Bringing Nutrition to the Table: Injury Risk Reduction & Support for Healing

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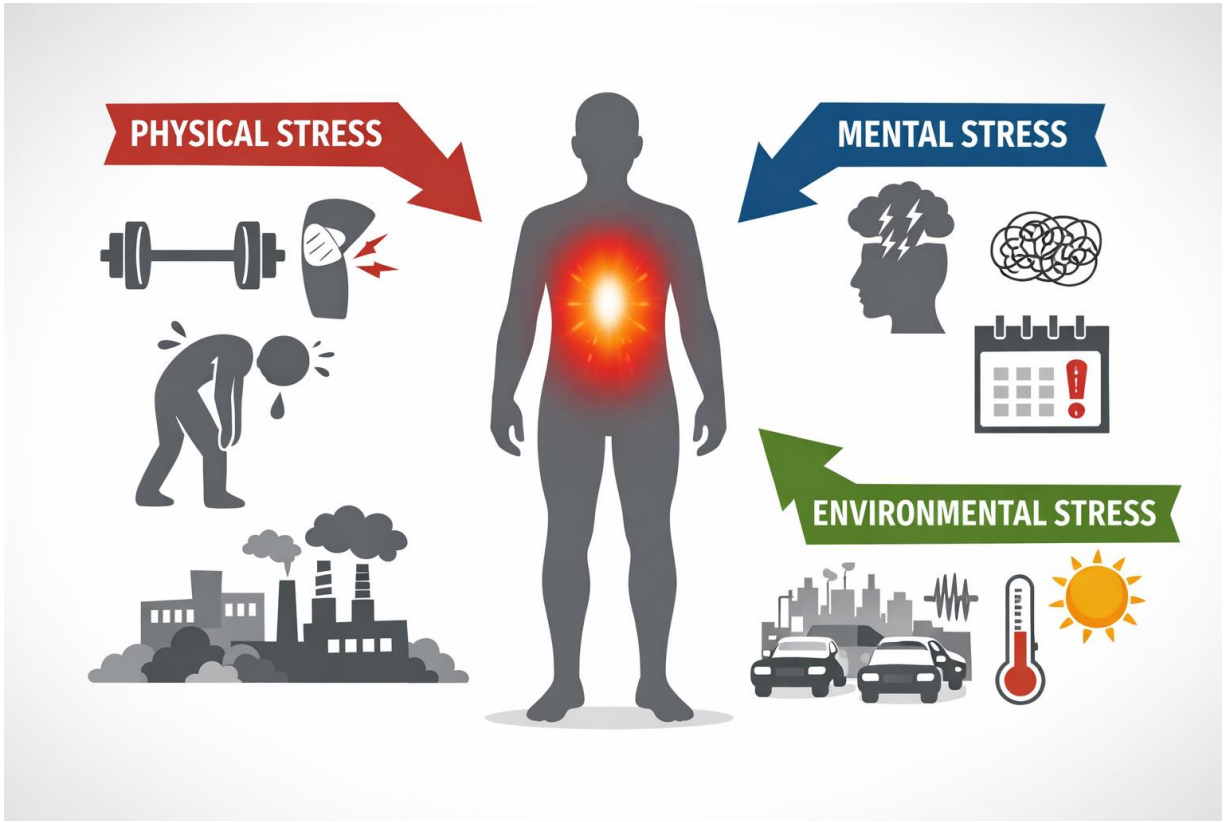
Tools to Support Our Physiology



Injury as a Stress Response

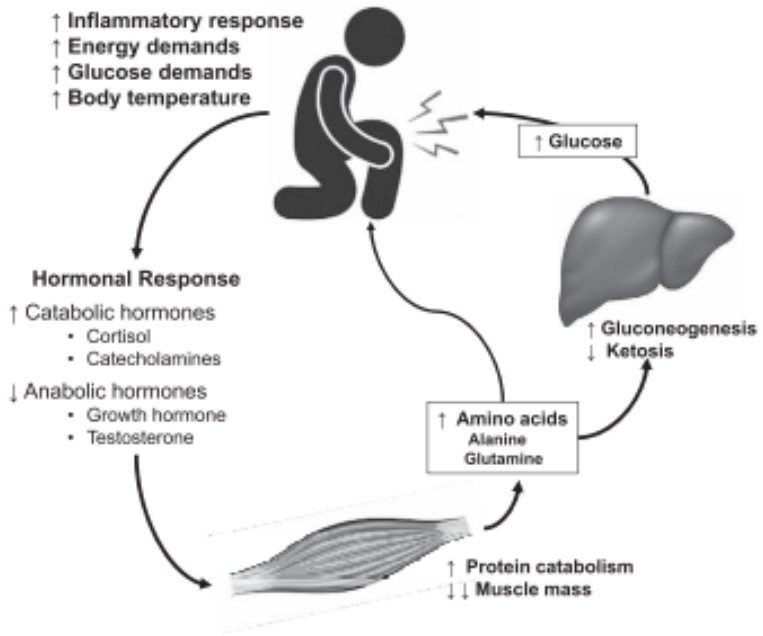
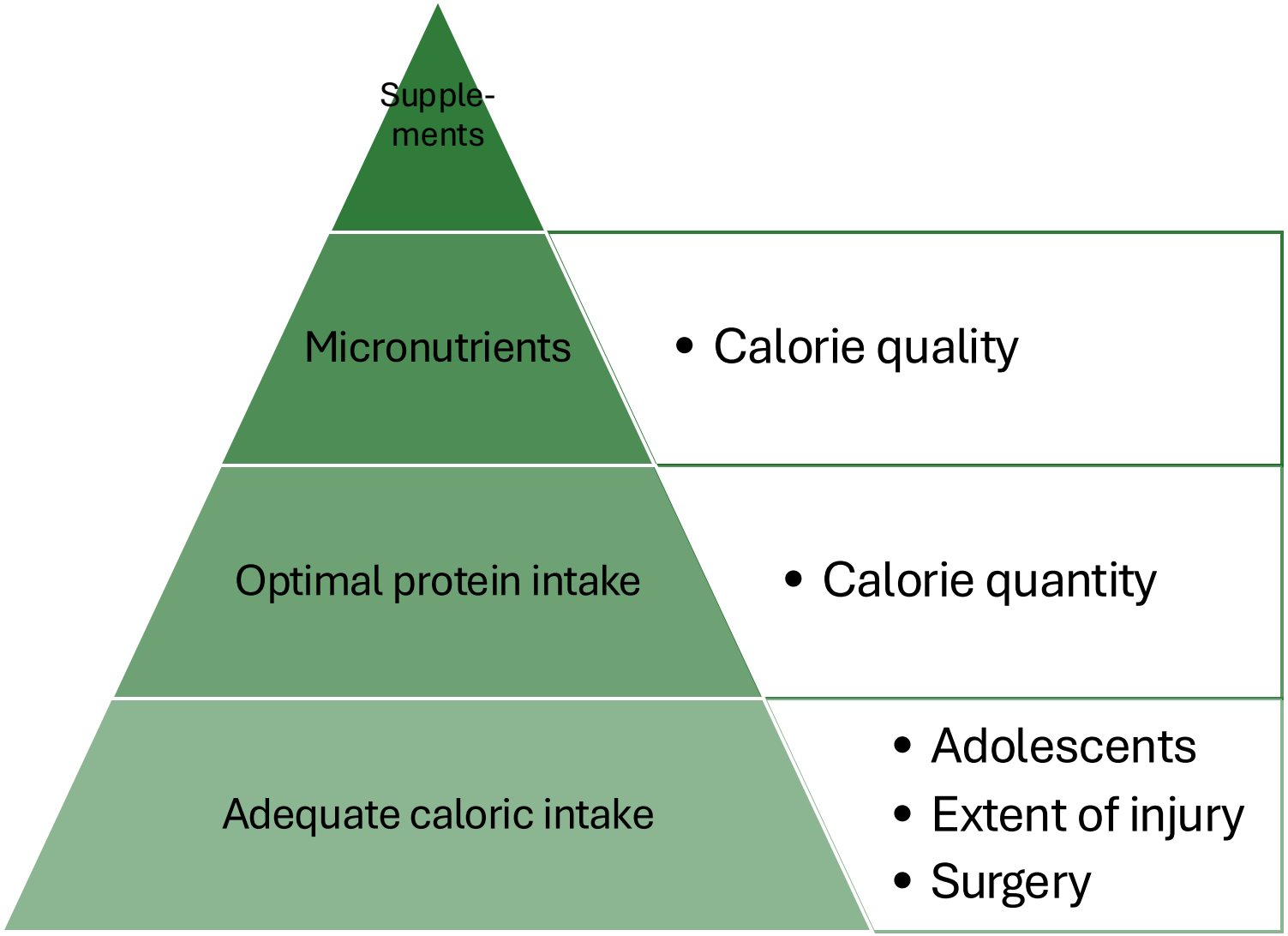
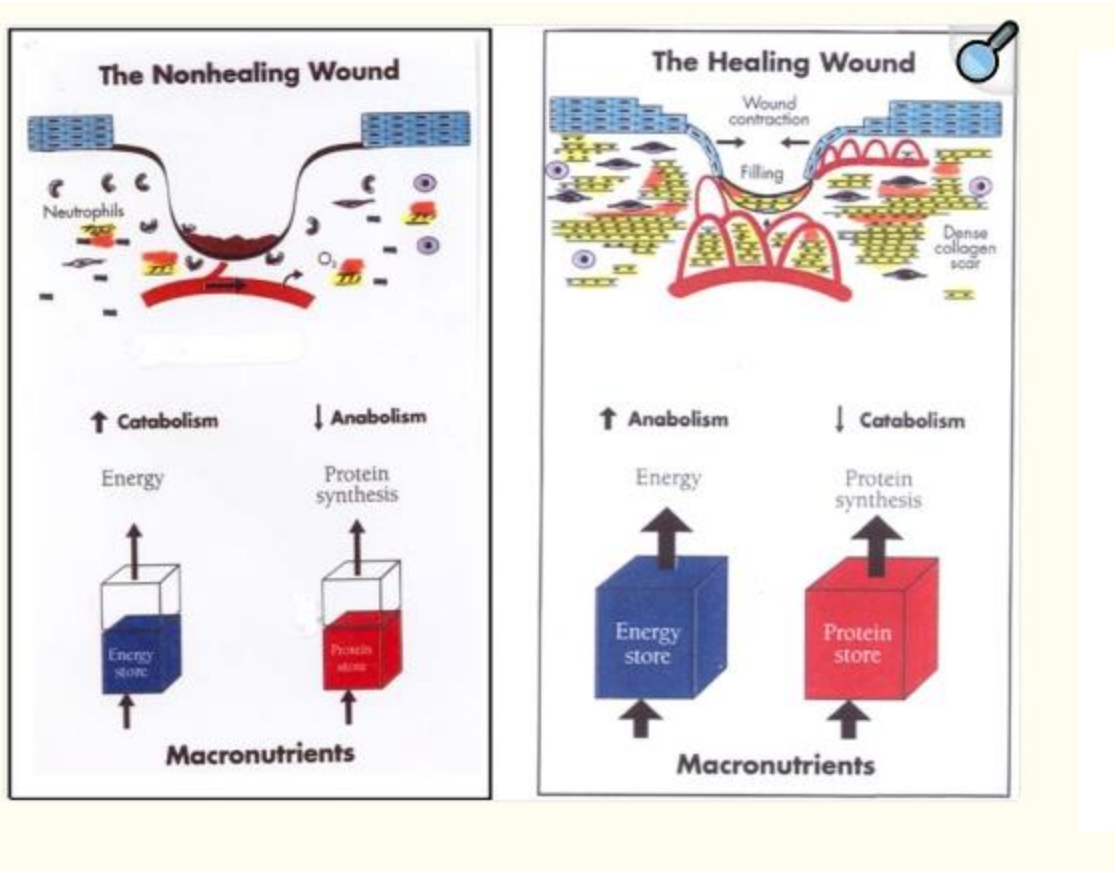


Figure 3. Injury and surgery result in a significant stress response, which highlights the potential for nutritional support. The demand for glucose and amino acids increases, which initiates a hormonal response resulting in a catabolic environment, leading to large losses in lean body mass. Adapted from Demling.[23]



Smith-Ryan, A et al. (2020)

Optimal Nutrition for Tissue Healing



Demling, 2009

Calculation of Energy Expenditure

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Resting metabolic rate

- Indirect calorimetry
- Harris Benedict
  - Men: RMR = 66 + (13.7 × wt [kg]) + (5 × ht [cm]) – (6.8 × age [y])
  - Women: RMR = 655 + (9.6 × wt [kg]) + (1.8 × ht [cm]) – (4.7 × age [y])
- Fat-free mass (Cunningham, 1980)
  - RMR = 370 + (21.6 × FFM [kg])

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Activity level

• Sedentary = 1.2	(little or no exercise, desk job)
• Lightly active = 1.375	(light exercise/sports 1-3 d/wk)
• Moderately active = 1.55	(moderate exercise/sports 6-7 d/wk)
• Very active = 1.725	(hard exercise every day, or exercising 2x/d)
• Extra active = 1.9	(hard exercise 2+ times/d; training for long endurance event)

×

Stress factor

- Minor injury (eg, ankle sprain, dislocation) = 1.2
- Minor surgery = 1.2
- Clean wound = 1.2
- Bone fracture = 1.2
- Infected wound = 1.5
- Major trauma (eg, anterior cruciate ligament surgery) = 1.5
- Severe burn = 1.5

Smith-Ryan, A et al. ,2020

Macronutrients for Healing

- Protein
  - 3g Leu
  - 20-40g/dose
  - Within 1 hr of waking
  - Around rehab sessions (takes the place of a training session)
  - Before bed
    - Casein
- Carbohydrate
  - Immune support
  - Protein sparing
  - 3-5g/kg
  - Prioritize complex (high fiber)
  - Limit refined sources
- Fat
  - Unsaturated fat sources
  - 20-25% kcal/
  - 0.8-2g/kg
  - Prioritize omega-3 FA
  - Limit UPF

(Smith-Ryan, A., et al., 2020; Areta, et al., 2013; Yang, et al., 2012)

Plating the Recommendations

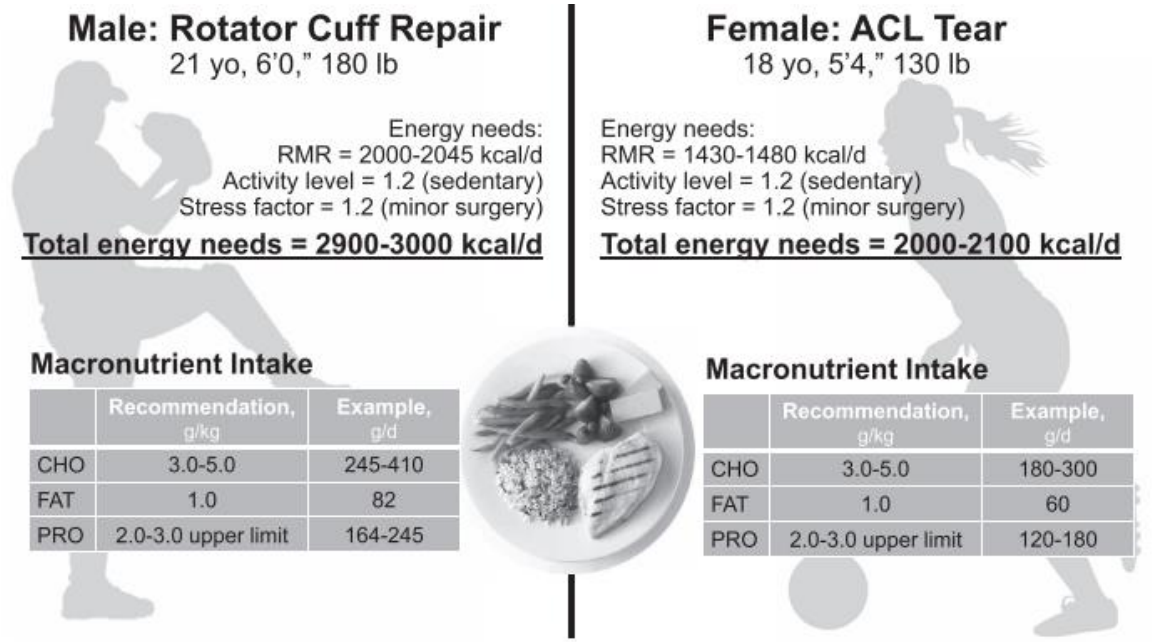


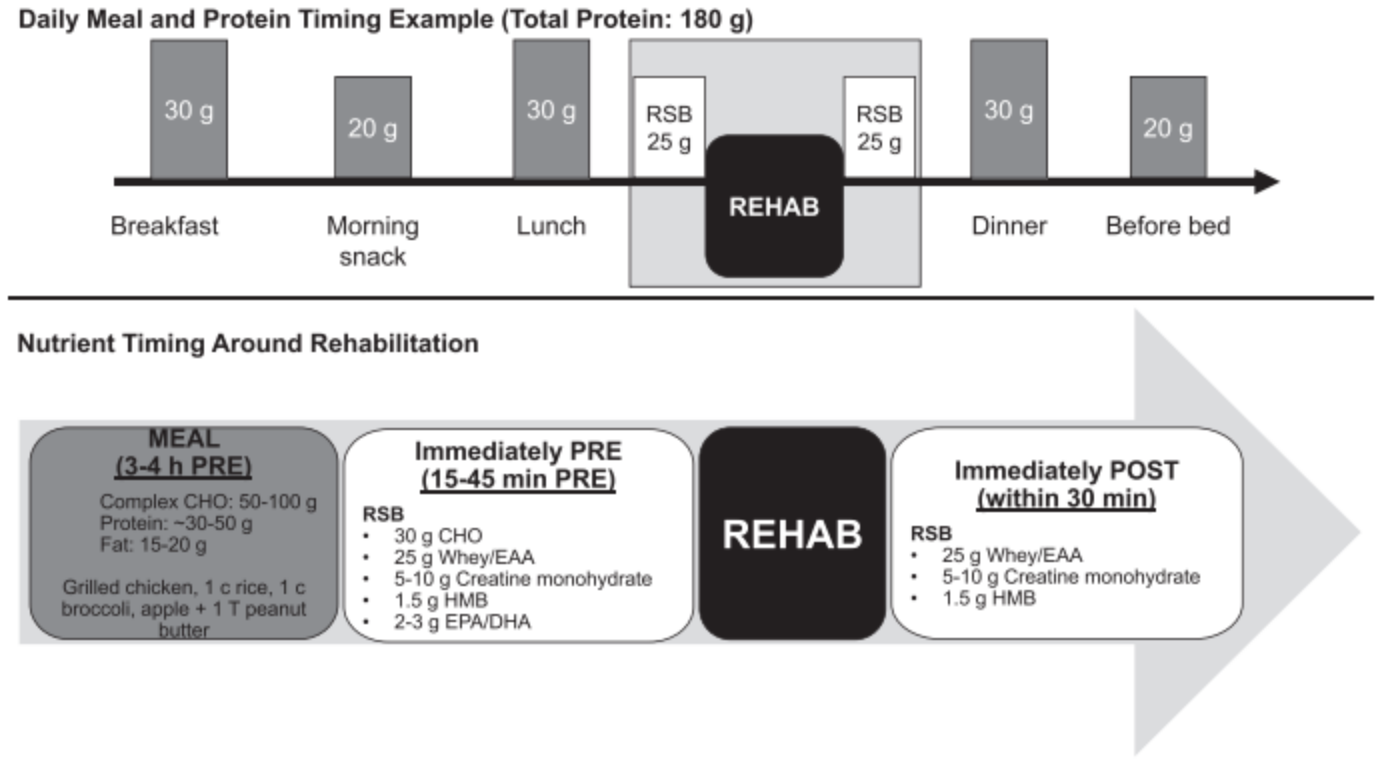
Figure 5. Energy needs and quality of calories should be evaluated postsurgery and during recovery. A diet consisting of complex carbohydrates, high-quality protein, and high-quality fats is advised. For example, create a plate with a 30-g serving of complete proteins paired with a complex whole grain. Then add fresh fruits and vegetables in a variety of colors to help provide antioxidants to enhance recovery, control inflammation, and provide important micronutrients. Abbreviations: ACL, anterior cruciate ligament; CHO, carbohydrates; PRO, protein; RMR, resting metabolic rate.

The Athlete's Plate are a collaboration between the United States Olympic Committee Sport Dietitians and the University of Colorado (UCCS) Sport Nutrition Graduate Program.
For educational use only. Print and use front and back as 1 handout.

Smith-Ryan, A et al. (2020)

Fueling & Recovering

- Strategic nutrition implementation around activity enhances adaptative response
- Protect your training (and rehab!)



Smith-Ryan, A., et al., 2020; Kerksick, et al. , 2017

Micronutrients- micro in size, macro in impact

	Vitamin C	Vitamin A	Vitamin E
Main Functions	• Stimulates collagen synthesis • Facilitates wound healing • Maintains bone	• Increases collagen deposition • Proliferation of epithelial cells • Decreases inflammation	• Modulates muscle proteolysis genes • Functions as an antioxidant • Enhances immune function
Good Sources	Kiwi 131 mg Grapefruit 94 mg Orange 93 mg Strawberries 85 mg Broccoli 51 mg	Sweet potato 961 µg Pumpkin 953 µg Squash 572 µg Carrots 534 µg Spinach 472 µg	Sunflower seeds 7.4 mg Almonds 7.3 mg Apricots 2.8 mg Whole avocado 2.7 mg Spinach 1.9 mg
Recommended Daily Amount	Males: 90 mg Females: 75 mg	Males: 900 µg Females: 700 µg	Males: 15mg Females: 15 mg

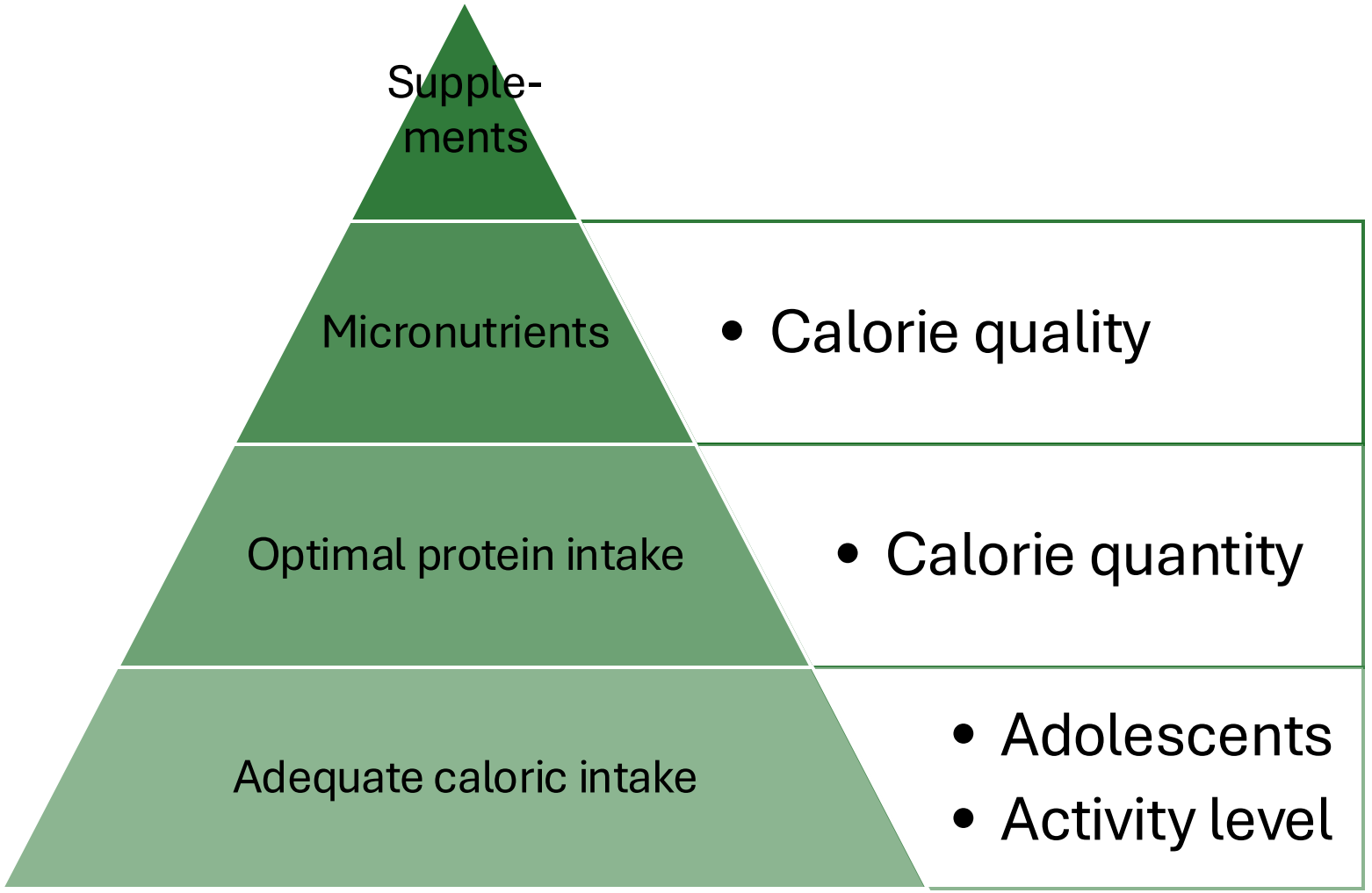
(Smith-Ryan, A., et al., 2020; Kerksick, et al. , 2017)

Supplementing to Supplement

- Multi-vitamin
  - Moderate benefit- low risk
- Creatine- 5g/d
  - May improve muscle size & strength during immobilization
  - Improved rehab response
- Omega-3s- 2000-4000mg/d
  - Management of prolonged inflammation
  - Enhance protein synthesis
- Protein 25-30g/serving
  - Whey isolate > plant protein
  - EAA pre-op & pre-rehab
- Vitamin D3- 4000 IU/d
  - Test for insufficiency/deficiency
  - Caution w/ bone injury
- B-hydroxy B-methyl butyrate (HMB)- 2 x 1.5g
  - LBM preservation during surgery, immobilization
  - LBM augmentation w/ rehab

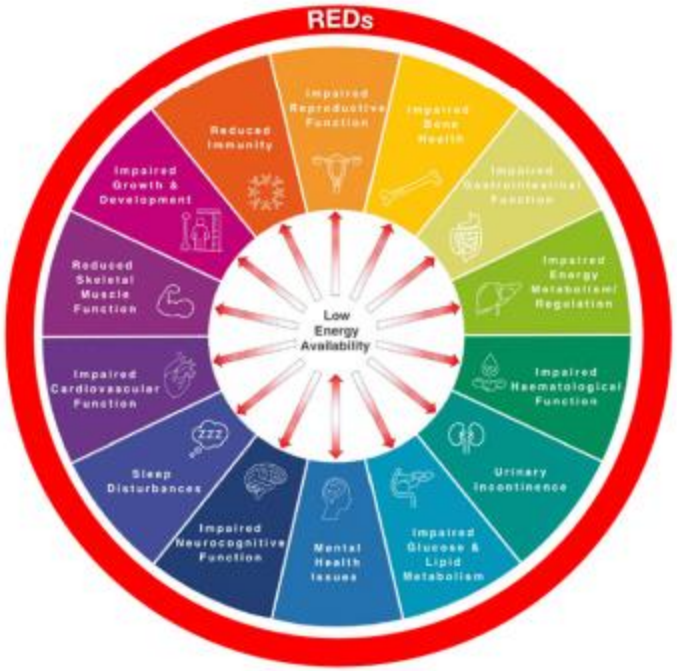
(Smith-Ryan, A., et al., 2020; Hespel, et al. , 2001)

Injury Risk Reduction

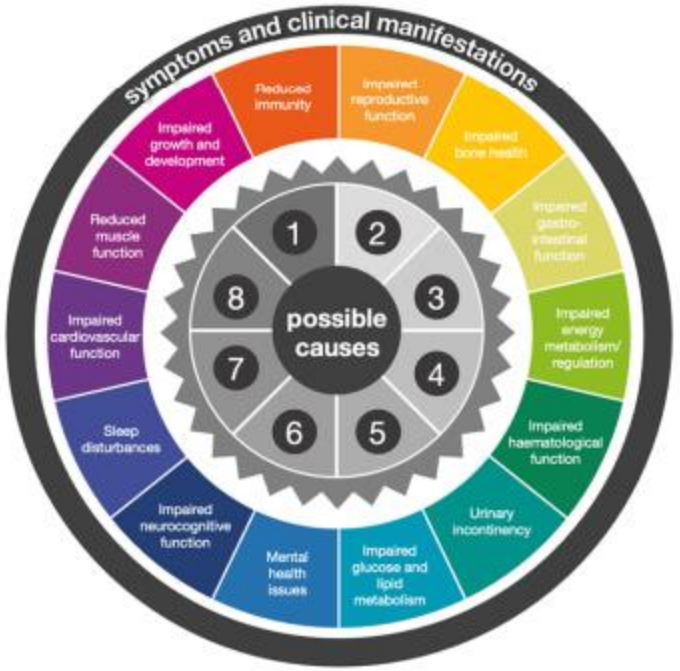


Alcock et al., 2024

It's More Than Calories In-Calories Out



REDs: an LEA-centric model where LEA is the only aetiology



1. Training/exercise
2. Life/environmental
3. Mental health
4. Disordered eating/eating disorders
5. Nutrition
6. Sleep
7. Infection/illness
8. Undiagnosed clinical conditions

A more holistic look giving equal attention to many (8 categories of) possible causes of similar symptoms

Jeukendrup, 2024

Do the basics really well

1. Eat breakfast
2. Fueling before & after training/rehab
3. Water as primary beverage, limiting alcohol consumption
4. Sleeping 7-9 hrs/night
5. Include a fruit or vegetable with every meal

Integrating Nutrition into Your Practice

- What did you have for breakfast today?
- Fuel for surgery and rehab
- Medications
  - Antibiotics
  - GLP-1s
- Consider a dietitian referral


Questions???

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