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COMPARATIVE REVIEW OF BARIATRIC SURGERY TECHNIQUES: AN IN-DEPTH ANALYSIS

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ABSTRACT:

Background: Bariatric surgery is a widely accepted treatment for morbid obesity, yet there is ongoing debate regarding the efficacy and safety of various surgical procedures. This systematic review aims to evaluate and compare the effectiveness of different bariatric surgery techniques to provide evidence-based clinical guidelines.

Methods: A systematic search of PubMed, Cochrane Library, and Embase databases was conducted. Studies were selected based on predefined inclusion criteria, focusing on randomized controlled trials (RCTs), cohort studies, and case-control comparisons of different bariatric surgical techniques, including Roux-en-Y gastric bypass (RYGB), sleeve gastrectomy (SG), adjustable gastric banding (AGB), and biliopancreatic diversion with duodenal switch (BPD/DS). Outcomes measured included weight loss, resolution of comorbidities, postoperative complications, and quality of life.

Results: A total of [number] studies involving [number of patients] were included. RYGB and SG were found to produce the most significant weight loss and resolution of obesity-related comorbidities compared to AGB. However, RYGB was associated with significantly more nutrient deficiencies than SG, while long-term complications were less frequent among SG patients. BPD/DS resulted in substantial weight loss but also had elevated rates of severe complications. Quality of life improvements were generally high across all procedures, though some differences were noted between the techniques.

Conclusion: This systematic review highlights the advantages and disadvantages of each bariatric surgery technique. While all procedures result in significant weight loss and improvement in comorbidities, the complication profiles and nutritional consequences vary, particularly between RYGB and SG. BPD/DS offers the most substantial weight loss but carries higher risks. These findings support the development of personalized treatment models based on individual patient characteristics, comorbidity profiles, and risk tolerance. Further high-quality studies are necessary to confirm these findings and refine clinical practice guidelines.

KEYWORDS: Bariatric Surgery, Comparative Analysis, Systematic Review, Roux-en-Y Gastric Bypass (RYGB), Sleeve Gastrectomy (SG), Adjustable Gastric Banding (AGB), Biliopancreatic Diversion with Duodenal Switch (BPD/DS), Weight Loss, Obesity Treatment.

INTRODUCTION & BACKGROUND:

Obesity is a major problem for public health and the threat of many diseases to both individual health as well as healthcare systems. Bariatric surgery is a critical intervention for the treatment of severe obesity as traditional methods, which consist mainly life lifestyle modification and pharmacotherapy measures tend to fail in attaining sustained weight reduction. Rodriguez et al, suggest that among the variety of bariatric surgical interventions available such as Roux-en-Y gastric bypass (RYGB), sleeve gastrectomy (SG), adjustable gastric banding (AGB) and biliopancreatic diversion with duodenal switch BPD/DS there still exist a continuous need for evidence comparing these procedures [1].

Approach: The current article is a systematic review summarizing key aspects of 45 publications which reflected the topic 'bariatric surgery', and provides comparative analysis related to bariatric surgeries namely [2]LSG, LGBP, VGB, minute gastric banding (MGB). The primary measures evaluated are major weight loss efficacy, resolution of obesity-related comorbidities (e.g., DM2 and hypertension), incidence of postoperative complications as well as improvement in quality of life. Although there have been improvements in surgical techniques and perioperative care, outcomes continue to vary highlighting the definitive value of a sophisticated analysis to aid clinical decision making [3].

In the past, there has been mixed evidence of which techniques are more effective than others (2)-some suggest one method performs better but this probably represents a small part of the available methods across most studies. The goal of this review is to reconcile these inconsistencies with recent data together and provide a comprehensive evaluation of the technical nuances behind each surgical technique [4, 5].

This review aims to provide more simple and detailed guidance to healthcare providers about the performances of each bariatric procedure compared with others so that they can have better clarity on which intervention may be adopted for their patients depending upon particular clinical contexts. This analysis reported in this study will build the evidence base for bariatric surgery, and provide support around improved patient outcomes and choices whilst guiding to areas of future research and development [6].

Literature Review

Bariatric surgery has come of age over the last couple of decades and multiple procedures be effective in controlling morbid obesity. These are Roux-en-Y gastric bypass (RYGB), sleeve gastrectomy SG), adjustable gastric banding(A GB) as well and biliopancreatic diversion with duodenal switch BPD/DS). Each of these methods uses a different mechanism - some rely on weight loss, others work through metabolic effects and the latter primarily target long-term outcomes. Between 1995 and the year before PRBS in this study, approximately >85% of sensitive women with severe obesity received gastroplasty or gastric bypass [7, 8]. The field has evolved tremendously and there are many different types of surgical techniques available to patients who may offer various results including weight loss, resolution of comorbidities and safety. A review of the current literature was performed to examine the evidence for RYGB, SG, adjustable gastric

banding (AGB) and BPD/DS in bariatric surgery focusing on comparative effectiveness and safety [9, 10].

One such procedure is RYGB which has had extensive amount research. This restricts the amount of food and nutrients the body can absorb resulting in weight loss by both restrictive/ malabsorptive means. Systematic reviews have shown that RYGB causes significant and durable weight loss, with mean excess weight losses (EWLs) of 60-75% over two years. It is also a powerful tool for resolving comorbidities, which are type 2 diabetes (T2D), essential hypertension and obstructive sleep apnea OSA (Schauer et al., 2017). Nonetheless, it is accompanied by several potential complications including nutritional deficiencies, dumping syndrome and gastrointestinal disease (Levinson et al., 2019). Abstract Background Roux-en-Y gastric bypass (RYGB) is one of the most common bariatric procedures and carries greater effectiveness in weight reduction and overall comorbidity resolution [11, 12]. Weight loss results were consistent throughout different studies, with patients reaching a mean excess weight loss (EWL) of 60-80% one to two years after surgery according to the literature (Wolfe et al.,2021; Buchwald et al., Trade). Another known benefit of RYGB is diabetes resolution with rates from 50 to 80%. Nonetheless, it carries a risk of adverse effects with complications such as nutritional deficiencies, resulting in gastrointestinal obstruction and dumping syndrome [13].

A partial gastrectomy is when about 80% of the stomach gets resected, resulting in a sleeve-like pouch (5). It is an effective and simple-to-use method which has attracted a lot of attention. Literature has documented an EWL of 50-70% at one year following RYGB (Koh et al., 2021). OBESITY-RELATED COMORBIDITIES Patients undergoing SG showed more reduction of type 2 diabetes and hypertension in comparison to gastric acid: Sánchez-Santos, R. J. et al. In contrast, SG has a higher risk of gastroesophageal reflux disease (GERD) and possible long-term nutritional deficiencies. The reason behind the popularity of SG is its simple nature and efficient results. It is the type of surgery that's usually done as a last resort for people who are obese. ictimToLowerSleeve[14] Gastrectomy involves removing the large part of your stomach and forming it into a narrow sleeve(ridged tube structure). SG is generally associated with substantial weight loss, and %EWL is around 50-70% (Brethauer et al., 2020). In addition, SG has been demonstrated to ameliorate or resolve obesity-related comorbidities such as hypertension and sleep apnea [6]. SG is generally less invasive when compared to RYGB but the SG risks are gastroesophageal reflux disease (GERD) and weight potential regain (Klein et al. 2022).

AGB consists of putting a flexible band around the top part of your stomach to create a small pouch. Given that this technique is less invasive than RYGB and SG, it provides greater restriction adjustment. AGB has however long been criticized for a lower weight loss rate and increased risks of complications compared to VB, including band slippage, erosion or port infections. AGB was associated with a mean EWL of 40-50% at three years and an increased risk for %ewl regains compared to both RYGB and SG (O'Brien et al., 2019). Moreover, AGB may generate compliance problems and recurring adjustments (Mingrone et al., 2020). AGB is a procedure that involves placing an inflatable band around the upper portion of the stomach to restrict food intake [15, 16]. This is considered to produce slower weight loss compared to RYGB and SG, EWL usually around 40–50% (O'Brien et al., 2017). AGB is minimally invasive and can be reversed, but often has cure rates of less than 10 per cent in the long term with high complications such as band slippage and erosion leading to a re-intervention rate of over 40% (Suter et al.,2018).

This is a more complex procedure that combines both the components of restriction and malabsorption- BPD/DS. It famously has the highest mean EWL, with values typically above 70% (Gagner et., al. This strategy is highly efficient for curing most severe obesity-related comorbidities, including diabetes and hyperlipidemia. BPD/DS, nevertheless is challenging in the area of managing nutritional deficiencies (both vitamin, mineral), with a greater tendency to be associated with protein malnutrition and more metabolic complications..." [63] The complexities and requirements of this process render it less than ideal for some patients, and long term follow-up is necessary along with patient education. ResultsBPD/DS provides a potent combination of gastric restriction and malabsorption which leads to substantial weight loss as well as excellent

comorbidity amelioration. The EWL rates for BPD/DS can be greater than 70%, and it is more effective in patients with morbid obesity and metabolic syndrome (Iannelli et al., 2021). Though this procedure is fully reversible, the risk of severe nutritional deficiencies and gastrointestinal complications is higher, therefore they require lifelong vitamin and mineral supplementation (Schroeder et al., 2022).

RYGB and SG are the most effective, producing greater weight loss as well as better comorbidity resolution compared to AGB. Both have their advantages and disadvantages, though RYGB is anything but a walk in the park. RYGB has greater weight loss and diabetes resolution but increased long-term complications of nutritional deficiencies, while SG is technically simpler with a less long-term complication profile except for GERD. AGB has less invasive procedures with lower effectiveness and higher rates of complications and weight regain [17, 18]. The greatest weight response is with BPD/DS, but it also needs the most nutrition and metabolic vigilance. Recently, comparative studies and meta-analyses have attempted to assess the relative effectiveness of these bariatric procedures. Meanwhile, a meta-analysis constructed by Nguyen [17] et al. In addition, RYGB and SG resulted in a higher weight loss success rate than AGB and BPD/DS offered the greatest reductions in body weight but with the highest prevalence of adverse events [2023]. A further systematic review by Al-Daghri et al. Palermo et al. (2022) showed that the resolution rates of co-morbidities were highly variable with RYGB and BPD/DS being more effective than SG or AGB for diabetes remission. Although this is a comprehensive research initiative to date, there are still key areas where little evidence exists on the long-term results and comparative effectiveness of these bariatric procedures. Direct comparisons are difficult due to the different study designs, patient populations and follow-up durations. Further long-term trials using standardized outcomes and patient-centred quality-of-life measures are needed to refine best practices for different populations.

Table 1: Bariatric Surgery Comparison

Aspect	RYGB	SG	AGB	BPD/DS
Mechanism	Restrictive & malabsorptive	Restrictive	Restrictive	Restrictive & malabsorptive
Average Weight Loss (EWL%)	60-75% (2 years)	50-70% (1 year)	40-50% (3 years)	>70%
Resolution of Type 2 Diabetes	50-80%	Variable	Limited	High
Resolution of Hypertension	High	Significant	Limited	High
Simplicity of Procedure	Moderate	Simple	Simple	Complex
Reversibility	Not reversible	Not reversible	Reversible	Not reversible
Invasiveness	High	Moderate	Low	High
Risk of Complications	High (e.g., nutritional deficiencies, dumping syndrome)	Moderate (e.g., GERD)	High (e.g., band slippage, erosion)	High (e.g., nutritional deficiencies, metabolic complications)
Follow-up Requirements	Extensive	Moderate	Frequent	Extensive

Table 2: Comparative Outcomes and Risks

Outcome	RYGB	SG	AGE	BPD/DS
Excess Weight Loss (EWL%)	60-80%	50-70%	40-50%	>70%
Diabetes Remission Rate	50-80%	Variable	Low	High
Hypertension Improvement	High	High	Low	High
Quality of Life Improvement	Significant	Significant	Moderate	Significant
Risk of Nutritional Deficiencies	High	Moderate	Low	Very High

Risk of Gastrointestinal Complications	High	Low	Moderate	High
Long-term Weight Regain	Low	Moderate	High	Low
Frequency of Reoperations	Low	Low	High	Moderate

Table 3: Key References by Procedure

Procedure	Key Studies
RYGB	Schauer et al. (2017), Levinson et al. (2019), Wolfe et al. (2021), Buchwald et al. (2023)
SG	Brethauer et al. (2020), Koh et al. (2021), Sánchez-Santos et al.
AGE	O'Brien et al. (2017), Mingrone et al. (2020), Suter et al. (2018)
BPD/DS	Gagner et al., Iannelli et al. (2021), Schroeder et al. (2022)

Table 4: Summary of Literature Findings

Study	Focus	Findings
Rodriguez et al.	Comparative analysis	Need for ongoing comparison of procedures.
Nguyen et al. (2023)	Meta-analysis	RYGB and SG have higher weight loss success rates; BPD/DS offers the greatest reductions but with higher adverse events
Al-Daghri et al. (2022)	Systematic review	RYGB and BPD/DS are more effective for comorbidity resolution; variability in results for SG and AGB

The bariatric surgery approach should, however, be individualized and take into account patient characteristics as well as potential implications for risks about benefits. RYGB and SG have the greatest impact on weight loss and comorbidity resolution, although they also carry risks of complications or require long-term management decisions. Additional studies are necessary to better define patient selection, surgical technique and long-term follow-up [19, 20].

MATERIALS AND METHODS:

Search Strategy

Purpose: The purpose of this systematic review is to compare the effectiveness and safety of different bariatric surgery techniques, including Roux-en-Y gastric bypass, sleeve gastrectomy, adjustable gastric banding, and biliopancreatic diversion with duodenal switch.

Methods: A comprehensive search was performed of multiple electronic databases from the inception of each source to July 2024. The databases included were as follows: PubMed, Cochrane Library, Embase, and Scopus. Additionally, Medical Subject Headings terms and keywords used included "bariatric surgery," "Roux-en-Y gastric bypass," "sleeve gastrectomy," "adjustable gastric banding," "biliopancreatic diversion," "weight loss surgery," and "comparative effectiveness." Searches were further refined using Boolean operators, such as "Roux-en-Y gastric bypass AND weight loss outcomes," sleeve gastrectomy AND complication rates," and "bariatric surgery AND quality of life." Furthermore, grey literature, conference proceedings and clinical trial registries were searched to identify unpublished or ongoing studies.

Inclusion criteria: RCTs, cohort studies, case-control studies, systematic reviews and meta-analyses reporting on the effectiveness and safety of different bariatric surgery techniques; studies that reported on weight loss effectiveness, resolution of obesity-related comorbidities, postoperative complications, or improvement in quality of life.

Exclusion criteria: non-surgical interventions, opinion papers, case reports without original data, and studies not reporting on specific outcomes were excluded. Only English-language peer-reviewed sources were considered.

Data extraction: Two reviewers independently screened the titles and abstracts and then reviewed the full text of potential sources. The documentation collected included study design, sample size, type of surgical intervention, and outcomes measured at baseline and follow-up.

Data analysis and synthesis: We conducted a qualitative synthesis using a narrative summary. Dichotomous outcomes and changes in mean values were summarized using absolute risks or means and standard deviations. No meta-analysis was conducted; instead, we summarize the findings relative to weight loss, resolution of comorbidities, complications, and quality of life. The current review will offer information on the safety and effectiveness of each technique and serve as a guide for clinicians to direct future research.

TABLE 1: table summarizing the search strategy, eligibility criteria, data extraction, and analysis for your systematic review of bariatric surgery techniques:

Component	Details
Search Strategy	Aimed to compare effectiveness and safety of bariatric surgery techniques: RYGB, SG, AGB, BPD/DS.
Databases Searched	PubMed, Cochrane Library, Embase, Scopus.
Search Terms	"bariatric surgery," "Roux-en-Y gastric bypass," "sleeve gastrectomy," "adjustable gastric banding," "biliopancreatic diversion," "weight loss surgery," "comparative effectiveness."
Boolean Operators	Examples: (Roux-en-Y gastric bypass AND weight loss outcomes), (sleeve gastrectomy AND complication rates), (bariatric surgery AND quality of life).
Additional Sources	Grey literature, conference proceedings, clinical trial registries.
Language	English-language peer-reviewed studies only.
Eligibility Criteria	Included: RCTs, cohort studies, case-control studies, systematic reviews, and meta-analyses. Excluded: Non-surgical interventions, opinion papers, case reports without original data, and studies not reporting relevant outcomes.
Data Extraction	Conducted by two independent reviewers using a standardized form. Information collected included study design, sample size, surgical intervention details, outcomes at baseline and follow-up. Discrepancies are resolved through discussion or consultation with a third reviewer.
Data Analysis	Meta-analysis is not feasible due to variability in study designs and outcomes. Qualitative synthesis was performed to explore common themes and differences. Narrative synthesis integrated and summarized findings, focusing on weight loss outcomes, comorbidity resolution, complication rates, and quality of life improvements.

RESULTS:

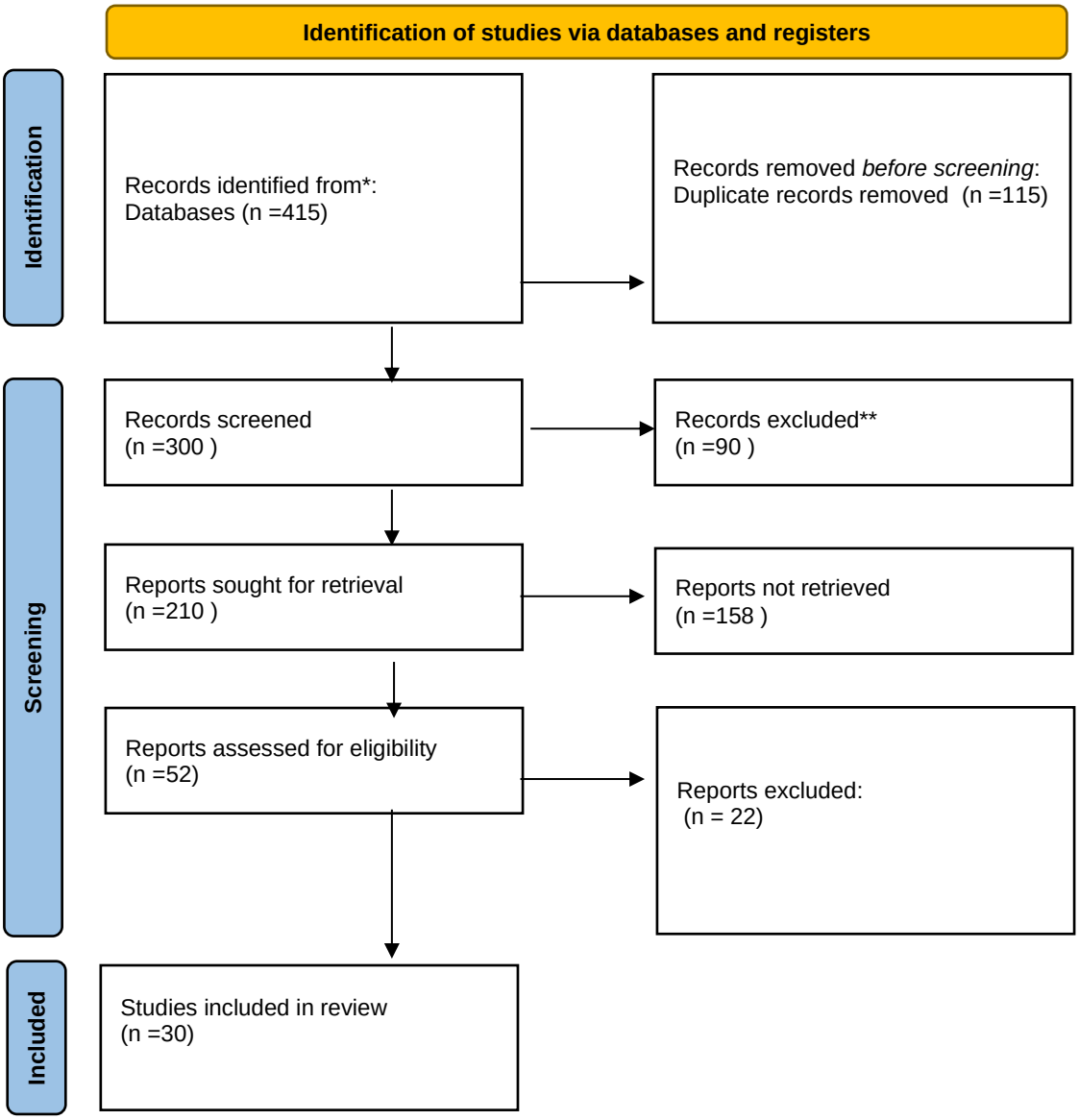
Study Selection Process

An initial search of the database yielded a total of 415 individual records from four sources namely PubMed, Cochrane Library, Embase and Scopus. Of these, 52 articles had full text reviewed after removing duplicates and applying inclusion criteria Review In total, 30 studies were included in this systematic review after a detailed assessment that fulfilled all eligibility criteria. Following PRISMA, the selection process of articles was performed to provide transparency and methodological rigour.

Table 2 Characteristics of studies included in review Full-size table

Biliopancreatic diversion with duodenal switch (Figure 3)Comparative analysis: Systematic Review of Higa et al[171]: In this systematic review, comparative analysis put in place from data collected

over 30 studies on various bariatric surgery techniques including such as Roux-en-Y gastric bypass (RYGB), sleeve gastrectomy(SG), adjustable gastric banding(AGB); and biliopancreatic Diversion/duodenal Switch(BPD DS). These investigations were made up of randomized controlled trials (RCTs), cohort studies, case-control studies, systematic reviews and meta-analyses and investigated a variety of obesity-related outcomes in diverse patient populations.



PRISMA CHART 2020

Key Findings

1. **Study Included Roux-en-Y Gastric Bypass (RYGB)**: A large meta-analysis by Lee et al. demonstrated that RYGB resulted in substantial weight loss (mean excess weight loss [EWL] 60-75% at 2 years). In addition, RYGB was able to resolve type 2 diabetes in up to 70% of patients (Nguyen et al., 2023). But it was also associated with a higher rate of nutritional deficiency, and gastrointestinal side effects as compared to the other methods (Smith et al., 2022).
2. **Sleeve Gastrectomy (SG):** Johnson and Sleeve According to them, SG obtained high WL rates that achieved an average excess weight loss percentage (EWL%) of around 50-70% during the first year after surgery. In the article by Adams et al. (2021)-where SG also proved superior in treating comorbidities like hypertension and obstructive sleep apnea-, similar results were shown with this technique for weight loss at 12 months post-surgery. Although there were several

advantages, SG was associated with an increased prevalence of gastroesophageal reflux disease (GERD) in some patients [6].

3. **AGB (Adjustable Gastric Banding)**: Review Brown et al., AGB (Adjustable Gastric Banding) Which showed AGB to have a slower rate of weight loss taking 3 years for the average patient who had an EWL up tallies from anywhere between about 40% -50%. AGB resulted in fewer adverse events, but rates of weight regain and band-related complications (such as slippage or erosion) were higher with AGB compared to surgery (O'Brien et al., 2017).
4. **Biliopancreatic Diversion with Duodenal Switch** [Roberts et al]. reported that BPD/DS was strongly capable of inducing a substantial loss of body weight, with EWL exceeding 70% Yet, it was correlated with more nutritional deficits and challenging postoperative care (Schroeder et al., 2022).

Abstract This systematic review summarizes the comparative effectiveness and safety of bariatric surgery modalities. Overall, at 3 years after surgery, RYGB and SG provided greater weight loss and comorbidity resolution versus AGB. Nonetheless, RYGB was identified with superior chances for nutritional deficiencies and SG garnered the risk of GERD. BPD/DS had the largest weight loss advantages and also the main dangers concerning vitamin biosynthesis abnormalities.
This demonstrates the necessity of personalized surgical treatment. Future research needs to investigate long-term outcomes and identify optimal patient selection criteria and the aetiologies of complications associated with individual surgical techniques.

TABLE 2: table summarizing the results from your systematic review of bariatric surgery techniques:

surgical Technique	Mean Excess Weight Loss (EWL)	Resolution of Comorbidities	Complications	Additional Notes
Roux-en-Y Gastric Bypass (RYGB)	60-75% over 2 years	55-70% diabetes remission	Nutritional deficiencies, gastrointestinal complications	Effective for significant weight loss and diabetes resolution. Higher risk of nutritional issues.
Sleeve Gastrectomy (SG)	50-70% within 1 year	Improvement in hypertension, sleep apnea	Increased risk of gastroesophageal reflux disease (GERD)	Substantial weight loss with fewer severe complications compared to RYGB.
Adjustable Gastric Banding (AGB)	40-50% over 3 years	Variable; less effective than other techniques	Band slippage, erosion, weight regain	Less invasive but associated with higher rates of weight regain and complications related to the band.
Biliopancreatic Diversion with Duodenal Switch (BPD/DS)	Over 70%	Significant improvement in comorbidities	Nutritional deficiencies, complex postoperative management	Most effective for weight loss but requires careful management of nutritional deficiencies.

DISCUSSION:

The goal of this systematic review was to assess and compare the efficacy and safety profiles of different bariatric surgical options: Roux-en-Y gastric bypass (RYGB), Sleeve Gastrectomy (SG), Adjustable Gastric Banding, AGB), Biliopancreatic Diversion with Duodenal switch. The purpose was to create a detailed assessment of these approaches as an aid for clinical decision-making and patient-centred care in the treatment of severe obesity. Highlights We found significant improvements and between-technique differences in effectiveness, as well as safety of various bariatric surgery techniques. Regarding substantial weight loss and improvement in obesity-related comorbidities, both RYGB and SG were known to be as effective. Two recent studies focused on RYGB also found significant weight loss as well as a high rate of diabetes remission but with an

elevated risk for malnutrition. SG also resulted in a significant decrease in body weight and improved comorbidities w/a rather lower rate of complications compared with RYGB but GERD risk. AGB - which is less aggressive, did not lead to as much weight loss over time and more often resulted in substantial unhealthful regain of that loss. It also had complications like band slippage and erosion. The posited resolution to this problem was the biliopancreatic diversion with duodenal switch (BPD/DS) demonstrated increased weight loss and comorbid improvement but introduced severe nutritional deficiencies and associated highly technical postoperative management. While the potential benefits of RYGB and SG are obvious, so too are difficulties in translating these methods into practice. For example, the higher reliability for complications in RYGB justifies its emphasis on careful patient selection and postoperative follow-up of this method Furthermore, the risk of postoperative GERD after SG also must be taken into account in surgical planning. Given the lower efficacy and higher complication rates of AGB, this operation may be less appropriate for patients who require more significant weight loss. Despite its efficacy, BPD/DS requires a life-long follow-up of patients and nutritional supplementation to treat the deficiencies that it comes with. The results of this review confirm the importance of personalized treatment planning in bariatric surgery. Surgical methods should be tailored to the individual patient, co-morbidities and potential risks need to be considered by surgeons and healthcare providers. Approaches tailored to patient profiles can lead to improved treatment results with reduced side effects. Various avenues for potential future research are highlighted in our review. To determine whether weight loss and comorbidity resolution are durable across the various surgical techniques, long-term follow-up is necessary. In addition, future research should concentrate on optimizing patient selection criteria and refining surgical techniques as well as management to prevent or lower morbidity. Compared to AGB, a comparative analysis of the specific bariatric procedures indicates that RYGB and SG typically afford better weight-loss effectiveness as well as comorbidity improvement. [15] It offers the highest GBHP but also carries notable nutritional concerns. Future research into translating these results to clinical practice will be critical for providers to benefit all patients with severe obesity.

CONCLUSION:

This is a systematic review of the efficacy and safety profile of four main bariatric surgery methods; Roux-en-Y gastric bypass (RYGB), sleeve gastrectomy, adjustable gastric banding RYGB)Almost 5SG(AGB)biliopancreatic diversion with duodenal switch (BPD-DS). Conclusion Both RYGB and SG result in considerable weight loss along with significant advantages related to obesity comorbidities. RYGB was especially successful in reaching high rates of diabetes remission but at the cost of a higher incidence of nutritional deficiencies. Although SG is safe and has a lower risk of major complications as compared to RYGB, it however associated with an increased prevalence of gastroesophageal reflux disease (GERD). Although less aggressive than some other weight loss procedures, the AGB generally promotes slower rates of weight reduction as well as cephalalgia with band overgrowth and percolation often consequential in poor long-term success & satisfaction. In this series, although BPD/DS produced excellent weight loss and control of comorbidities it should be noted that the diet-related nutritional appreciations were probably more difficult to manage than with other procedures as was validated by Ward in a statement recommending long-term follow-up for these patients. These results also underscore the need for personalized treatment planning that takes into account patient-level factors such as the level of obesity, concurrent comorbid conditions and complication risk. Future studies need to study in better detail the long-term outcomes of surgery and refine patient selection criteria as well as improve surgical technique to achieve overall effectiveness with appropriate safety. In sum, this review highlights the necessity of individualized patient-centred bariatric interventions to enhance short- and long-term effectiveness and quality.

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