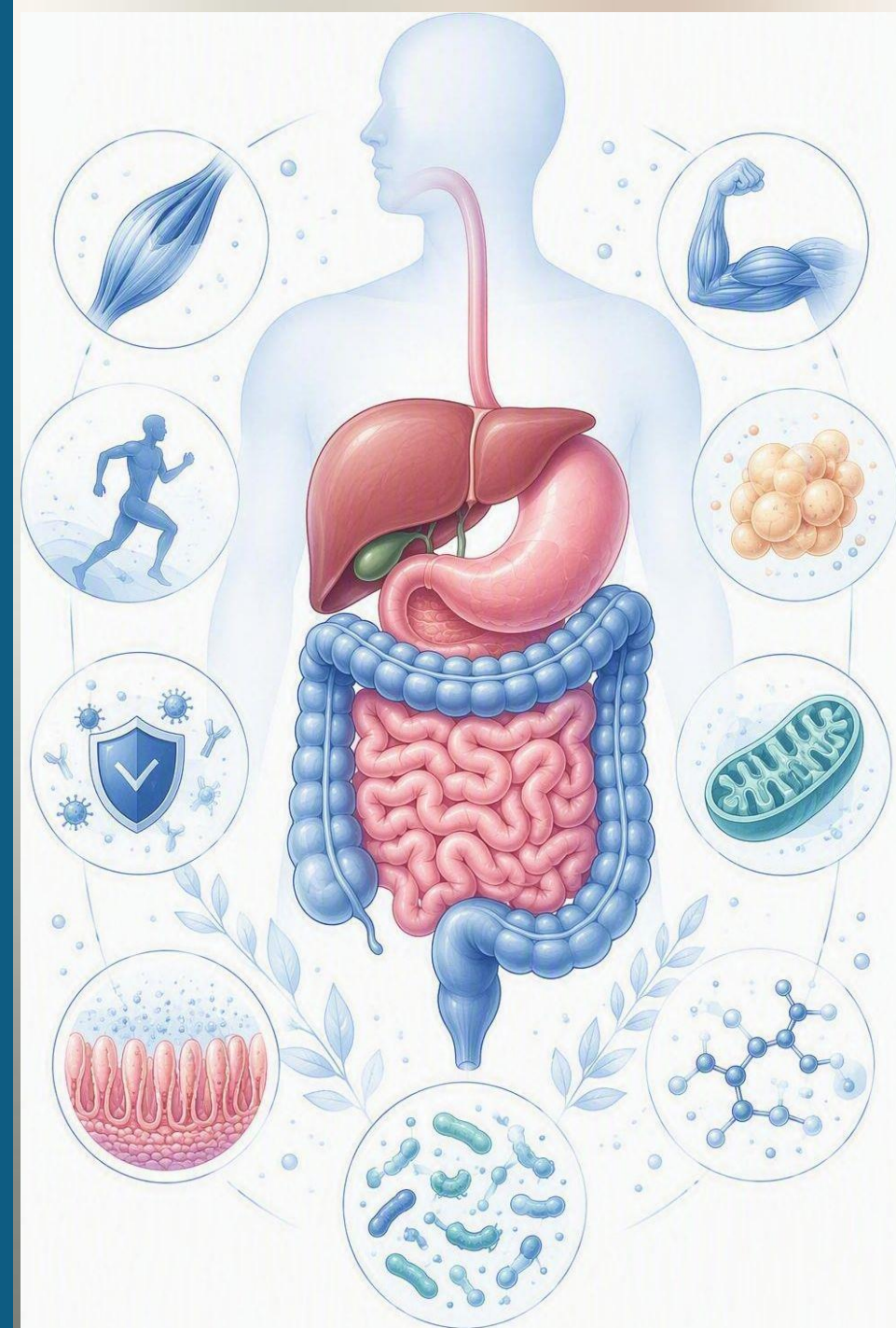


Health Gain: Beyond Weight Loss — The Real Benefits of Bariatric and Metabolic Surgery

Nutrition Perspective | **Silvia Leite, PhD, MSc, RD** | Private Practice and University of Brasília – Brazil. IFSO-IH



No Disclosures

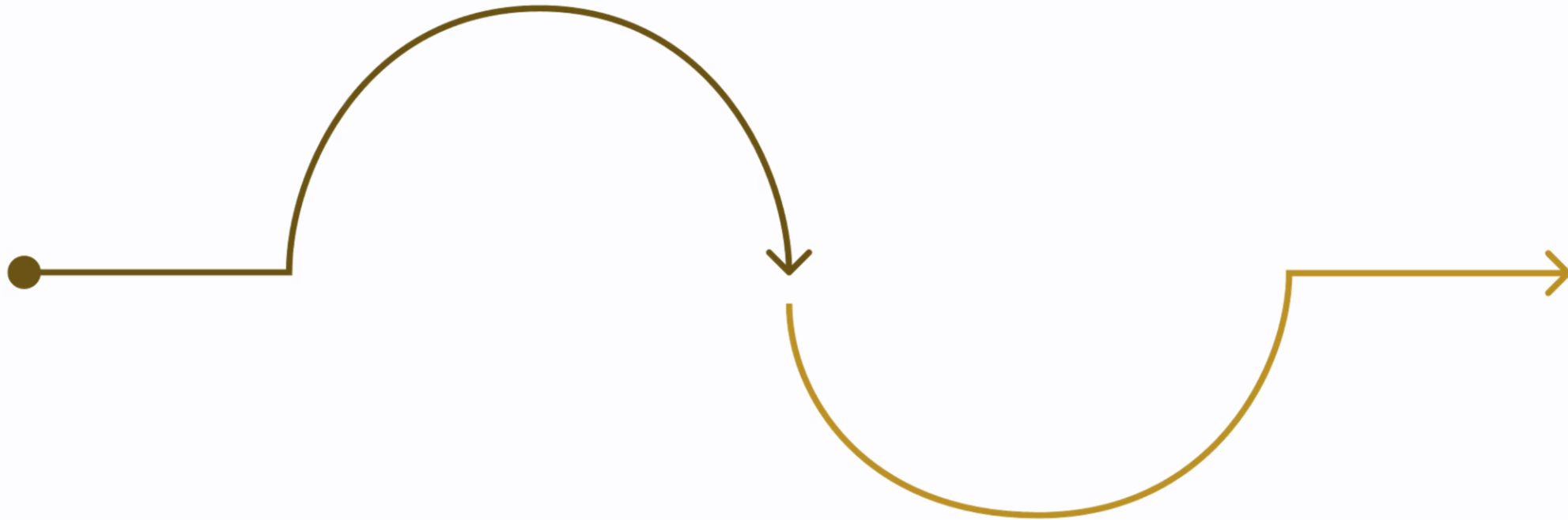


The Game Plan for Today

- 1 From Weight Loss to Health Gain**
Reframe surgical success beyond the kilograms lost.
- 2 Three Benefits of Bariatric and Metabolic Surgery**
The evidence from a nutrition perspective.
- 3 Nutrition Strategy and Take-Home Messages**
Practical priorities and the key take-home messages.



From Weight Loss to Health Gain



Traditional Outcome

Weight loss measured in kilograms — a scale-focused, single-metric definition of surgical success.

Modern Outcome: Health Gain

Multi-dimensional success: disease remission, physical function improvement , nutrition and healthy aging.

MECHANISMS OF ACTION

Bariatric Surgery: A Metabolic Procedure

Benefits begin **before** major weight loss occurs. The metabolic effects of surgery are rapid, multifactorial, and independent of caloric restriction alone.



Gut Hormone Changes

GLP-1, PYY, and bile acid signaling shift rapidly post-surgery, driving early metabolic improvement.



Insulin Sensitivity

Improved glucose uptake occurs independent of weight loss, often within days of surgery.



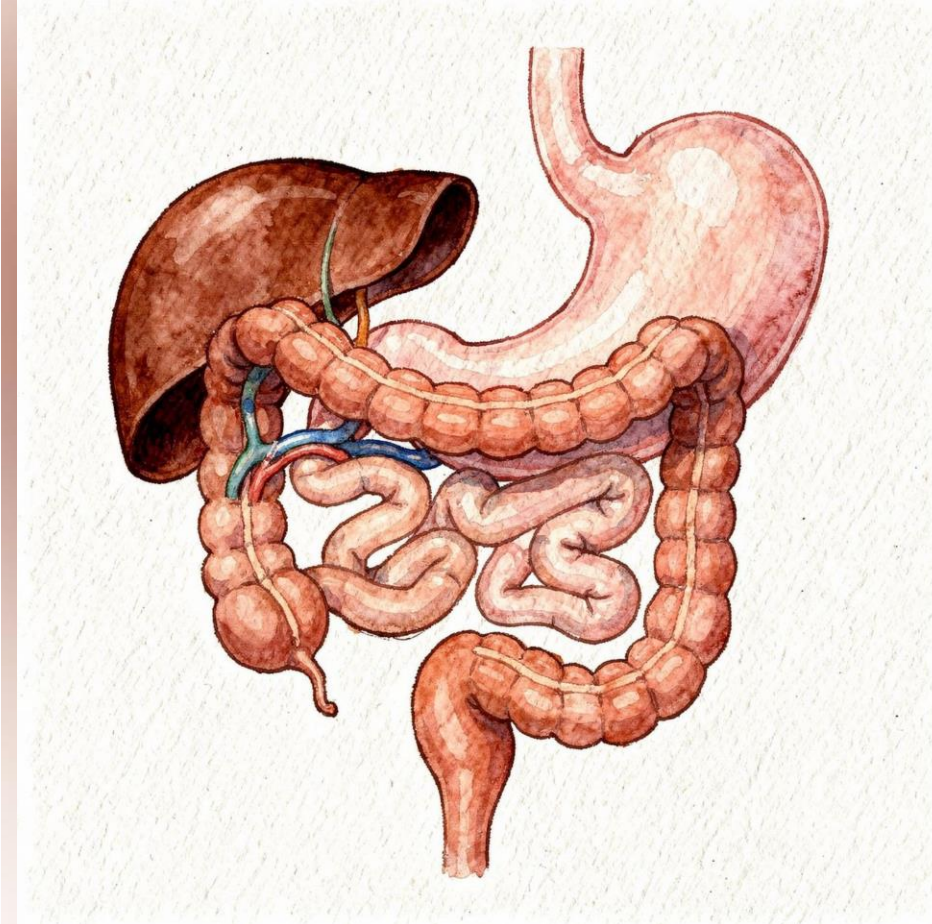
Appetite Regulation

Satiety signals improve substantially, supporting long-term energy balance and reduced caloric intake.

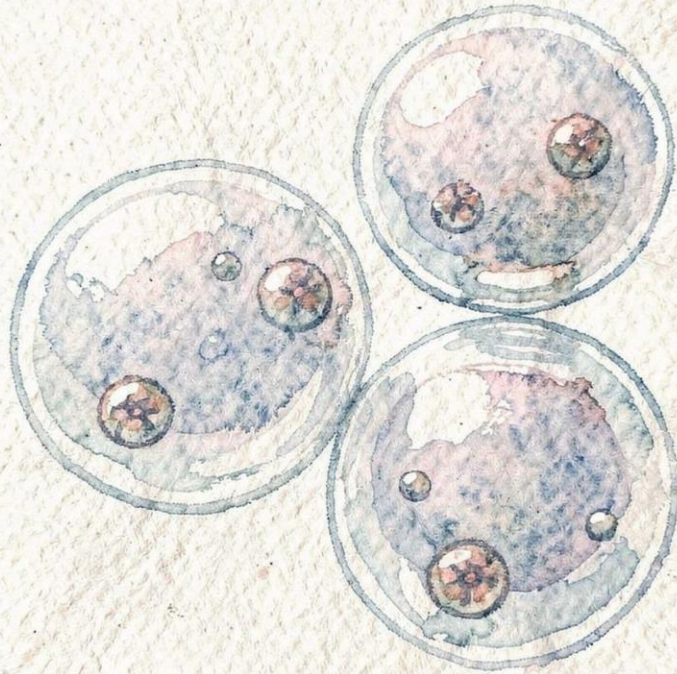


Reduced Inflammation — the downstream outcome

Systemic inflammatory markers — CRP, IL-6, TNF- α — decline rapidly in the early post-operative period.



Reduced Inflammation



CRP

C-Reactive Protein

Primary systemic inflammation marker — declines significantly in the early post-operative period.

IL-6

Interleukin-6

Pro-inflammatory cytokine — reduced levels correlate with improved insulin sensitivity and metabolic outcomes.

TNF- α

Tumor Necrosis Factor- α

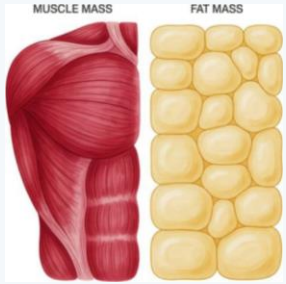
Key mediator of systemic and skeletal muscle inflammation — downregulated after bariatric surgery.



Result: Better metabolic health, improved immune function, and reduced chronic disease risk — hallmarks of true health gain.

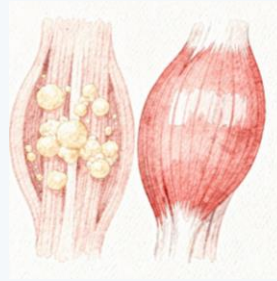
Health Gain: Three Nutritional Domains

The goal of nutritional management after bariatric surgery is not simply avoiding deficiencies — the goal is **optimizing health**. Three key domains define nutritional health gain post-surgery.



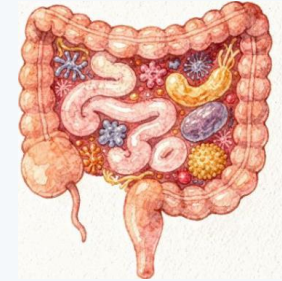
(1) Body Composition

Muscle-to-fat ratio improves: fat mass loss exceeds muscle mass loss, with decreased systemic inflammation.



(2) Myosteatosis Improvement

Ectopic intramuscular fat is reduced, restoring metabolic function within skeletal muscle.



(3) Gut Health

Microbiome diversity increases after bariatric surgery, with reduced endotoxemia and improved gut barrier function.

Part 1

Body Composition After Weight Loss

Body Composition After Weight Loss

Both fat and lean mass decline, yet the fat-to-lean ratio improves markedly — a key distinction from simple caloric restriction.

Parameter	Post-Bariatric Finding
Fat mass loss	30-50% of total weight lost, with preferential reduction in visceral adiposity
Lean mass attrition	FFM / SMM accounts for only 15-25% of weight lost — proportionally far less than fat
Muscle-to-weight ratio	Increases after surgery, reflecting improved relative lean mass
Handgrip strength	Preserved — muscle function maintained despite mass reduction

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ORIGINAL CONTRIBUTIONS



Preserved Muscle Strength Despite Muscle Mass Loss After Bariatric Metabolic Surgery: a Systematic Review and Meta-analysis

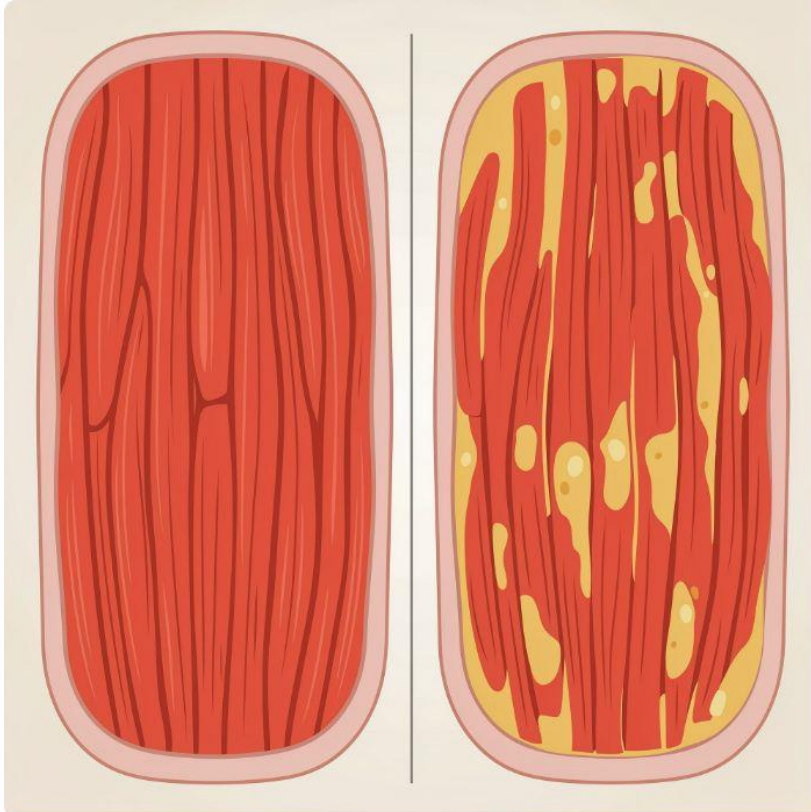
Han Na Jung¹ · Seon-Ok Kim² · Chang Hee Jung^{3,4} · Woo Je Lee^{3,4} · Myung Jin Kim^{3,4} · Yun Kyung Cho^{3,4}

Clinical relevance: absolute strength may dip slightly in load-bearing limbs, but **HGS-to-BMI and HGS-to-muscle mass ratios improve** — inversely associated with metabolic syndrome risk.

Part 2

Myosteatorsis: Fat Within Muscle

(2) Myosteatorsis: Fat Concealed Within Muscle



Ectopic lipid deposited inside skeletal muscle, where it disrupts metabolic function rather than serving as energy storage.

Two compartments — IMAT sits between muscle fibers; intramyocellular lipid sits inside them.

In obesity — mitochondrial dysfunction lowers oxidative capacity, driving fibrosis and inflammation.

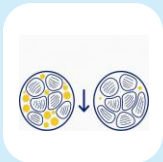
After surgery — myosteatorsis falls and insulin and anabolic sensitivity recover.

Myosteatorosis

Weight Loss & Bariatric Surgery Reverse Myosteatorosis

Key message: Despite muscle mass loss, bariatric surgery improves muscle *quality* by reversing myosteatorosis.

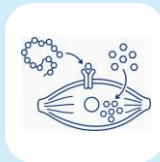
1



Reduced IMAT

Falls to lean-like levels by 1 year

2



Lower Muscle Lipid

Lower SREBP-1c restores insulin and anabolic sensitivity.

3



Less Muscle Inflammation

TNF- α , IL-6 and MCP-1 drop inside the muscle.

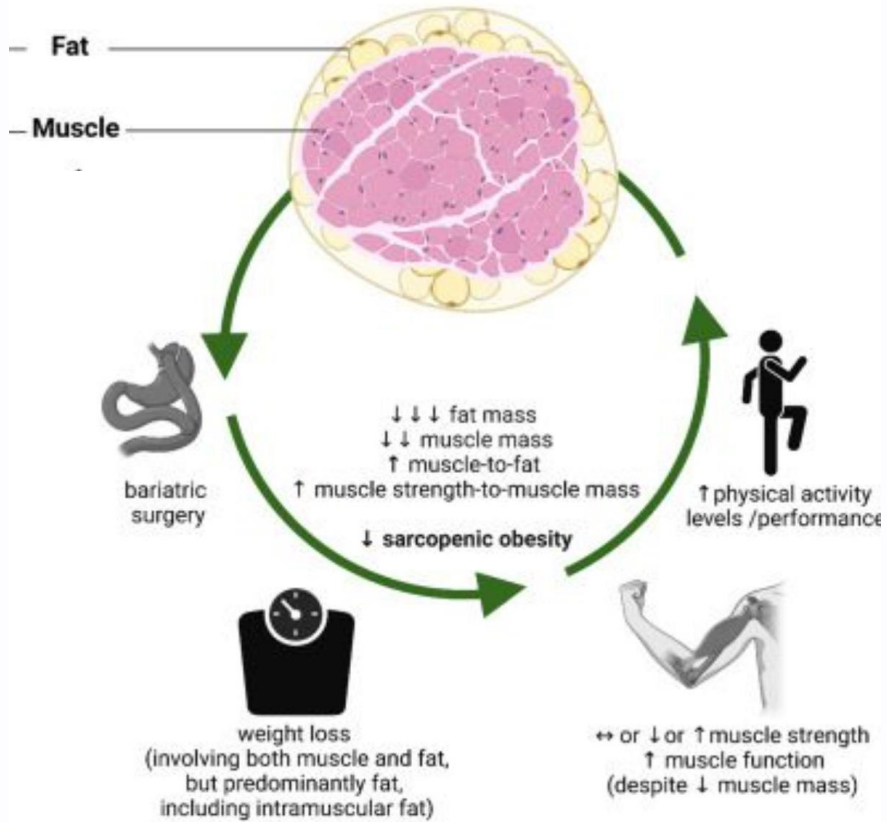
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Restored Mitochondria

Full recovery at 1 year, with higher PGC-1 α

Myosteatorsis



How bariatric surgery may break the sarcopenic-obesity loop.

Surgery removes far more fat than muscle.

The muscle-to-fat ratio rises.

Strength and function hold up despite lower muscle mass.

Part 3

The Gut Microbiome

Gut Microbiome: A Key Mediator of Health Gain

Surgery-specific microbiome shifts drive metabolic gain, lower inflammation and hormonal regulation.



01

Increased Microbiota Diversity & Richness

Diversity rises after surgery — a healthier, more resilient gut.



02

Altered Firmicutes/Bacteroidetes Ratio

Firmicutes fall, Bacteroidetes rise — less obesity-linked inflammation.



03

Increased Beneficial Bacterial Taxa

Akkermansia muciniphila expands, strengthening the gut barrier and metabolism.



04

Changes in Microbial Metabolites

More short-chain fatty acids (butyrate, propionate) and bile acid diversity.



05

Reduced Inflammation & Endotoxemia

Lower LPS, IL-1, IL-6 and TNF- α — less systemic inflammatory load.



06

Gut-Brain Axis & Hormonal Regulation

Microbial shifts act on appetite hormones, reinforcing satiety.



Gut Microbiome Changes After Weight Loss

Shifts in bacterial populations and their metabolic consequences.

	Change	Bacteria	Effect
↓	F/B Ratio ↓	Bacteroidetes ↑	Reduced inflammation
+	Beneficial ↑	Akkermansia ↑	Improved gut barrier
↑	SCFAs ↑	SCFA producers ↑	Satiety benefits
●	Bile Acids ↑	Veillonella ↑	Metabolism modulation
—	Inflammation ↓	Bifidobacterium ↑	Lower cytokines

Take-Home Messages



Success Beyond the Scale

Kg lost are not the outcome — health is.



Systemic Benefits

Metabolic, muscular, inflammatory and gut systems all improve.



Nutrition is Essential

Optimize nutrition; don't just prevent deficiency.



Muscle Preservation

Protect lean mass with protein, exercise and monitoring.



Multidisciplinary Follow-Up

Long-term multidisciplinary follow-up sustains the gain.

Final Message

Treating obesity is about restoring **health, function, and quality of life** — not just losing weight. Nutrition is the bridge from the operating room to lifelong health.

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