

Risk of Malnutrition and Nutritional Considerations for Patients on Surgically and Medically Prescribed Weight Loss Therapies

With the current obesity epidemic and the increased use of medical and surgical treatments for weight loss, there is a growing concern about malnutrition in these patients as they lose weight.¹ This resource highlights the nutritional issues associated with weight loss therapies and offers strategies to help prevent malnutrition during the weight loss process.

Malnutrition and Nutritional Deficiencies Associated with Weight Loss Therapies

Micronutrient Deficiencies

Lower levels of micronutrients are often associated with obesity and may worsen with weight loss.² These include:

- Vitamins C, D, E, selenium, folate, and carotenoids³
- Vitamin A, thiamine, folate, vitamin B₁₂, vitamin D, iron, calcium, and magnesium, particularly after very low-calorie diets or bariatric surgery⁴⁻⁶

Loss of Lean Body Mass and Changes in Body Composition Occur with Rapid Weight Loss

For those undergoing bariatric surgery^{7,8}

- 55% of lean body mass (LBM) loss occurs within the first 3 months of surgery
- Typically, greater than 8 kg of fat-free mass (FFM) is lost within the first year of surgery
- Reduced intake of dietary protein occurs
- Unused muscle tissue is broken down to meet protein requirements
- The predictive score for sarcopenia increases from 8% to 32% within 1 year
- The gastric banding procedure produces less LBM and FFM loss, but also less weight loss in general

For those on Hormonal Incretin Therapy (GLP-1, GIP)⁹⁻¹⁵

- Medications include Liraglutide (GLP1-RA), Semaglutide (GLP1-RA), and Tirzepatide (GLP1-RA/GIP)
- In the medication studies conducted, LBM loss ranged from 0–40% of total weight loss
- Review of studies on body composition after hormonal incretin therapy have limitations. See Table 1 for details

Strategies to Mitigate Negative Nutritional Issues^{5,16-18}

Energy

- 1200–1500 kcals/d for women, 1500–1800 kcals/day for men

Protein

- New meta-analysis indicates that intake above 1.3 g/kg/d of protein is associated with increased muscle mass, and less than 1.0 g/kg/d is associated with muscle mass decline¹⁸
- Sedentary individuals should consume 1.0–1.2g/kg/d of protein; those who exercise, up to 1.5g/kg/d¹⁶
- Divide protein amount across the 3 main meals
- Choose high-quality protein sources
- Consume high-protein foods first; meal replacement products such as shakes (15–25 g protein), bars or other formulated foods can be used to supplement dietary intake of protein¹⁷

Fluids

- >2–3 L/d such as water, low-calorie beverages (unsweetened coffee or tea), or nutrient-dense beverages (low-fat, dairy or soy alternatives)¹⁷

Dietary fiber

- >21g/d for women, >30 g/d for men; good sources include fruits, vegetables, and whole grains
- Consider use of a fiber supplement—soluble, nonfermentable, gel-forming fibers such as psyllium and insoluble fibers (coarse wheat bran) can increase stool water content and bulk, which may aid stool passage

Micronutrients

- Treat preexisting deficiencies and counsel on adequate micronutrient intake
- Increase intake of food sources with micronutrients of concern such as vegetables, fruits, low-fat dairy, and fortified soy alternatives¹⁷
- Consider supplementation with a complete multivitamin, vitamin D, and calcium to help reduce risk of deficiencies

Exercise and Activity

- Reduce sedentary time
- Type of exercise is important; resistance training for preserving muscle mass and strength at least 2x/week

Registered Dietitian

- Consult with a registered dietitian for patient education and support

Table 1. Selected Studies on Hormonal Incretin Therapy (GLP-1, GIP) and Impact on Body Composition

Author (Year)	Drug	Duration/Number of Subjects	Conclusion
Jendle ⁹ (2009)	Liraglutide SQ vs. placebo vs. Glimiperide	26 weeks and 52 weeks / n=160	Liraglutide treatment reduced fat mass more than lean tissue mass while glimepiride increased the mass of one or both tissue types.
McCrimmon ¹⁰ (2020)	Semaglutide SQ vs. placebo vs. canagliflozin	52 weeks / n=178	Changes in body composition between semaglutide and canagliflozin were not significantly different in participants with uncontrolled type 2 diabetes on stable-dose metformin therapy. Numerical improvements in body composition were observed following treatment in both treatment arms, the specific impact of both treatments on body composition in the absence of a placebo arm is speculative.
Wilding ¹¹ (2021)	Semaglutide SQ vs. placebo	68 weeks / n=1961	Semaglutide led to greater reduction in fat mass than lean body mass. Total lean body mass decreased in absolute terms (kg), however the proportion of lean body mass relative to total body mass increased with semaglutide.
Ozeki ¹² (2022)	Semaglutide SQ	3 months / n=48	Muscle mass (MM) was conserved. Although skeletal MM decreased, skeletal MM % after 3 months of semaglutide treatment was maintained. There were no changes in the upper and lower leg MM percentages or in the ratio of lower/upper MM after 3 months of semaglutide treatment.
Volpe ¹³ (2022)	Semaglutide SQ	26 weeks / n=48	Semaglutide provided significant weight loss, predominantly due to a reduction in fat mass and visceral adipose tissue (VAT) with a mild decline in the fat-free mass index (FFMI) and skeletal muscle mass (SMM) not associated with a loss of muscle strength. The concomitant reduction in lean mass (LM) and SMM was expected, however it was considered to be clinically irrelevant.
Jastreboff ¹⁴ (2022)	Weekly tirzepatide vs. placebo included a 20-week dose-escalation period	72 weeks / n=2539	Approximately three-fold greater fat mass loss than lean mass, resulting in an overall improvement in body composition. The ratio of fat-mass loss to lean-mass loss was similar to that reported with lifestyle-based and surgical treatments for obesity.
Heise ¹⁵ (2023)	Tirzepatide vs. Semaglutide vs. placebo	28 weeks / n=117	Both drugs decreased weight primarily through a reduction in fat mass. Greater effects of tirzepatide than semaglutide on total body mass and fat mass reduction in people with type 2 diabetes. Total lean mass loss not reported.

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