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SPRING MEETING

18 - 19 MAGGIO 2023  
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CONDIVIDERE PER CRESCERE  
Strategie di integrazione  
in Chirurgia Bariatrica

Presidente del Congresso  
ANTONIO BRAUN

# INSUFFICIENT WEIGHT LOSS E WEIGHT REGAIN

NICOLA TARTAGLIA

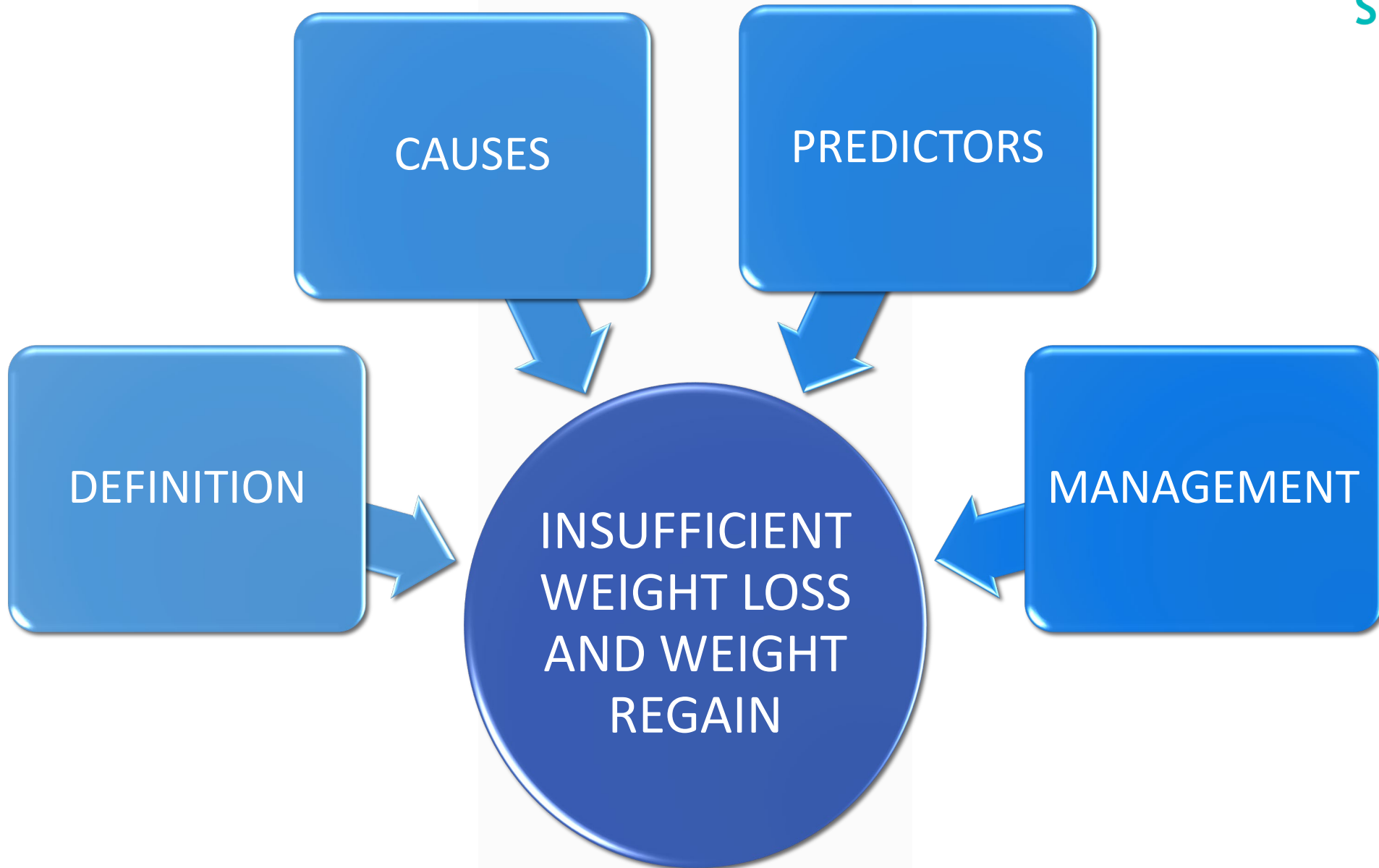
UNIVERSITÀ DI FOGGIA

CLINICA CHIRURGICA:

*Direttore Prof. Antonio Ambrosi*

SCUOLA DI SPECIALIZZAZIONE IN CHIRURGIA  
GENERALE:

*Direttore Prof. Nicola Tartaglia*





# DEFINITION

SUFFICIENT WEIGHT LOSS

>50% of Excess weight loss at 18 months and reasonable resolution of comorbidities

BARIATRIC SURGERY

INSUFFICIENT WEIGHT LOSS

Insufficient weight loss is defined as excess weight loss percentage (EWL%) of < 50% 18 months post-Bariatric Surgery.

**FAILURE**

WEIGHT REGAIN

Weight Regain is defined as progressive weight regain that occurs after achievement of an initial successful weight loss (defined as EWL>50%)



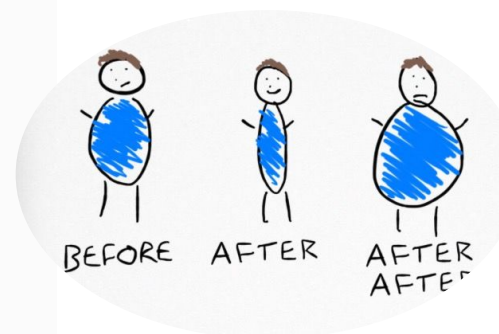


## Weight Regain and Insufficient Weight Loss After Bariatric Surgery: Definitions, Prevalence, Mechanisms, Predictors, Prevention and Management Strategies, and Knowledge Gaps—a Scoping Review

Walid El Ansari<sup>1,2,3</sup> · Wahiba Elhag<sup>4</sup>

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# CAUSES



**Table 2** Summary of causes, predictors, and prevention and management strategies of WR and IWL after BS

### Characteristic

### Summary

#### Causes

Hormonal/metabolic

Increase in ghrelin, decrease in peptide YY and GLP-1, post-bariatric hypoglycemia, role of leptin is unclear [24, 40–49]

Dietary non-adherence

Increase caloric intake with time, dietary non-adherence/food indiscretion, grazing, lack of nutritional follow-up [13, 32, 50–56]

Physical inactivity

Non-compliance, sedentary behavior, presence of barriers to exercise [51, 57–61]

Mental health

Depression, multiple psychiatric conditions, binge eating disorder, loss of control over eating [54, 62–68]

Anatomic surgical failure

LAGB

Pouch distension [69]

LSG

Dilatation of gastric pouch [70–77]

RYGB

Dilatation of gastric pouch, dilatation of gastrojejunostomy stoma outlet, gastrogastric fistula [73–75]



# CAUSES

## SURGICAL FAILURE

**SLEEVE  
GASTRECTOMY**

Gastric dilatation

Surgical/anatomic  
factors

Higher residual  
gastric volume

**ROUX AND Y  
GASTRIC  
BYPASS**

Large gastro-jejunal stoma  
diameter

Gastric pouch  
dilation

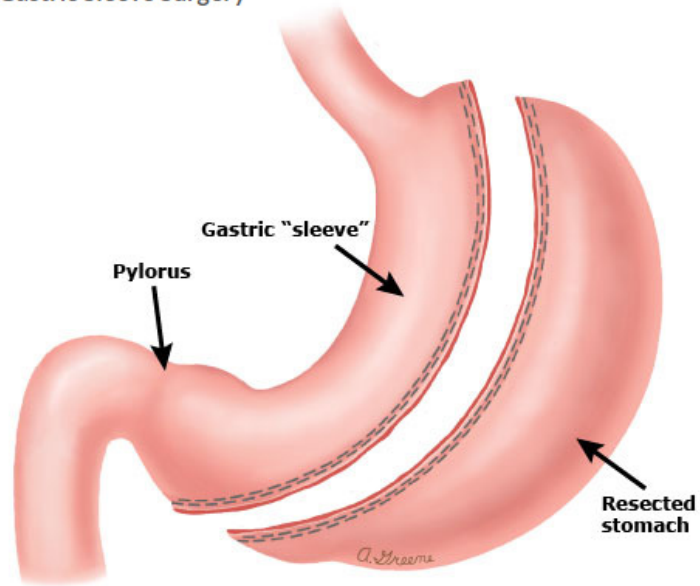
Gastro-gastric fistula  
as a surgical  
complication



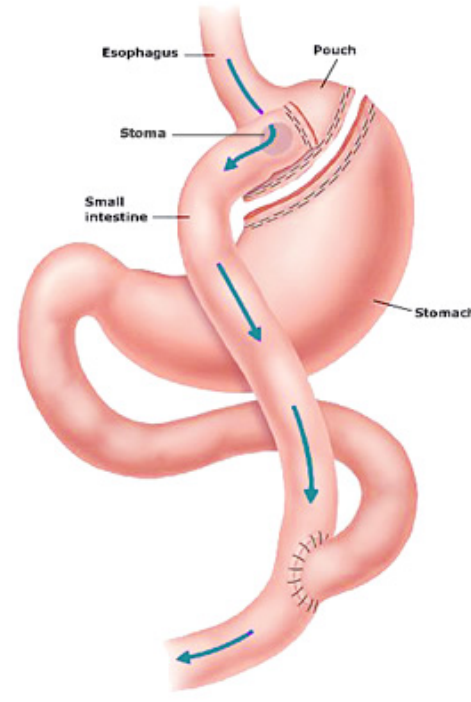
# PREDICTORS



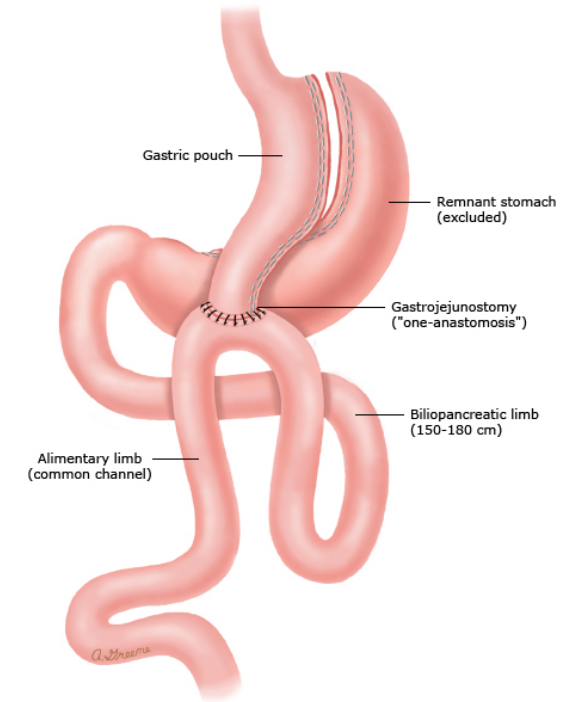
Gastric Sleeve Surgery



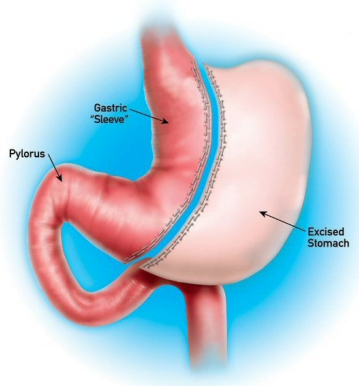
## SLEEVE GASTRECTOMY



## GASTRIC BYPASS



## OAGB



# PREDICTORS

## Abstract

**Background** Weight regain (WR) and insufficient weight loss (IWL) after sleeve gastrectomy (SG) are challenging issues. This study aimed to evaluate the predictors of WR and IWL after SG.

**Methods** In this retrospective analytical study, 568 patients who underwent SG at Hazrat-e Rasool General Hospital, Tehran, Iran, between January 2015 and April 2022 were evaluated. A total of 333 patients were included. WR and IWL were evaluated by multiple criteria such as a BMI of  $> 35 \text{ kg/m}^2$ , an increase in BMI of  $> 5 \text{ kg/m}^2$  above nadir, an increase in weight of  $> 10 \text{ kg}$  above nadir, percentage of excess weight loss (%EWL)  $< 50\%$  at 18 months, an increase in weight of  $> 25\%$  of EWL from nadir at 36 months, and percentage of total weight loss (%TWL)  $< 20\%$  at 36 months. All participants were followed up for 36 months.

**Result** The univariate analysis showed that preoperative BMI, obstructive sleep apnea, metformin consumption, and grades 2 and 3 fatty liver disease were associated with WR and IWL ( $P < 0.05$ ). WR or IWL incidence varied (0–19.3%) based on different definitions. The multivariate analysis showed that a preoperative BMI of  $> 45 \text{ kg/m}^2$  [odds ratio<sub>Adjusted</sub> (OR<sub>Adj</sub>) 1.77, 95% CI: 1.12–4.11,  $P = 0.038$ ] and metformin consumption [OR<sub>Adj</sub>: 0.48, 95% CI: 0.19–0.78,  $P = 0.001$ ] were associated with WR and IWL after SG, regardless of the definition of WR or IWL.

**Conclusion** This study showed that preoperative BMI of  $> 45 \text{ kg/m}^2$ , obstructive sleep apnea, metformin consumption, and grades 2 and 3 of fatty liver disease were associated with WR or IWL.

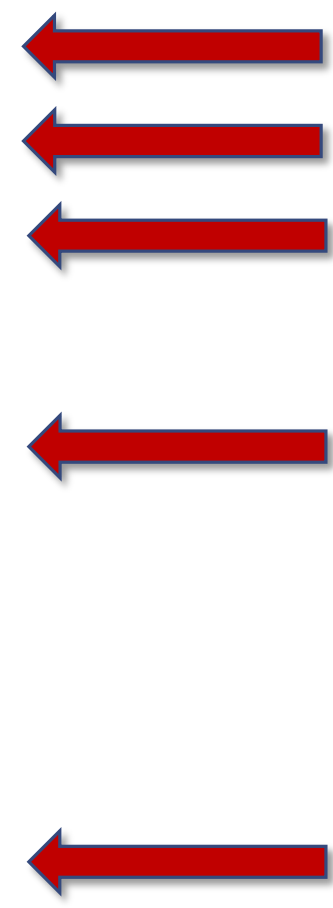


# PREDICTORS

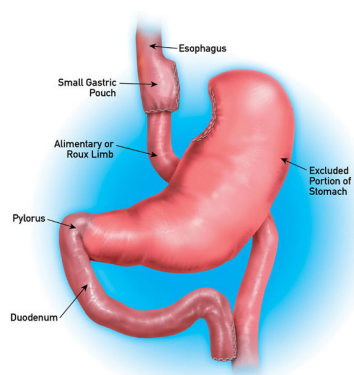
Table 1  
Studies examining predictors of weight regain after sleeve gastrectomy with definition provided

Author and country	Sample size & characteristics	Study design	Follow-up duration	Definition of weight regain	Predictors of weight regain
Fahmy et al. (2016) [31] Egypt	89 Age: 18 to 55 (mean, 33.9 yr) Female: 75 (84.3%)	Longitudinal	2 yr	A regain of $\geq 5\%$ of the weight that had been initially lost, occurring 12–24 mo after SG	Distance between pylorus and beginning of staple line, large residual gastric volume
Alvarez et al. (2016) Chile	40 Age: $43 \pm 11$ Female: 32 (80%)	Retrospective case-control study	38.5 months (34–41 months)	In the $>50^{\text{th}}$ percentile for percentage of weight regain (weight regain [kg] / maximum weight loss [kg] $\times 100$ )	Greater residual gastric volume, higher fat intake, and a trend toward higher total energy intake, anxiety
Nicolau et al. (2015) [38] Spain	50 RYGB and 10 SG Age: $46.35 \pm 9.9$ Female: 47 (78.3%)	Cross-sectional	$46.48 \pm 18.1$ mo	An increase $>10\%$ of the minimum weight loss achieved	Grazing
Obeidat et al. (2015) [27] Jordan	110 Age: $33.8 \pm 10.8$ Female: 83 (75.5%)	Retrospective	33 mo	As an increase in weight $>10$ kg from the nadir	Less antral resection
Bohdjalian et al. (2010) [36] Austria	26 Age: $46.2 \pm 2.5$ Female: 19 (73.1%)	Longitudinal	5 yr	An increase of weight $>10$ kg from the nadir	—
Balla et al. (2017) [25] Italy	127 Group A: Age: $46.3 \pm 10.82$ Female: 31 (86.1%) Group B: Age: $44 \pm 10.9$ Female: 31 (67.4%) Group C: Age: $45.04 \pm 10.6$ Female: 34 (75.6%)	Retrospective	Group A: 69.7 mo Group B: 33.3 mo Group C: 14.8 mo	Regain of $\geq 15\%$ of lost weight	Larger bougie size
Abdallah et al. (2014) [28] Egypt	105 Age: $29.9 \pm 7.4$ Female: 78 (74.3%)	Longitudinal	2 yr	An increase of weight $>10$ kg from the nadir	—
Chou et al. (2017) [76] Taiwan	40 Age: 33.5	Cross-sectional	$\geq 5$ yr	Weight increase from nadir $>25\%$ of their lost weight	—
Essayli et al. (2018) [40] United States	167 Age: $49.1 \pm 12.4$ Female: 140 (83.2%)	Cross-sectional	1 yr (98) 2 yr (36) 3 yr (33)	Regained $>20\%$ of their lowest postoperative weight	Discontinue using portion control, abandoning self-monitoring, limiting sweets, avoiding drinking during meals, and drinking more water

RYGB = Roux-en-Y gastric bypass; SG = sleeve gastrectomy.







# PREDICTORS

Obesity Surgery (2020) 30:4852–4859

<https://doi.org/10.1007/s11695-020-04877-7>

## ORIGINAL CONTRIBUTIONS

# Pre-operative Predictors of Weight Loss and Roux-en-Y Gastric Bypass Surgery: a Prospective Cohort Study

Hassan Aliakbarian<sup>1,2</sup> · Hina Y. Bhutta<sup>1,2</sup> · Keyvan Heshmati<sup>1,2</sup> · Ali Tavakkoli<sup>1,2</sup>

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**Table 1** Post-operative  $WL_{max}$  and pre-operative characteristics of the patients in overall cohort and separately in non-DM and T2D subgroups

	Overall mean ± SD (n = 105)	Non-DM mean ± SD (n = 79)	T2D mean ± SD (n = 26)	p value (t test/chi-sq.)
$WL_{max}$	35.3 ± 7.4	36.5 ± 7.4	31.4 ± 6.2	< 0.01**
Gender (M:F)	25:80	16:63	9:17	0.14
Age (year)	44.4 ± 13.0	41.5 ± 12.7	53.3 ± 9.6	< 0.01**
Race (W:B:H)	71:16:15	53:13:12	18:3:3	0.80
Weight (kg)	125.0 ± 24.7	126.1 ± 24.7	121.7 ± 24.9	0.43
Initial BMI (kg/m <sup>2</sup> )	45.1 ± 6.7	45.4 ± 6.2	44.2 ± 8.6	0.45
Pre-op WL (%)	4.6 ± 3.6	4.4 ± 3.6	5.0 ± 3.5	0.43
CRP (mg/l)	6.6 ± 6.1	6.1 ± 4.5	7.8 ± 8.9	0.24
Glucose (mg/dl)	101.5 ± 25.8	94.1 ± 15.4	124.6 ± 36.8	< 0.01**
A1C (%)	6.0 ± 0.9	5.7 ± 0.4	7.1 ± 1.2	< 0.01**
Insulin (IU/ml)	12.9 ± 18.8	9.0 ± 8.3	26.5 ± 33.6	< 0.01**
HOMA-IR	3.4 ± 5.3	2.2 ± 2.3	7.8 ± 9.2	< 0.01**
Glucagon (pg/ml)	64.3 ± 26.2	62.2 ± 27.7	69.6 ± 21.7	0.24
Leptin (ng/ml)	49.8 ± 30.1	52.6 ± 31.1	40.7 ± 25.2	0.10
Ghrelin (pg/ml)	54.9 ± 22.9	55.2 ± 22.1	54.1 ± 25.3	0.84
GLP-1 (pg/ml)	3.9 ± 2.8	4.1 ± 3.1	3.2 ± 1.7	0.45
GIP (pg/ml)	38.5 ± 23.7	36.2 ± 22.2	44.7 ± 28.4	0.43

SD, standard deviation; non-DM, non-diabetic; T2D, type 2 diabetes; chi-sq., chi-square test;  $WL_{max}$ , maximal total body weight loss; M, male; F, female; W, white; B, black; H, Hispanic; BMI, body mass index; WL, weight loss; CRP, C-reactive protein; A1C, glycosylated hemoglobin; HOMA-IR, homeostasis model assessment of insulin resistance; GLP-1, glucagon-like peptide 1; GIP, glucose-dependent insulinotropic polypeptide; \* $p < 0.05$ ; \*\* $p < 0.01$

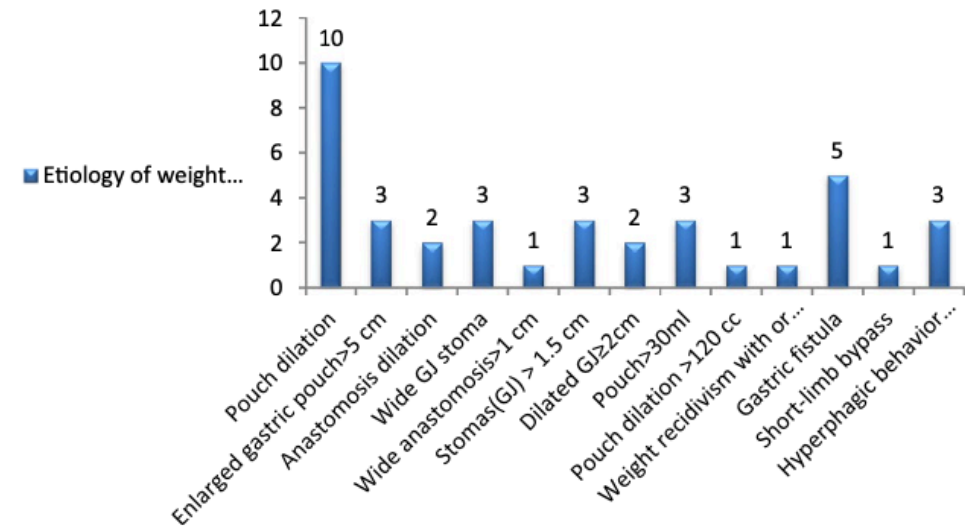


# PREDICTORS

**Table 6** Reported etiology of weight regain among selected studies

Etiology	Frequency of articles
Pouch dilation	10
Enlarged gastric pouch > 5 cm	3
Anastomosis dilation	2
Wide GJA	3
GJA > 1 cm	1
GJA > 1.5 cm	3
GJA $\geq$ 2 cm	2
Gastric Pouch > 30 ml	3
Gastric pouch > 120 ml	1
Weight recidivism with or without GG fistulae	1
Gastric fistula	5
Short-limb bypass	1
Hyperphagic behavior (polyphagia)	3

*Cm* centimeter, *GJA* gastro-jejunal anastomosis, *ml* milliliter, *GG* gastro-gastric



Kermansaravi M, Davarpanah Jazi AH, Shahabi Shahmiri S, Eghbali F, Valizadeh R, Rezvani M. Revision procedures after initial Roux-en-Y gastric bypass, treatment of weight regain: a systematic review and meta-analysis. *Updates Surg.* 2021 Apr;73(2):663-678. doi: 10.1007/s13304-020-00961-w. Epub 2021 Jan 11. PMID: 33428184.



# PREDICTORS



Obesity Surgery  
<https://doi.org/10.1007/s11695-019-03734-6>

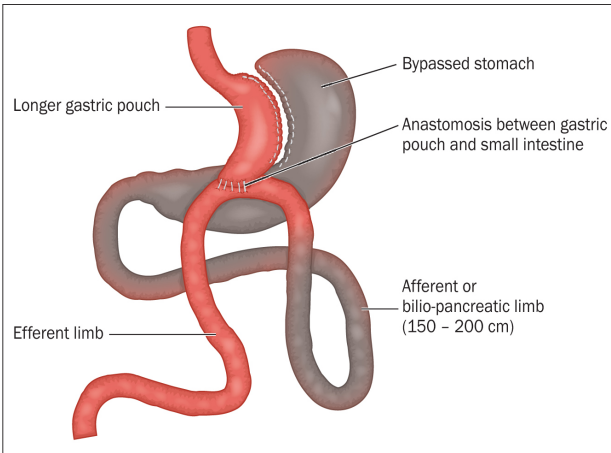


BRIEF COMMUNICATION



## Weight Regain After Bariatric Surgery—A Multicentre Study of 9617 Patients from Indian Bariatric Surgery Outcome Reporting Group

Sarfaraz J. Baig<sup>1</sup> · Pallawi Priya<sup>1</sup> · Kamal K. Mahawar<sup>2</sup> · Sumeet Shah<sup>3</sup> · for the Indian Bariatric Surgery Outcome Reporting (IBSOR) Group



### Abstract

**Background** There is little robust data on weight regain (WR) after bariatric surgery making it difficult to counsel patients regarding long-term outcomes of different bariatric procedures. The purpose of this study was to see WR in medium and long term after SG, RYGB, and OAGB in Indian population.

**Methods** In a multicentre study, data on preoperative and postoperative weights over 5 years were collected. Multiple definitions were applied to find the proportion of patients with significant WR increase of 25% of lost weight from nadir (definition 1), weight gain of > 10 kg from nadir (definition 2), and BMI gain of > 5 kg/m<sup>2</sup> from nadir (definition 3). The proportion of those with significant WR was compared across sub-groups.

**Results** A total of 9617 patients were included. Median WR at 5 years was 14.1% of lost weight, 1.92 kg/m<sup>2</sup>, and 5 kg. Significant WR using definition 1 was 35.1%, 14.6%, and 3% after sleeve gastrectomy (SG), Roux-en-Y gastric bypass (RYGB), and mini-one anastomosis gastric bypass (OAGB) respectively. Severe albumin deficiency was highest in OAGB (5.9%) patients followed by SG (2.9%) and RYGB (2.2%) at 5 years ( $p = 0.023$ ). Haemoglobin levels < 10 g/dL were seen in 8.2%, 9.0%, and 13.9% of SG, RYGB, and OAGB patients respectively ( $p = 0.041$ ).

**Conclusions** In the first comparative study of WR, OAGB had lesser WR in comparison to SG and RYGB but had the most impact on Hb and albumin levels in the long term. Definition selection for reporting WR has a significant impact on the results. There is a need for standardising the reporting of WR in bariatric literature.

# Patients' experiences of weight regain after bariatric surgery

## METHODS

- Qualitative interview study
- 16 patients, 4 men and 12 women with weight regain after gastric bypass.
- Thematic analysis

*"I think it has been very shameful. Because it's like "I've undergone this, I've undergone this really, and really extreme action and I'm still not succeeding. It's crappy, to be honest."*

*"...that barrier disappeared. The very effect of surgery gradually disappeared and much faster than expected."*

## RESULTS

Loss of control and focus

Reducing the burden of weight management

Challenges in everyday life

Social support

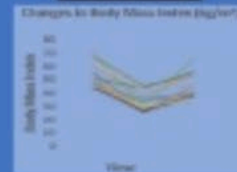
Changes in appetite

Self-care

Physical and mental health

Lasting benefits from surgery

Emotional distress



## CONCLUSIONS

### Experience of weight regain

- Unexpected and difficult
- Induced shame and hopelessness
- Contributing factors:





# MANAGEMENT



## IMPORTANCE OF THE MULTIDISCIPLINARY TEAM





# MANAGEMENT

## Management

### Behavioral

Type and mode: What is the effectiveness of various types/modes of delivery of behavioral therapies (e.g., group vs individualized, face to face vs remote)?

Timing: When should behavioral therapy be introduced to effectively prevent or treat WR/IWL (e.g., preventive at weight plateau vs management after WR)?

### Pharmacological

Type and dose: What is the effectiveness of various medication to manage WR/IWL (e.g., type of medication, single vs combination, effective dose)?

Timing: What is the optimal time for medication/s to be introduced (e.g., preventive at weight plateau vs management after WR)?

### Surgical

Revision type: What is the suitable type of revisional surgery for WR/IWL (e.g., better WL outcomes and lower complications)?

---

*WL* weight loss, *WR* weight regain, *IWL* insufficient weight loss, *WL* weight loss, *EWL%* excess weight loss percentage, *T2DM* type 2 diabetes, *HTN* hypertension, *OSA* obstructive sleep apnea, *GLP-1* glucagon-like protein-1, *PPY* peptide YY, *PA* physical activity, *QoL* quality of life, *pre-op* preoperative, *BS* bariatric surgery, *PA* physical activity



Obesity Surgery (2022) 32:2035–2046  
<https://doi.org/10.1007/s11695-022-06020-0>



## REVIEW



### Treatment Options for Weight Regain or Insufficient Weight Loss After Sleeve Gastrectomy: a Systematic Review and Meta-analysis

Rutger J. Franken<sup>1</sup> · Nina R. Sluiter<sup>1</sup> · Josephine Franken<sup>1</sup> · Ralph de Vries<sup>2</sup> · Dennis Souverein<sup>3</sup> · Vitor E. A. Gerdes<sup>4,5</sup> · Maurits de Brauw<sup>1</sup>

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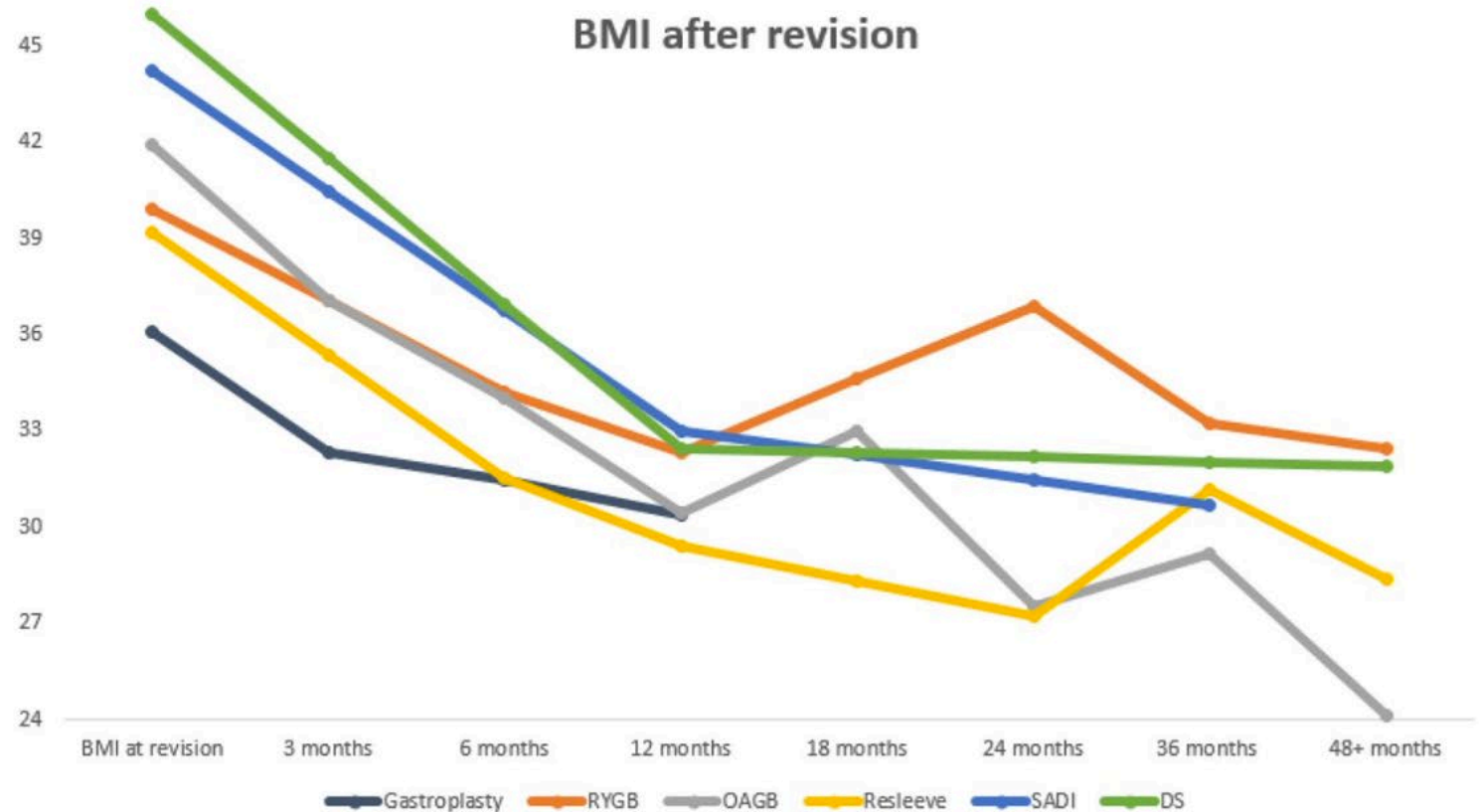


- GASTROPLASTY
- RE-SLEEVE
- ROUS AND Y GASTRIC BYPASS
- ONE ANASTOMOSIS GASTRIC BYPASS
- DUODENAL SWITCH
- SINGLE-ANASTOMOSIS DUODENO-ILEAL BYPASS



# MANAGEMENT

**Fig. 3** Effect of different revision techniques on BMI during follow-up



Franken RJ, Sluiter NR, Franken J, de Vries R, Souverein D, Gerdes VEA, de Brauw M. Treatment Options for Weight Regain or Insufficient Weight Loss After Sleeve Gastrectomy: a Systematic Review and Meta-analysis. *Obes Surg.* 2022 Jun;32(6):2035-2046. doi: 10.1007/s11695-022-06020-0. Epub 2022 Apr 2. PMID: 35366738.





Updates in Surgery (2021) 73:663–678  
<https://doi.org/10.1007/s13304-020-00961-w>

ORIGINAL ARTICLE



## Revision procedures after initial Roux-en-Y gastric bypass, treatment of weight regain: a systematic review and meta-analysis

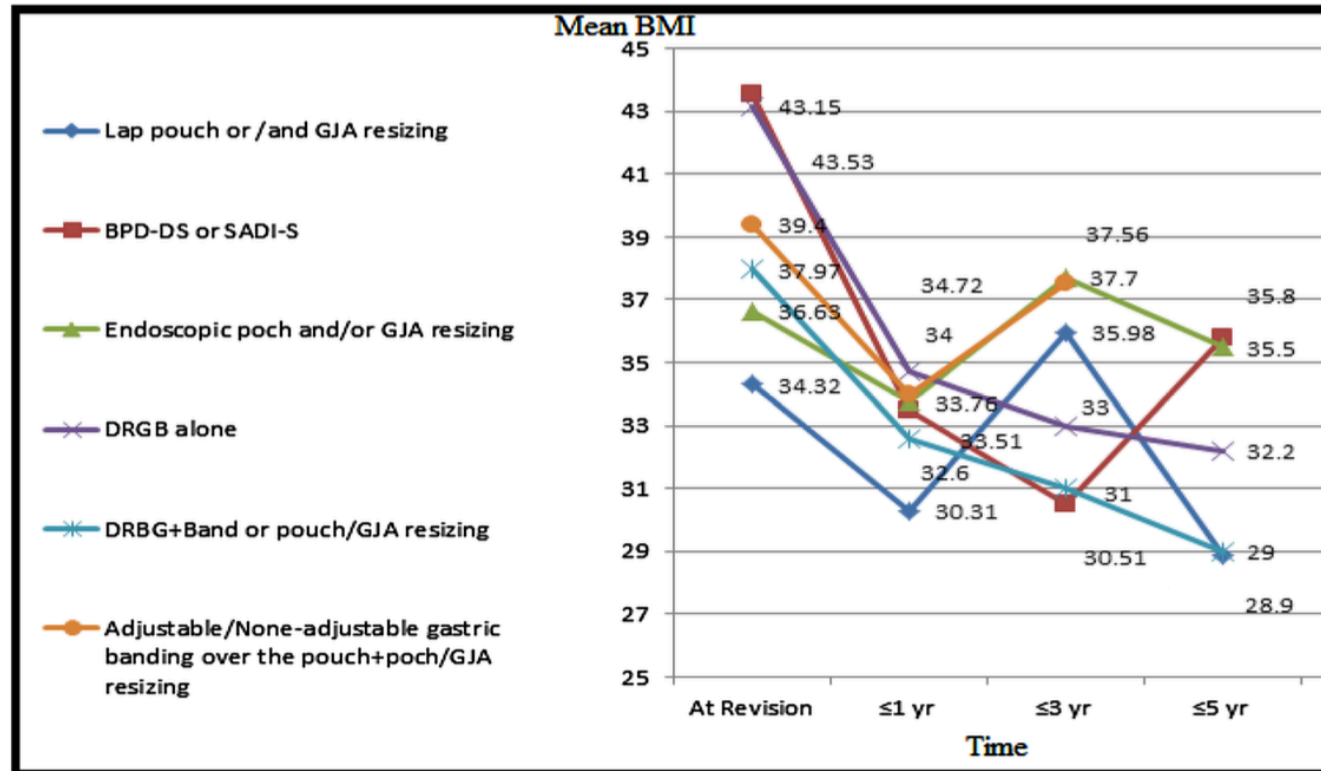
Mohammad Kermansaravi<sup>1</sup> · Amir Hossein Davarpanah Jazi<sup>2</sup> · Shahab Shahabi Shahmiri<sup>2</sup> · Foolad Eghbali<sup>1</sup> · Rohollah Valizadeh<sup>3</sup> · Masoud Rezvani<sup>4</sup>

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The selected studies were categorized into six groups of revision procedures, including laparoscopic pouch resizing and/or revision of gastrojejunal anastomosis (GJA), adjustable or non-adjustable gastric band over pouch ± pouch/GJA resizing, endoscopic revision of gastric GJA ± pouch, distal Roux-en-Y gastric bypass (DRGB), biliopancreatic diversion with duodenal switch (BPD-DS) or single anastomosis duodeno-ileal bypass with gastric sleeve (SADI-S), DRGB + Band or pouch/GJA resizing.



# MANAGEMENT



**Fig. 6** Effect of different revision surgeries on BMI. *BMI* body mass index, *BPD-DS* biliopancreatic diversion with duodenal switch, *Lap* laparoscopic, *SADI-S* single anastomosis duodeno-ileal anastomosis

with sleeve gastrectomy, *GJA* gastro-jejunal anastomosis, *DRGY* distal Roux-en-Y gastric bypass



# MANAGEMENT



## ALTERNATIVE APPROACH



medicina



Review

### Transoral Outlet Reduction (TORe) for the Regain and Dumping Syndrome after Roux

Landry Hakiza <sup>1,2</sup>, Adrian Sartoretto <sup>3</sup>, Konstantin Burgmann <sup>1,2</sup>, Vivek K Frank Seibold <sup>1,2</sup> and Dominic Staudenmann <sup>1,2,\*</sup>

Obesity Surgery (2022) 32:3194–3204  
https://doi.org/10.1007/s11695-022-06174-x

NEW CONCEPT

### Single Anastomosis Jejun-ileal (SAJI): a New Model of Malabsorp Revisional Procedure for Insufficient Weight Loss or Weight Regain After Roux-en-Y Gastric Bypass

Maurizio De Luca <sup>1</sup>, Giacomo Piatto <sup>2</sup>, Alberto Sartori <sup>2</sup>, Monica Zese <sup>3</sup>, Cesare Lunardi <sup>2</sup>, Simone Cristiano Giardiello <sup>5</sup>, Paolo Gentileschi <sup>6</sup>, Jacques Himpens <sup>7</sup>

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Received: 1 May 2019 | Accepted: 14 May 2019

DOI: 10.1111/cob.12323

ORIGINAL RESEARCH ARTICLE

clinicalobesity WILEY

### Liraglutide 3.0 mg for the management of insufficient weight loss or excessive weight regain post-bariatric surgery

> Surg Technol Int. 2022 Nov 22;41:sti41/1647. doi: 10.52198/22.STI.41.GS1647.  
Online ahead of print.

### Surgical Technique for Weight Regain after Roux-en-Y Gastric Bypass: Pouch-resizing and the MiniMIZER® Gastric Ring

Larissa Nixdorf <sup>1</sup>, Daniel M Felsenreich <sup>1</sup>, Christoph Bichler <sup>1</sup>, Julia Jedamzik <sup>1</sup>, Jakob Eichelter <sup>1</sup>, Lisa Gensthaler <sup>1</sup>, Magdalena Mairinger <sup>1</sup>, Paula Richwien <sup>1</sup>, Mahir Gachabayov <sup>2</sup>, Felix B Langer <sup>1</sup>, Gerhard Prager <sup>1</sup>

Affiliations + expand

PMID: 36413791 DOI: 10.52198/22.STI.41.GS1647



# TIPS AND TRICKS

- 1.Importance of the multidisciplinary team**
- 2.Consideration of the preoperative predictors**
- 3.Adequate primary and revisional surgical technique**
- 4.Adherence to Follow-up**





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SPRING MEETING

18 - 19 MAGGIO 2023

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Strategie di integrazione  
in Chirurgia Bariatrica

Presidente del Congresso  
**ANTONIO BRAUN**

**Grazie per  
l'attenzione**