days preoperatively TID up until 2h pre-anesthesia.	
Servings Per Pack: 1 Serving Size: 178ml(Tetra)	Average Quantity per Serving
Calories	200 kcal
Total Fat*	8 g
Sodium	200 mg
Potassium	450 mg
Total Carbohydrate	15 g
Protein**	18 g
Vitamin A	
- Retinol	290 mcg
- B-Carotene	575 mcg
Vitamin C	20 mg
Calcium	270 mg
Iron	4 g
Vitamin D	3.8 mcg

Vitamin E	39.5 µg
Vitamin K	22 mcg
Thiamin	0.4 mg
Riboflavin	0.6 mg
Niacin	5.3 mg
Vitamin B6	0.5 mg
Folic Acid	65 mcg
Vitamin B12	0.8 mcg
Biotin	10 mcg
Folate	66.7 µg
Vitamin B6	0.5 mg
Vitamin B12	1.9 µg
Biotin	24 µg
Pantothenic Acid	2.7 mg
Phosphorus	240 mg
Iodine	50 mcg
Magnesium	0.7 mg
Zinc	5 mg

Selenium	16 mcg
Copper	0.3 mg
Manganese	0.7 mg
Chromium	12 mcg
Molybdenum	15 mcg
Chloride	400 mg
Choline	90 mg
* 1.3g MCT per 178 ml ** 4.2g Arginine per 178 ml	

Commercially available formula used by Eneroth et al.⁴⁵ given postoperatively to hip fracture patients on admission to the hospital.

250ml of a commercially available solution consisting of 10% Intravenous Fat Emulsion is a sterile, non-pyrogenic fat emulsion prepared for intravenous administration as a source of calories and essential fatty acids. It is made up of 10% Soybean Oil, 1.2% Egg Yolk Phospholipids, 2.25% Glycerin, and Water for Injection. In addition, sodium hydroxide has been added to adjust the pH so that the final product pH is 8. pH range is 6 to 8.9. This is added to 750ml of another commercially available solution that includes Calcium Chloride Dihydrate, Glucose Monohydrate, Glycine, L-Alanine, L-Arginine, L-Aspartic Acid, L-Cysteine, L-Glutamic Acid, L-Histidine, L-Isoleucine, L-Leucine, L-Lysine Hydrochloride, L-Methionine, L-Phenylalanine, L-Proline, L-Serine, L-Threonine, L-Tryptophan, L-Tyrosine, L-Valine, Magnesium Chloride Heptahydrate, and Potassium Chloride

Commercially available formula used by Delmi et al.⁴⁶ given postoperatively to hip fracture patients on admission to the hospital.

Utilized 250 ml of an oral nutritional supplement that provided 254 kcal, 20.4 g protein, 29 g carbohydrate, 5-8 g lipid, 525 mg calcium, 750 IU vitamin A, 25 IU vitamin D3, vitamins E, B₁, B₂, B₆, B₁₂, C, nicotinamide, folate, calcium pantothenate, biotin, and minerals. Supplementation was started on admission to the orthopaedic unit and continued throughout the stay in the second(recovery) hospital. The supplement was given for a mean period of 32 days

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