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Factors Influencing Recurrent Weight Gain after Bariatric-Metabolic Surgery

A Narrative Review

TORONTO2026

**The Future of Obesity Management:
From Weight Loss to Health Gain**

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Disclosure Slide

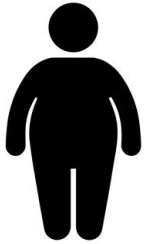
☒ **No, nothing to disclose**

☐ Yes, please specify

I have no financial, commercial, or other conflicts of interest to declare in relation to this presentation.



Introduction



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Prevalence of obesity has
doubled worldwide,
1990–2022

Okunogbe et al., 2022

~89%

Relative risk reduction in
all-cause mortality after MBS

Christou et al., 2004

50–75%

Excess weight loss achieved,
often maintained for 10 years

Hankey, 2010

After reaching their lowest weight (nadir), patients gradually experience recurrent weight gain, reversing metabolic and quality-of-life benefits and increasing comorbidity progression.



Objective of the Review



To critically synthesize current evidence on preoperative and postoperative determinants of recurrent weight gain following laparoscopic sleeve gastrectomy and Roux-en-Y gastric bypass.



Methods

Narrative literature review (non-systematic)

Included:

Observational studies, RCTs,
systematic reviews, and meta-
analyses.

Published from 2010 onward.

In English or Spanish.

Addressing the topic of this
review.

Keywords:

weight regain,
laparoscopic sleeve
gastrectomy,
laparoscopic Roux-en-
Y gastric bypass.

Search in
Pubmed

Study
selection

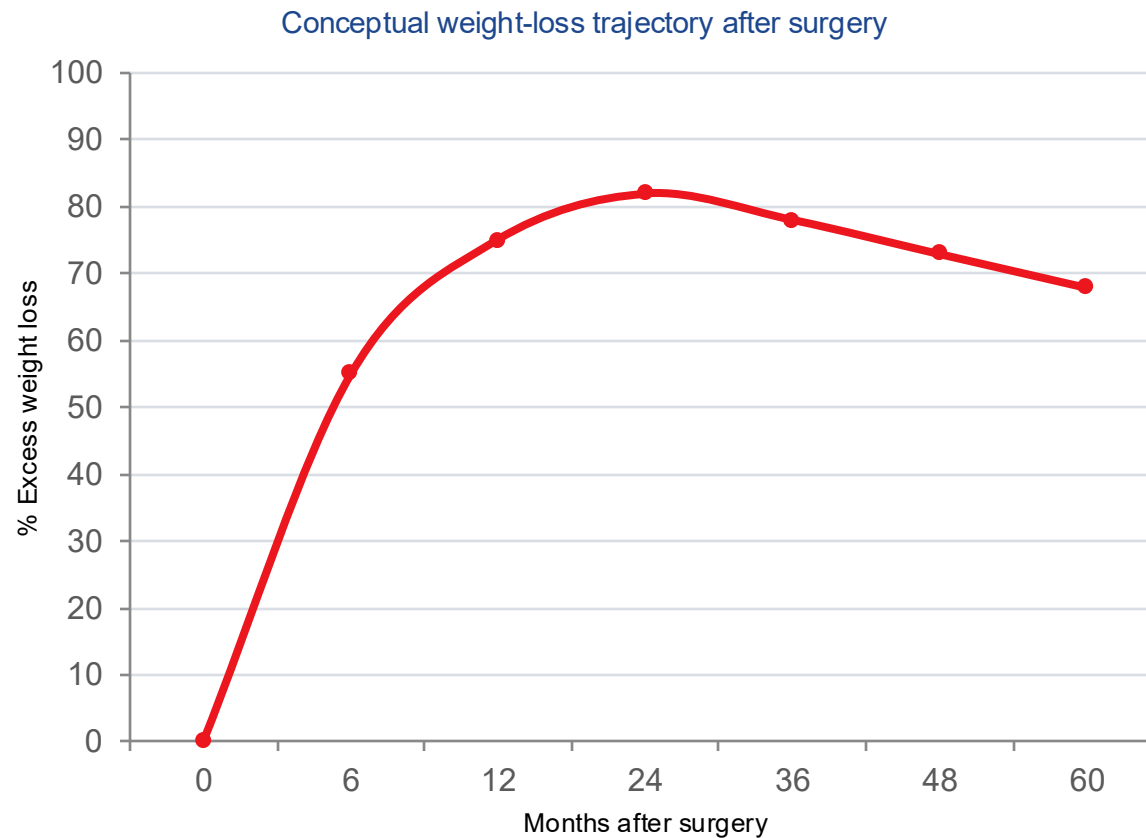
Excluded:

Case studies,
expert opinions,
and studies
unrelated to the
topic.

Organization
and Analysis



The Weight Trajectory after Surgery



Illustrative curve, adapted from de Hollanda et al., 2015



Nadir

Lowest weight reached at $\sim 23.7 \pm 15.7$ months;
 $\sim 82\%$ of excess weight lost



Gradual recurrent gain

Begins ~ 2 years after surgery



Clinically significant

$>20\%$ of maximum weight lost — best
predictor of comorbidity progression and
reduced quality of life

King et al., 2018



Factors Associated with Recurrent Weight Gain

Preoperatively

1. Baseline BMI



2. Surgical Technique



Postoperatively

1. Anatomic Changes



2. Hormonal Factors



3. Psychological and Behavioral



4. Dietary Intake



5. Physical Activity



6. Multidisciplinary Follow-Up



Baseline BMI

1. Baseline BMI



- Higher relative weight loss with higher baseline BMI, but a lower % of excess weight loss.
- Obesity III (BMI 40–<50 kg/m²) or higher associated with greater long-term recurrent weight gain — up to 100% of patients with BMI >50 kg/m² (Obesity IV) regained >4 BMI points at long-term follow-up.
- One Chilean cohort (BMI ~35, Obesity II) found no association — suggesting the effect concentrates at higher BMI classes.

Ochner et al., 2013; Heneghan et al., 2012; Csendes et al., 2018; Alvarez et al., 2016



Surgical Technique

2. Surgical Technique



- Both RYGB and SG are effective, but RYGB tends to show less long-term recurrent weight gain.
- At 3 and 5 years, RYGB achieved significantly greater %EWL than SG (mean difference 5.5 and 4.6 points).
- After SG, regain of >10 kg was reported in ~30% of patients by 5 years.

Hu et al., 2020; Braghetto et al., 2012; King et al., 2020



Anatomic Changes

1. Anatomic Changes



- Larger residual gastric volume after SG correlated with % recurrent weight gain ($r = 0.67$).
- Gastrojejunal stoma dilation after RYGB independently predicted regain $\geq 20\%$ of weight lost, and was linked to uncontrolled eating behavior.
- Pouch length alone was not associated with recurrent weight gain.

Alvarez et al., 2016; Abu Dayyeh et al., 2017; Heneghan et al., 2012; Athanasiadis et al., 2021



Hormonal Changes

2. Hormonal Factors



- Ghrelin and PYY did not correlate with recurrent weight gain in most cohorts.
- Lower fasting leptin and greater postprandial GLP-1 rise were associated with better weight maintenance.
- Overall, hormonal findings remain inconsistent across studies.

Santo et al., 2016; Tsouristakis et al., 2019



Psychological and Behavioral

3. Psychological and Behavioral



↑ Associated with more recurrent gain

- Loss-of-control / uncontrolled eating
- Concern about alcohol use
- Binge-eating tendency & anxiety
- Fewer social supports, lower self-esteem

Livhits et al., 2011; Alvarez et al., 2016; Odom et al., 2009

↓ Protective factors

- Regular self-weighing and self-monitoring
- Stopping intake at satiety, avoiding grazing
- Better control of eating impulses and habits
- Higher self-esteem and social support

Mitchell et al., 2016; Odom et al., 2009; Livhits et al., 2011



Dietary Intake

4. Dietary Intake



- Recurrent weight gain $\geq 10\%$ linked to higher consumption of sweets and larger portion sizes; negatively linked to fruit and zinc intake.
- Patients regaining weight reported poorer diet quality, more snacking and higher fat intake.
- Higher absolute fat and caloric intake found in patients with greater regain post-SG.

Athanasiadis et al., 2021; Freire et al., 2012; Alvarez et al., 2016



Physical Activity

5. Physical Activity



- ≥ 1 session/week of moderate-to-vigorous activity $\rightarrow$ 3.5 $\times$ greater odds of losing $\geq 50\%$ of excess weight.
- Highest tertile of sitting time $\rightarrow$ significantly less weight loss and maintenance.
- Lower activity levels linked to recurrent weight gain of $\sim 25\%$ of weight lost after SG.

Herman et al., 2014; Freire et al., 2012; Alvarez et al., 2016



Multidisciplinary Follow-Up

6. Multidisciplinary Follow-Up



- Patients with zero postoperative follow-up visits were **4.6 times** more likely to have recurrent weight gain than those attending 4–5 annual visits.
- ≥ 2 years of postoperative nutritional counseling, physical activity guidance, and psychological support (NICE Guidelines).
- Pre- or postoperative interventions to increase physical activity levels, to help prevent recurrent weight gain (EASO Guidelines).
- Structured follow-up >3 years supports weight maintenance after both RYGB and SG.

Odom et al., 2009; NICE, 2014; Busetto et al., 2018; King et al., 2018; Braghetto et al., 2012



Limitations and Future Perspectives

Limitations

- Non-systematic search strategy — relevant studies may have been missed
- No standardized definition of recurrent weight gain across studies
- Small samples, limited long-term follow-up, few multivariable analyses
- Mostly observational data — associations, not causality
- Gut microbiota and lean-mass loss not addressed

Future Perspectives

- Longer, standardized longitudinal studies (>2–3 years).
- Explore the role of gut microbiota and lean-mass preservation
- Digital tools — exergames, VR, AI apps, telehealth follow-up — for adherence
- Personality traits and neurodivergence as drivers of adherence
- Supervised exercise programs and multidisciplinary care models



Recurrent Weight Gain is Multifactorial — and Largely Modifiable

- 1 Higher preoperative BMI (Obesity III+) and, to a lesser extent, sleeve gastrectomy are linked to greater long-term recurrent weight gain.
- 2 Anatomic dilation (gastric pouch/sleeve volume, stoma diameter) is measurable and may guide targeted follow-up.
- 3 Hormonal changes remain inconclusive across studies.
- 4 Disordered eating behavior, anxiety, and alcohol misuse increase risk; self-monitoring and social support are protective.
- 5 Diet quality, portion size, and physical activity are modifiable levers with consistent associations.
- 6 Multidisciplinary follow-up for ≥ 2 years is the strongest actionable recommendation.





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Thank You

Questions & Discussion Welcome

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