When to revise? This is the Question

What is the Scientific Current Evidence on Revisional MBS based on the IFSO/ASMBS Update?

Maurizio De Luca

Director Department of Surgery Rovigo,Trecenta and Adria Hospitals– Italy
President Elect Italian Society of Bariatric Surgery and Metabolic Disorders (SICOB)
Treasurer International Federation for Surgery of Obesity and Metabolic Disorders European Chapter (IFSO EC)
Co-chair Scientific Committee International Federation for Surgery of Obesity and Metabolic Disorders (IFSO EC)
Scientific Committee International Federation for Surgery of Obesity and Metabolic Disorders (IFSO)
Scientific Commitee Italian Society of Obesity (SIO)
Scientific Commitee The Upper Gastrointestinal Surgeons (TUGS)

3rd of September, 2024

Prof. Maurizio De Luca, *Director Department of Surgery Rovigo,Trecenta and Adria Hospitals– Italy*

I have no potential conflict of interest to report

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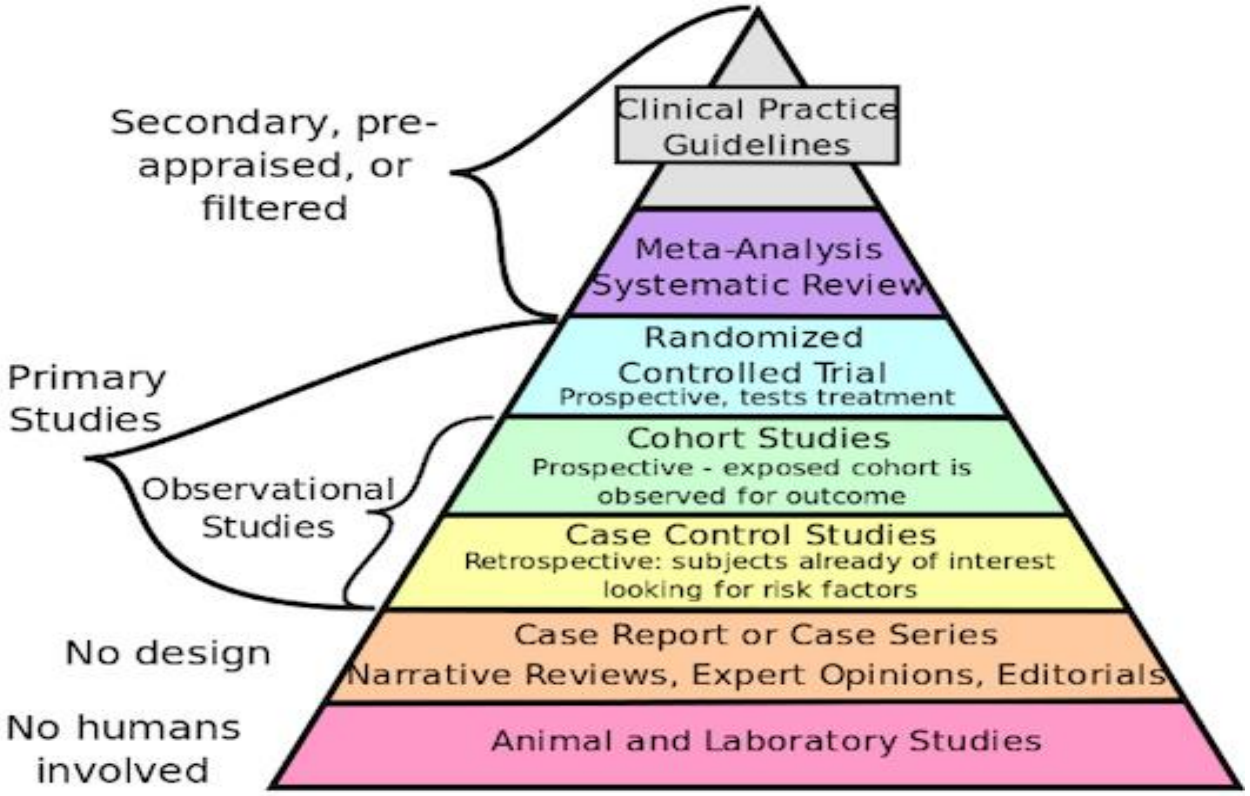


Centre for Evidence-Based Medicine. Study Designs. 2016
https://www.cebm. net/2014/04/study-designs/.

AGREE (Appraisal of Guidelines for Research and Evaluation) - II

USER'S MANUAL page 7

DOMAINS		No. of Items
1	Scope & Purpose	3
2	Stakeholder Involvement	3
3	Rigour of Development	8
4	Clarity & Presentation	4
5	Applicability	3
6	Editorial Independence	2

DOMAIN 3: RIGOUR OF DEVELOPMENT

Systematic methods were used to search for evidence.

There is an explicit link between the recommendations and the supporting evidence.

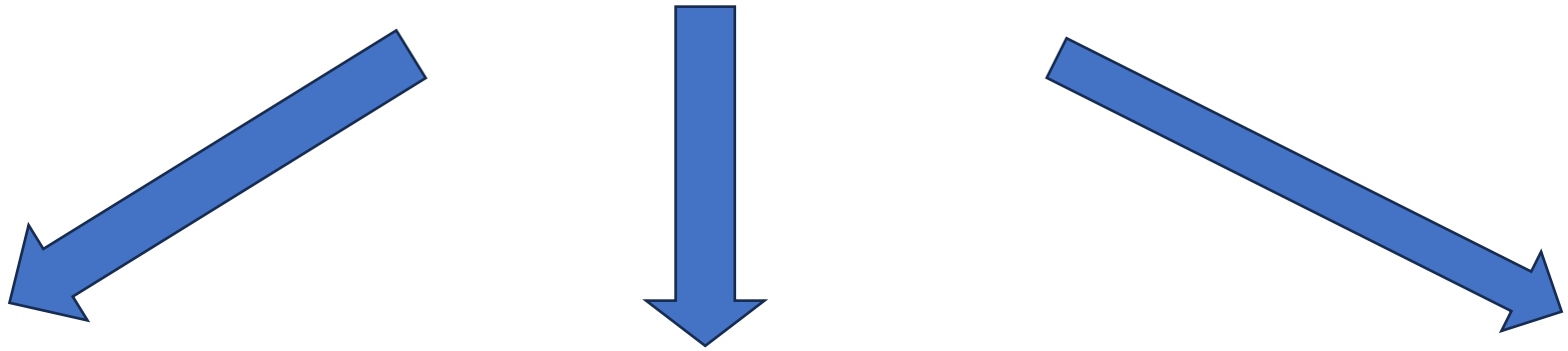
The guideline has been externally reviewed by experts prior to its publication.

A procedure for **updating** the guideline is provided.

Prof. Maurizio De Luca, *Director Department of Surgery Rovigo,Trecenta and Adria Hospitals– Italy*

DEFINITIONS

REVISIONAL MBS



CONVERSION

changing the primary surgery to a different type of MBS

CORRECTIVE

repairing a primary MBS

REVERSAL

returning to original anatomy

Brethauer SA, Kothari S, Sudan R, et al. Systematic review on reoperative bariatric surgery. SOARD. 2014; 10:952–972.

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ORIGINAL CONTRIBUTIONS

Scientific Evidence for the Updated Guidelines on Indications for Metabolic and Bariatric Surgery (IFSO/ASMBS)

Maurizio De Luca[1] · Scott Shikora[2] · Dan Eisenberg[3] · Luigi Angrisani[4] · Chetan Parmar[5] · Aayed Alqahtani[6] · Ali Aminian[7] · Edo Aarts[8] · Wendy Brown[9] · Ricardo V. Cohen[10] · Nicola Di Lorenzo[11] · Silvia L. Faria[12] · Kasey P. S. Goodpaster[13] · Ashraf Haddad[14] · Miguel Herrera[15] · Raul Rosenthal[16] · Jacques Himpens[17] · Angelo Iossa[18] · Mohammad Kermansaravi[19] · Lilian Kow[20] · Marina Kurian[21] · Sonja Chiappetta[22] · Teresa LaMasters[23] · Kamal Mahawar[24] · Giovanni Merola[25] · Abdelrahman Nimeri[2] · Mary O'Kane[26] · Pavlos Papasavas[27] · Giacomo Piatto[28] · Jaime Ponce[29] · Gerhard Prager[30] · Janey S. A. Pratt[3] · Ann M. Rogers[31] · Paulina Salminen[32] · Kimberley E. Steele[33] · Michel Suter[34] · Salvatore Tolone[35] · Antonio Vitiello[36] · Marco Zappa[37] · Shanu N. Kothari[38]

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2022: in light of significant advances in the understanding of the disease of obesity and in MBS, the **leadership of the ASMBS and IFSO have convened to produce this joint statement.**

Obesity Surgery
https://doi.org/10.1007/s11695-022-06332-1

ORIGINAL CONTRIBUTIONS

2022 American Society of Metabolic and Bariatric Surgery (ASMBS) and International Federation for the Surgery of Obesity and Metabolic Disorders (IFSO) Indications for Metabolic and Bariatric Surgery

Dan Eisenberg[1] · Scott A. Shikora[2] · Edo Aarts[3] · Ali Aminian[4] · Luigi Angrisani[5] · Ricardo V. Cohen[6] · Maurizio de Luca[7] · Silvia L. Faria[8] · Kasey P.S. Goodpaster[4] · Ashraf Haddad[9] · Jacques M. Himpens[10] · Lilian Kow[11] · Marina Kurian[12] · Ken Loi[13] · Kamal Mahawar[14] · Abdelrahman Nimeri[15] · Mary O'Kane[16] · Pavlos K. Papasavas[17] · Jaime Ponce[18] · Janey S. A. Pratt[1,19] · Ann M. Rogers[20] · Kimberley E. Steele[21] · Michel Suter[22,23] · Shanu N. Kothari[24]

Major updates to 1991 National Institutes of Health guidelines for bariatric surgery

ELSEVIER

Surgery for Obesity and Related Diseases 18 (2022) 1345–1356

SURGERY FOR OBESITY AND RELATED DISEASES

Original article

2022 American Society for Metabolic and Bariatric Surgery (ASMBS) and International Federation for the Surgery of Obesity and Metabolic Disorders (IFSO): Indications for Metabolic and Bariatric Surgery

Dan Eisenberg, M.D.[a,*], Scott A. Shikora, M.D.[b], Edo Aarts, M.D., Ph.D.[c], Ali Aminian, M.D.[d], Luigi Angrisani, M.D.[e], Ricardo V. Cohen, M.D., Ph.D.[f], Maurizio De Luca, M.D.[g], Silvia L. Faria, Ph.D.[h], Kasey P. S. Goodpaster, Ph.D.[d], Ashraf Haddad, M.D.[i], Jacques M. Himpens, M.D., Ph.D.[j], Lilian Kow, B.M.B.S., Ph.D.[k], Marina Kurian, M.D.[l], Ken Loi, M.B.B.S., B.Sc. (Med)[m], Kamal Mahawar, M.B.B.S., M.Sc.[n], Abdelrahman Nimeri, M.D., M.B.B.Ch.[o], Mary O'Kane, M.Sc., R.D.[p], Pavlos K. Papasavas, M.D.[q], Jaime Ponce, M.D.[r], Janey S. A. Pratt, M.D.[a,s], Ann M. Rogers, M.D.[t], Kimberley E. Steele, M.D., Ph.D.[u], Michel Suter, M.D.[v,w], Shanu N. Kothari, M.D.[x]

Methods

- In order to *methodologically support* the previously published ASMBS/IFSO 2022 guidelines, **two international teams** of researchers were created.

- **One team** of seven researcher (MDL, GM, AI, GP, ST, SC, AV) *performed systematic review of high-level evidence for different items, according to the PRISMA*
- **13 PRISMAs were carried out (for 13 items) with 12 different systematic reviews**
  - PRISMA on item 2 *(BMI 35-40 kg/m2 without obesity-associated medical problems*) produced no studies
  - Systematic review on item 6 *(MBS prior to joint arthroplasty)* produced controversial results

TWO INDEPENDENT RESEARCHERS FOR EVERY ITEM ANALYZED EACH ARTICLE

IN CASE OF DISAGREEMENT A THIRD RESEARCHER (MDL) WAS CONSULTED

Level of Evidence Supporting the ASMBS/IFSO 2022 Guidelines

- **The second team** (MDL, MK, ST) was tasked to resolve any issues that were not answered by the PRISMAs (item 2) and systematic reviews (item 6).
- **Delphi survey** was constructed and consisted of two consecutive rounds.
- 49 recognized MBS experts from 18 different countries participated in this Delphi survey

First Name	Last Name	Country
Edo	Aaarts	Netherland
Ahmad	Aly	Australia
Ali	Aminian	USA
Luigi	Angrisani	Italy
Ahmad Abdallah	Bashir	Jordan
Estuardo	Behrens	Guatemala
Helmuth Thorlakur	Billy	USA
Sonja	Chiappetta	Italy
Jean-Marc	Chevallier	France
Ricardo Vitor	Cohen	Brazil
Maurizio	De Luca	Italy
Pierre Y	Garneau	Canada
Khaled Aly	Gawdat	Egypt
Ashraf	Haddad	Jordan
Jacques M	Himpens	Belgium
Farah Anwari	Husain	USA
Angelo	Iossa	Italy
Mohammad	Kermansaravi	Iran
Shanu Nikhil	Kothari	USA
Lilian	Kow	Australia
Marina	Kurian	USA
Teresa LeAnn	LaMasters	USA
Silvia	Leite Faria	Brazil
Ken Wing King	Loi	Australia
Kamal K	Mahawar	UK
Corrigan Lee	McBride	USA
Giovanni	Merola	Italy
Monali	Misra	USA
Abdelrahman Ali	Nimeri	USA
Joe	Northup	USA
Mary	O'Kane	UK
Pavlos	Papasavas	USA
Richard M	Peterson	USA
Giacomo	Piatto	Italy
Luis	Poggi	Peru
Jaime	Ponce	USA
Gerhard	Prager	Austria
Janey Sue Andrews	Pratt	USA
Almino Cardoso	Ramos	Brazil
Ann M	Rogers	USA
Paulina	Salminen	Finland
Nathaniel James	Sann	USA
John David	Scott	USA
Scott Alan	Shikora	USA
Michel	Suter	Switzerland
Salvatore	Tolone	Italy
Antonio	Vitiello	Italy
Cunchuan	Wang	China

Delphi survey

- 9 statements regarding 2 items were analysed:
  - *BMI 35-40 kg/m2 without obesity-associated medical problems and (item2)*
  - *MBS prior to joint arthroplasty (item6)*
- **Consensus was reached when the agreement/disagreement rate was equal to or greater than 70%**
- An online platform (Survey Monkey) was used.
- 7 statements reached consensus in the first round and 2 statements reached consensus in the second round of voting

Level of Evidence Supporting the ASMBS/IFSO 2022 Guidelines

GRADE OF RECOMMENDATION	LEVEL OF EVIDENCE	TYPE OF STUDY
A	1a	Systematic review of [homogeneous] randomized controlled trials
A	1b	Individual randomized controlled trials [with narrow confidence intervals]
B	2a	Systematic review of [homogeneous] cohort studies of "exposed" and "unexposed" subjects
B	2b	Individual cohort study / low-quality randomized control studies
B	3a	Systematic review of [homogeneous] case-control studies
B	3b	Individual case-control studies
C	4	Case series, low-quality cohort or case-control studies
D	5	Expert opinions based on non-systematic reviews of results or mechanistic studies

Evidence-Based Medicine, Stony Brook University Libraries, 14 March 2023

Level of Evidence Supporting the ASMBS/IFSO 2022 Guidelines

Recommendations

- **13 recommendations were expressed from the panel**
- 12 different systematic reviews from the 13 PRISMA were carried out.

  - PRISMA on item 2 (BMI 35-40 kg/m2 without obesity-associated medical problems) produced no studies.
  - Systematic review on item 6 (MBS prior to joint arthroplasty) produced controversial results

Criteria	PRISMA and DELPHI	Level of Evidence	Grade of Recommendation
MBS for BMI 30 - 34.9 kg/m²	PRISMA	2a	B
MBS for BMI 35-40 kg/m² without obesity-associated comorbidities	PRISMA Insufficient data DELPHI	5	D
BMI thresholds in the Asian population	PRISMA	2a	B
MBS in the lder population	PRISMA	2a	B
MBS for the pediatric and adolescents	PRISMA	1b	A
MBS prior to joint Arthroplasty	PRISMA Conflicting data DELPHI	2b	B
MBS and abdominal wall hernia repair	PRISMA	2b	B
MBS prior to organ transplantation	PRISMA	2b	B
MBS for BMI ≥ 60 kg/m²	PRISMA	2a	B
MBS in patients with liver cirrhosis	PRISMA	2b	B
MBS in patients with heart failure	PRISMA	2b	B
Multidisciplinary care	PRISMA	2c	B
Revisional surgery	PRISMA	2b	B

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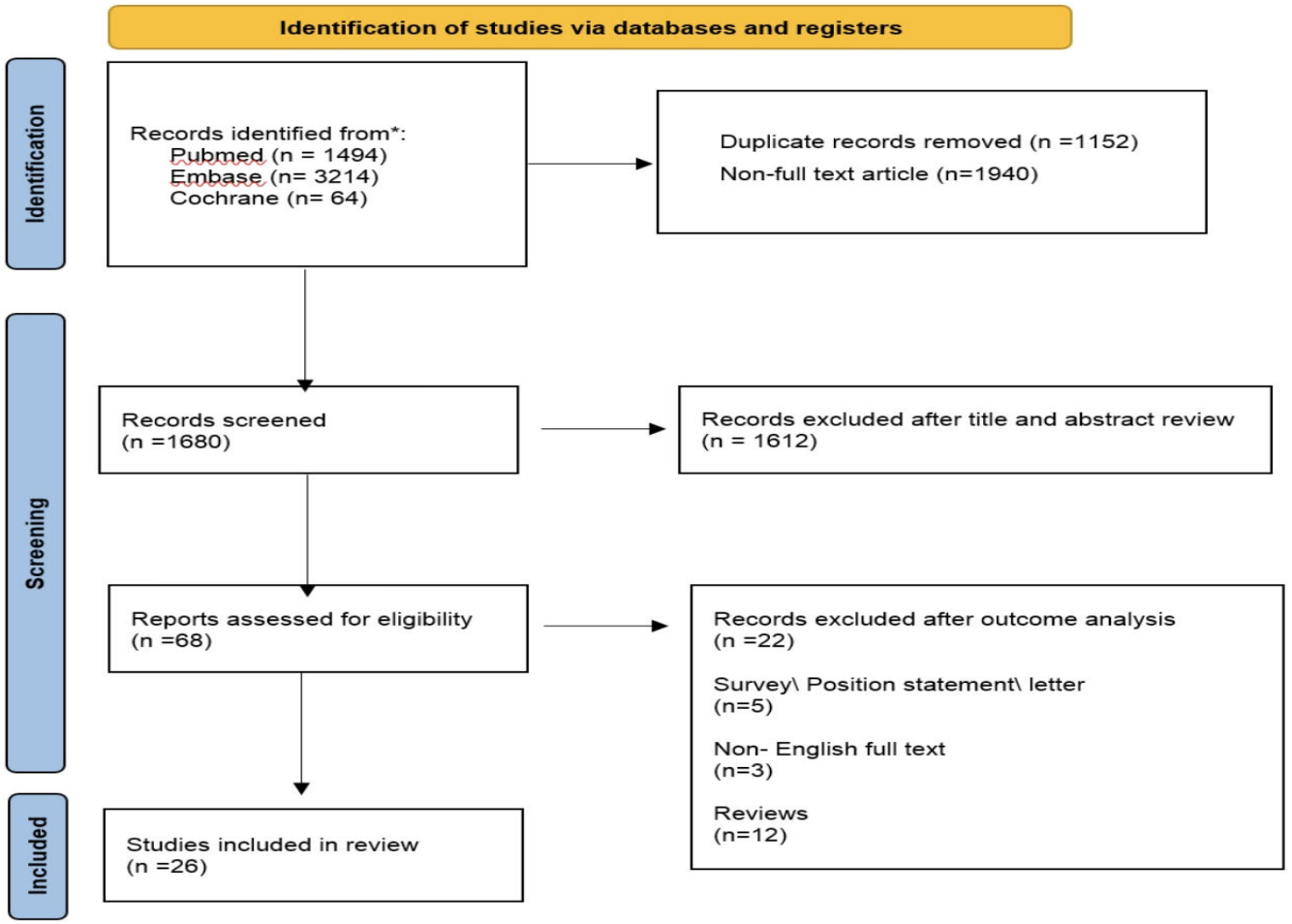
PRISMA Flow Diagram: Revisional MBS



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Check for updates

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Table 13 This is mandatory. Please provide

First author (year)	Study design	Quality assessment (NOS)	Number of patients	BMI	Reason for conversion/ revision	Conversion/ revision	Laparoscopic/ robotic/ open	Intervention	Operative time (min)	Length of stay (days)	Weight loss	Complication Clavien–Dindo 1–2	Complications Clavien–Dindo 3–4	Complications Clavien–Dindo 5 (surgical related mortality)	Nutritional complications	Follow-up (months)	Other outcomes
Vahibe (2023) [285]	Retrospective	Fair quality	53	Not available	Malnutrition	Revision	Laparoscopic	Different types	Not available	Not available	Not available	45.2%	Not available	3.8%	5.7%	24	Improvement of nutritional complications
Vanetta (2022) [286]	Retrospective	Good quality	20,387	39.5–47.2	Weight regain, GERD, complications	Conversion	Laparoscopic/ robotic	Different types (especially from AGB and SG)	103–196.9	1.3–2.9	Not available	3.8%	9%	0.2%	Not available	30 days	
Major (2022) [287]	Retrospective	Fair quality	799	48	Weight regain, complications	Conversion	Laparoscopic	Different types (especially from AGB and VGB to RYGB and OAGB)	Not available	3.5	33.4% WL; 14 Δ BMI	9.52%	4.76%	0%	4.76%	22.7	43% Remission from TD2M; 31% remission from hypertension
Xie (2022) [288]	Retrospective	Good quality	221	45.6	Weight regain, GERD, complications	Conversion	Laparoscopic/ robotic	Different types (especially from AGB and SG)	149.2	2	17.3% WL	7.7%	3.1%	0.4%	0.9%	24	
Hernandexz (2021) [289]	Retrospective	Fair quality	54	41.7	Weight regain, GERD, complications	Revision	Laparoscopic	Revisional RYGB, AGB, SG	Not available	4.1	Not available	Not available	0.9% early and 1.8% late	0%	Not available	Not available	

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Gero (2021) [290]	Retrospective	Good quality	3143	35.2	Weight regain, GERD, complications	Revision/ conversion	Laparoscopic	Different types	93	not available	17.7% WL	Not available	23.8%	0.06%	Not available	12	Secondary BS is safe, although postoperative morbidity exceeds the established benchmarks for primary BS
Dreifuss (2021) [291]	Retrospective	Good quality	76	45.7	Weight regain, GERD, complications	Revision/ conversion	Robotic	Different types (especially from AGB and SG to RYGB)	182	2.1	22.4% WL	Not available	3.9% early and 5.2% late	1%	Not available	24	
King (2020) [292]	Retrospective	Good quality	167	37–39.5	Complications, weight regain	Revision	laparoscopic/ robotic	Revisional RYGB, AGB, SG	Not available	5.2–5.8%	Not available	5.2–5.8%	1.9–5.2%	0%	Not available	30 days	Comparable results between laparoscopic and robotic revisional surgery

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Cheema (2021) [293]	Retrospective	Fair quality	266	39.8–45	Weight regain, GERD, complications	Revision/ conversion	Laparoscopic	Revisional RYGB, conversion from AGB and SG	Not available	2	10–30% WL	Not available	2.6%	0%	Not available	24 months	Improvement of HbA1c and CV risk
El Chaar (2021) [294]	Retrospective	Good quality	440	42.4	Not available	Revision	Laparoscopic/ robotic	Revisional RYGB, revisional SG	145.5	Not available	Not available	Not available	3%	0%	Not available	30 days	
Mora Oliver (2020) [295]	Retrospective	Fair quality	112	41.9	Weight regain	Conversion	Laparoscopic	Different types (especially from AGB, VBG, and SG to OAGB)	135.8	4.9	27.5% WL	3%	2.7%	0%	Not available	20.8	Improvement of TD2M and HTN
Keren (2019) [296]	Retrospective	Good quality	266	41.3	Weight regain (90%), complications	Revision/ conversion	Laparoscopic/ open	Different types (especially from AGB and SG)	Not available	3.2	30.5% WL	4.8%	2.4	2%	Not available	12	
Acevedo (2020) [297]	Retrospective	Good quality	2288	40.9	Not available	Revision/ conversion	Laparoscopic/ robotic	Revisional RYGB, revisional SG	125.4	2.2	Not available	Not available	3.2%	0.2%	Not available	30 days	

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First author (year)	Study design	Quality assessment (NOS)	Number of patients	BMI	Reason for conversion/ revision	Conversion/ revision	Laparoscopic/ robotic/ open	Intervention	Operative time (min)	Length of stay (days)	Weight loss	Complication Clavien–Dindo 1–2	Complications Clavien–Dindo 3–4	Complications Clavien–Dindo 5 (surgical related mortality)	Nutritional complications	Follow-up (months)	Other outcomes
Clapp (2019) [298]	Retrospective	Good quality	37,916	41.6	Not available	Revision/ conversion	Laparoscopic/ robotic	Revisional RYGB, conversion from AGB and SG	103–167	1.7-2.3	10 Δ BMI	Not available	Not available	0.1%	Not available	12	
Aleassa (2019) [299]	Retrospective	Fair quality	81	41.2–47.2	Weight regain, complications	Revision/ conversion	Laparoscopic	Revisional RYGB, conversion of VBG, AGB, and SG to RYGB	Not available	Not available	20.5% WL	Not available	Not available	Not available	Not available	22	23.1–35% Remission from TD2M
Qiu (2018) [300]	Retrospective	Good quality	84	38-42	Weight regain, complications	Revision/ conversion	Laparoscopic	Revisional RYGB, conversion of VBG, AGB, and SG to RYGB	133–175	2	7.7–30.2% WL	8.3%	6%	0%	Not available	12	
Gray (2018) [301]	Retrospective	Good quality	84	39–45	Weight regain, complications	Revision/ conversion	Laparoscopic/ robotic	Revisional RYGB, conversion from AGB and SG	177–238	3.7–5.8	Not available	Not available	5.9%	0%	Not available	12	

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Table 13 (continued)

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Souto (2018) [302]	Retrospective	Fair quality	67	36.9	Malnutrition, weight regain	Revision/ conversion	Laparoscopic	Revisional JIB, revisional BPD-DF	Not available	Not available	28.7–77% EWL	Not available	11.9%	11.9%	9.2%	Over 29 years	
Fulton (2017) [303]	Retrospective	Fair quality	117	44.7	Weight regain, malnutrition	Revision/ conversion	Laparoscopic/ open	Revisional RYGB, conversion from AGB and SG	168	4	61.2% EWL	Not available	10.8%	0%	Not available	12	
Daigle (2016) [304]	Retrospective	Fair quality	121	47.5	Weight regain	Revision/ conversion	Laparoscopic	Revisional RYGB, conversion from AGB, SG, and VSG	Not available	6	59.4% EWL	17%	3.3%	0%	Not available	40	Revisional bariatric surgery is capable of treating both inadequate weight loss and refractory metabolic disease
Shimizu (2013) [305]	Retrospective	Fair quality	154	44	Weight regain, complications	Revision/ conversion	Laparoscopic/ open	Different types	268–280	5.4–9.5	37.6% EWL	10.3%	12.9%	0.6%	Not available	12	

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Kuesters (2011) [306]	Retrospective	Fair quality	100	28–62	Weight regain, complications	Revision/ conversion	Laparoscopic/ open	Different types	Not available	Not available	56% EWL	Not available	Not available	0%	Not available	12	
Fronza (2010) [307]	Retrospective	Fair quality	63	38–41	weight regain, malnutrition	Revision/ conversion	Laparoscopic/ open	Different types	Not available	Not available	>50% EWL	19%	11%	0%	Not available	12	
Spyropoulos (2010) [308]	Retrospective	Fair quality	56	46.9	Weight regain, malnutrition	Revision/ conversion	Open	Revisional RYGB, revisional BPD-DS	210	16.5	68.9% EWL	20.8%	13.1%	0%	3.6%	102	
Lim (2009) [309]	Retrospective	Fair quality	75	46.3	Weight regain, malnutrition	Revision/ conversion	Laparoscopic/ open	Revisional RYGB, conversion from AGB and SG	152–231	2–5.8	47.8% EWL	17.3%	4.0%	0%	Not available	6	
Nesset (2009) [310]	Retrospective	Fair quality	218	42	Weight regain, complication, malnutrition	Revision/ conversion	Open/ laparoscopic	Revisional RYGB, revisional JIB, revisional VBG	298	9	13 Δ BMI	Not available	26%	0.9%	Not available	84	

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Table 14 Grade of recommendation and level of evidence

Grade of recommendation	Level of evidence	Type of study
A	1a	Systematic review of [homogeneous] randomized controlled trials
A	1b	Individual randomized controlled trials [with narrow confidence intervals]
B	2a	Systematic review of [homogeneous] cohort studies of "exposed" and "unexposed" subjects
B	2b	Individual cohort study/low-quality randomized control studies
B	3a	Systematic review of [homogeneous] case–control studies
B	3b	Individual case–control studies
C	4	Case series, low-quality cohort, or case–control studies
D	5	Expert opinions based on non-systematic reviews of results or mechanistic studies

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Revisional Surgery

Level of Evidence 2b

Grade of Recommendation B

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A	1a	Systematic review of [homogeneous] randomized controlled trials
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B	2b	Individual cohort study/low-quality randomized control studies
B	3a	Systematic review of [homogeneous] case–control studies
B	3b	Individual case–control studies
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Level of Evidence 2c
Grade of recommendation B

Revisional Surgery

- **26 studies** selected. **All retrospective studies with a good/fair quality**
- Conversion from Adjustable Gastric Banding(AGB) and Sleeve Gastrectomy(SG) and revision of Roux-en-Y Gastric Bypass (RYGB) and One-Anastomosis Gastric Bypass(OAGB) reported by most recent literature.
- Revisional MBS is currently performed both laparoscopically and robotically, with a **growing trend toward a robotic approach**.
- **Reduced operative time and length of stay (LOS)** of revisional surgery with **time and experience.**

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Revisional Surgery

Level of Evidence 2b

Grade of Recommendation B

- **Additional weight loss** reached in all revisional interventions
- **Clavien–Dindo complications 3–4** range from **0.9 to 26% (one study).**
- **Mortality lower than 1% for conversions from restrictive procedures**, and **up to 11.9% after revisional stapling procedures (one study).**
- Revisional surgery shown to induce **further remission from Type 2 Diabetes Mellitus (T2DM) and Hypertension (HTN)**

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RECOMMENDATION
Indications for Revisional Surgery after MBS

- Indications may vary among patients

- **Indications include:**

1. **Insufficient weight loss**
2. **Weight regain**
3. **Insufficient remission of comorbidities**
4. **Management of complications (e.g., gastroesophageal reflux)**

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Table 15 Summary of recommendations with their grade and level of evidence

Criteria	PRISMA and DELPHI	Appendix/ Table	Level of evidence	Grade of recommendation	Recommendation
Revisional surgery	PRISMA	13	2b	B	Revisional MBS induces satisfactory metabolic outcomes with acceptable rates of complications and mortality

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RECOMMENDATION

- Revisional MBS may be associated with higher rates of perioperative complications
- Satisfactory metabolic outcomes with acceptable complications and mortality rates

Is MBS clinical practice currently driven by evidence or opinion?

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IFSO European Chapter 2025

15-17 May 2025, Venice Italy

President of the Congress:
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Thank you for your attention!