

The Sarcopenic Obesity Prevention Protocol: Defending Lean Mass on GLP-1s

Operationalizing the 1.2 g/kg Protein Floor, the Leucine Anchor, and Mechanical Loading · By Cat Clark

1. The Sarcopenia Risk Profile: Why Crude Scale Weight Is a Compromised Metric

In the **Shared Agency Framework (SAF)**, crude scale weight is treated as a secondary metric; the primary clinical objective is defending metabolically active lean mass while reducing visceral and subcutaneous adipose tissue. Dual-energy X-ray absorptiometry (DEXA) substudies from landmark incretin trials demonstrate that without targeted nutritional and mechanical intervention, approximately **25% to 40% of total weight lost during rapid pharmacologic weight reduction comes from lean mass** (Wilding et al., STEP 1 DEXA substudy, NEJM 2021; PMID: 33567185; Conte et al., JAMA 2024).

- The Metabolic Engine Trap:** Skeletal muscle is the body's primary site for insulin-mediated glucose disposal (~80% of postprandial glucose uptake) and a major determinant of resting energy expenditure. Losing skeletal muscle while losing fat lowers basal metabolic rate and accelerates rebound fat regain if therapy is interrupted.
- The SAF Retention Standard:** A smaller body is a clinical failure if it is a weaker, osteosarcopenic body. Both prescriber and patient track waist circumference, functional strength (grip/sit-to-stand), and protein adherence alongside scale weight.

2. The Daily Protein Floor & The 2.5g to 3.0g Leucine Anchor (PMID: 28414324 | PMID: 23867520)

When appetite drops by 30% to 50% on GLP-1 therapy, dietary protein is frequently the first macronutrient to fall below physiological maintenance thresholds. To prevent endogenous muscle proteolysis, the SAF protocol establishes two mathematical anchors:

Clinical Parameter	Mathematical Target & Formula	Physiological Rationale & Caveats
Daily Protein Floor	1.2 g to 1.6 g per kg of reference/adjusted body weight Formula: (Weight in lbs / 2.2) x 1.2 = Baseline Daily Grams	Starting clinical target per PROT-AGE guidelines (Bauer et al., PMID: 23867520). In patients with higher BMI, calculate using goal or adjusted body weight (commonly 60g to 110g/day); screen eGFR in chronic kidney disease (CKD).
The Leucine Trigger (mTORC1)	2.5g to 3.0g of Leucine per meal (~25g to 35g of high-quality intact protein per feeding)	Overcomes anabolic resistance by activating intracellular mTORC1 muscle protein synthesis (Phillips, PMID: 28414324). Plant protein blends require ~30g to 40g or leucine fortification to match whey/egg leucine density.

Clinical Parameter	Mathematical Target & Formula	Physiological Rationale & Caveats
Protein Pacing & Priming	3 to 4 evenly spaced intakes daily Always consume Protein First at every meal.	Backloading protein into one large dinner fails on GLP-1 therapy because delayed gastric emptying triggers early fullness. Eating protein first secures amino acid uptake before satiety terminates the meal.

3. The Mechanical Load Signal: Minimum Effective Dose Resistance Training

Dietary amino acids provide the structural building blocks, but mechanical tension provides the biological directive to retain tissue. Without contractile loading, a body in caloric deficit down-regulates muscle protein synthesis even when protein intake is adequate (Longland et al., Am J Clin Nutr 2016; PMID: 26817506).

- **Minimum Effective Dose (MED):** Two to three non-consecutive days per week of progressive resistance training targeting major multi-joint movement patterns (squat/sit-to-stand, hinge, push, pull, loaded carry) in the **8 to 12 repetition range** near muscular fatigue.
- **Movement as Medicine, Not Punishment:** Under SAF, exercise is never prescribed to "burn off calories." It is prescribed strictly as an endocrine and mechanical signal instructing the body to preserve skeletal muscle and bone mineral density.

4. Hydration, Renal Stewardship & Consultation Checklist

Higher protein density combined with reduced thirst signaling on GLP-1 agonists increases the risk of subclinical dehydration and prerenal azotemia. Patients pair every protein intake window with clear electrolyte/water hydration separated by 20 to 30 minutes from solid food, and review baseline CMP/eGFR with their prescriber.

Key Citations: Wilding JPH et al., NEJM 2021 (PMID: 33567185) · Bauer J et al., JAMDA 2013 (PMID: 23867520) · Phillips SM, Front Nutr 2017 (PMID: 28414324) · Longland TM et al., Am J Clin Nutr 2016 (PMID: 26817506) · Prado CM et al., Ann Med 2018 (PMID: 30160531).

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