# How effective is gastric bypass for weight loss?

## EVIDENCE-BASED ANSWER

Gastric bypass results in weight loss of approximately 33% at 2 years and 25% at 8 years (strength of recommendation [SOR]: **B**, based on a cohort study). Gastric bypass is one type of bariatric surgery, which also includes gastroplasty and gastric banding procedures (**Figure 1**). These procedures all can produce enough weight loss to measurably improve health, but they differ in the amount of long-term weight loss, as well as side effects, which can be serious.

Gastric bypass is more effective than gastroplasty for weight loss and is associated with fewer revisions, but it has more side effects (SOR: **A**, based on a systematic review). Limited evidence suggests that gastric bypass produces more weight loss than gastric banding (SOR: **B**, based on a cohort study).

Bariatric surgery, including gastric bypass, improves conditions comorbid with obesity, including diabetes, abnormal lipid profiles, and low quality-of-life scores. It decreases the incidence of hypertension at 2 years after surgery, but whether this effect is sustained is unclear (SOR: **B**, based on a cohort study and multiple case series). Bariatric surgery also improves obstructive sleep apnea, obesity hypoventilation syndrome, menstrual irregularity, and female urinary stress incontinence (SOR: **C**, based on multiple case series). Bariatric surgery has a complication rate of 13% and a mortality rate of 0.2% (SOR: **B**, based on 1 cohort study).

## EVIDENCE SUMMARY

A systematic review comparing bariatric surgery with conventional medical therapy for obesity included 1 randomized controlled trial and the Swedish Obesity Study, a large cohort study with matched controls. Surgery produced 23 to 28 kg more weight loss at 2 years.[1] The study demonstrated 33% ± 10% weight loss for gastric bypass and 0% for medical therapy (not described) at 2 years,[2] and 25% ± 6% loss vs 0.9% gain at 8 years.[3] Among bariatric surgical techniques, patients undergoing gastric bypass lost more weight than those with gastroplasty (using staples to partition the stomach, either horizontally or vertically (**Figure 1**) ($P$=.057, not significant) or gastric banding (placing a constricting ring around the stomach) ($P$<.05) at 8 years.[3]

The same systematic review assessed multiple randomized controlled trials comparing gastric bypass with gastroplasty and found greater weight loss, fewer revisions, and more side effects from gastric bypass (**Figure 2**).[1] Five trials comparing

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## What are Clinical Inquiries?

**Clinical Inquiries answer real questions** that family physicians submit to the Family Practice Inquiries Network (FPIN), a national, not-for-profit consortium of family practice departments, residency programs, academic health sciences libraries, primary care practice-based research networks, and other specialists.

**Questions chosen** for Clinical Inquiries are those that family physicians vote as most important through a web-based voting system.

**Answers are developed by a specific method:**

**Type I answers**

- FPIN medical librarians conduct systematic and standardized literature searches in collaboration with an FPIN clinician or clinicians.
- FPIN clinician authors select the research articles to include, critically appraise the research evidence, review the authoritative sources, and write the answers.
- Each Clinical Inquiry is reviewed by 4 or more peers and editors before publication in *JFP*.
- FPIN medical librarians coauthor Type I Clinical Inquiries that have required a systematic search.
- Finally, a practicing family physician writes an accompanying commentary.

FIGURE 1

**Bariatric surgical techniques for weight loss**

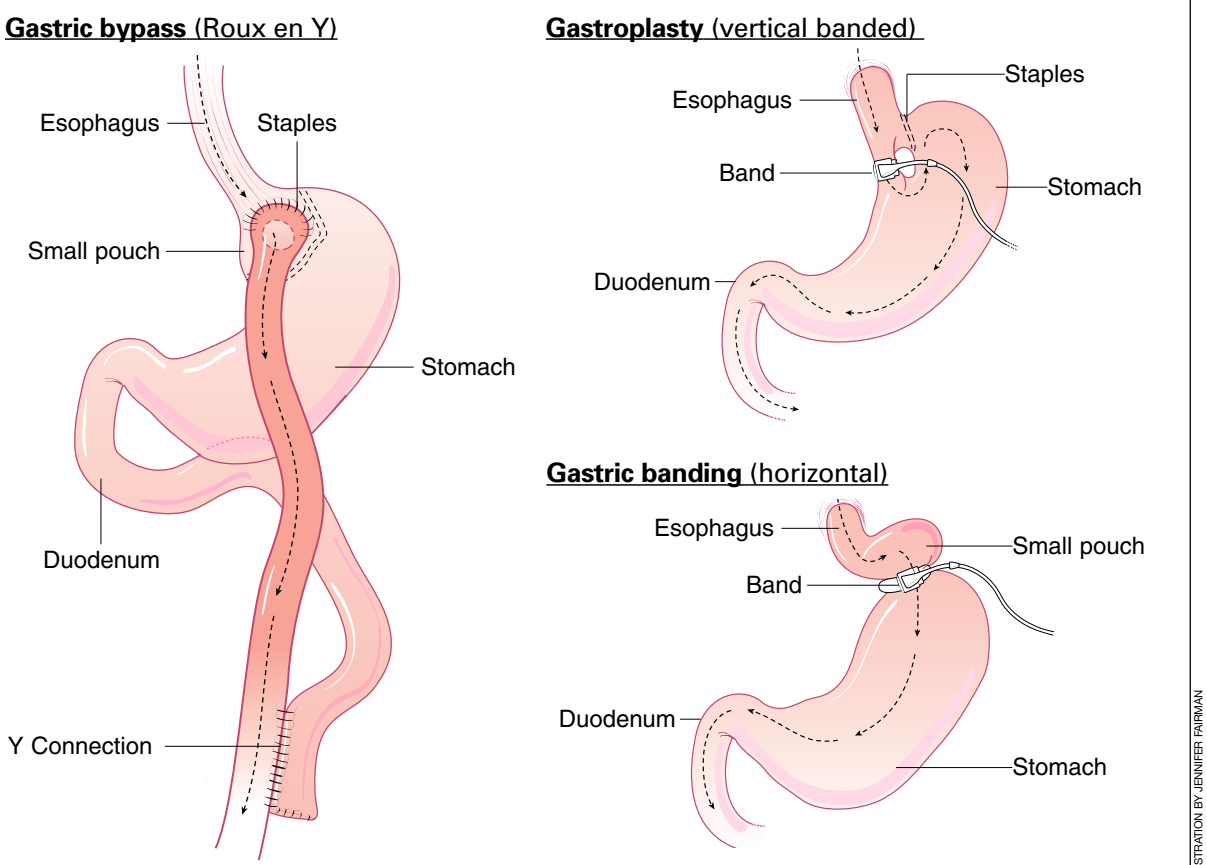


ILLUSTRATION BY JENNIFER FAIRMAN

gastric bypass with horizontal gastroplasty demonstrated significantly greater weight loss from gastric bypass. Five other trials comparing weight loss from gastric bypass with vertical gastroplasty produced mixed results, with 3 trials favoring gastric bypass and 2 showing no difference.[1] Fewer patients required revision after gastric bypass (0%–4%) compared with vertical gastroplasty (9%) or horizontal gastroplasty (19%–40%). One included trial found that postoperative dumping syndrome (28% vs 0%, $P<0.05$) and heartburn (59% vs 32%, $P<.05$) were more common with gastric bypass than with gastroplasty.[1]

Bariatric surgery, including gastric bypass, improves a variety of obesity-related comorbid conditions. Diabetes prevalence decreased among gastric bypass patients at 2 years (0.0% vs 4.7%, $P<0.005$) and 8 years (3.6% vs 18.5%, $P<.0005$) compared with those receiving medical therapy.[2,3] In a case series involving 154 diabetic gastric bypass patients, diabetes resolved for 83% by 1 year, and for 86% at 5 to 7 years.[4] In several case series, most patients became euglycemic and discontinued insulin or oral agents.

In the Swedish Obesity Study, hypertriglyceridemia decreased postoperatively but hypercholesterolemia did not.[5] In a case series, bariatric surgery reduced triglycerides (50%) as well as total cholesterol (15%) ($P<.05$ for both) at 6 months and significantly increased high-density lipoprotein cholesterol levels at 1 and 5 years.[6]

Bariatric surgery significantly lowered the incidence of hypertension at 2 years (3.2%) compared with conventional treatment (9.9%), but

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after 8 years this difference disappeared.[2,3,5] However, in multiple large case series with morbidly obese patients, hypertension resolved or improved. The largest study showed resolution of hypertension for 69% at 1 to 2 years (91% follow-up), 66% at 5 to 7 years (50% follow-up), and 51% at 10 to 12 years (37% follow-up).[4]

Bariatric surgery improved obstructive sleep apnea and obesity hypoventilation syndrome in 2 case series. In one, Epworth Sleepiness Scale scores, minimum $O_2$ saturation, and other measures improved significantly ($P<.001$) by 3 to 21 months after surgery.[7]

In another case series, menstrual irregularities decreased from 40.4% to 4.6% following surgery ($P<.001$) among women who lost 50% of their excess weight.[8] The incidence of urinary stress incontinence also decreased significantly (61.2% to 11.6%, $P<.001$ in this study[8]). The Swedish Obesity Study found significant improvements in Health-Related Quality of Life scores at 2 years with surgery vs conventional treatment.[9]

Bariatric surgery, including gastric bypass, has significant postoperative morbidity and mortality. Thirteen percent of patients in the Swedish Obesity Study experienced perioperative complications, including pulmonary symptoms (6.2%), abdominal infection (2.1%), wound complications (1.8%), bleeding (0.9%), thromboembolic events (0.8%), and other miscellaneous complications (4.8%). Postoperative complications required reoperation for 2.2% of surgical patients, and there were 4 postoperative deaths (0.2% of the operative patients; 3 due to leakage, and 1 due to a technical laparoscopic error).[2]

Nutritional and vitamin deficiencies are common following gastric bypass, including deficiencies of vitamin B12, iron, folate, and calcium. Lifelong nutritional supplementation is generally necessary following this procedure.[10]

## RECOMMENDATIONS FROM OTHERS

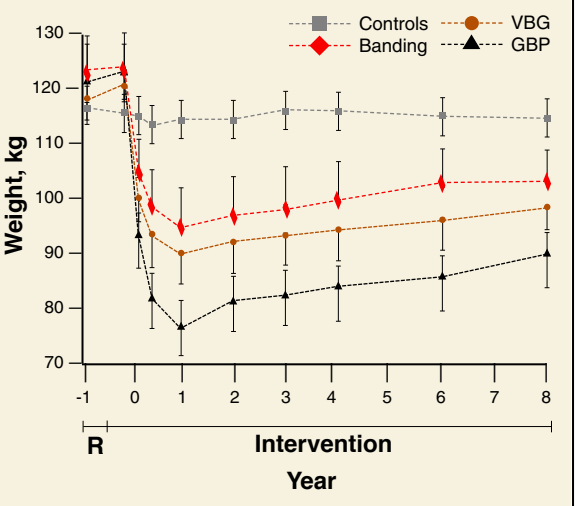
A 1991 National Institutes of Health consensus conference suggested consideration of obesity surgery for patients with a body-mass index ≥40, or ≥35 plus severe obesity-related medical comorbidities (such as severe sleep apnea, obesity hypoventilation syndrome, obesity-related cardiomyopathy, or severe diabetes) who have not been successfully treated with nonsurgical attempts at weight reduction.

Selected patients should be well-informed and motivated, with acceptable operative risk. A multidisciplinary team with medical, surgical, psychiatric, and nutritional expertise should evaluate patients who are candidates for surgery. An experienced surgeon, working in a clinical setting with adequate support for all aspects of management and assessment, should perform the surgery.

Lifelong medical surveillance is necessary after surgery, and patients should be selected who are likely to comply with this.[11]

FIGURE 2

**Long-term weight loss with bariatric surgery**




*Long-term weight loss with bariatric surgery: comparison of controls, horizontal gastric banding (Banding), vertical banded gastroplasty (VPG), and gastric bypass (GBP). Source: Sjostrom et al 2000.*[3]

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## CLINICAL COMMENTARY

### Bariatric surgery is an important option for select patients

The lack of successful interventions for obesity is frustrating. This is accentuated as obesity is increasingly recognized as the proverbial forest in which we find ourselves hacking at the "trees" of diabetes, hypertension, dyslipidemia, and many other diseases. As we focus on this, the second-leading preventable cause of death, we find ourselves uniquely skilled as family physicians to offer balanced advice and advocacy.[12]

Bariatric surgery is an important option for select patients. For such a patient, I continuously advocate for lifestyle changes, document all nonsurgical measures pursued (important for third-party review), discuss realistic expectations and risks, and direct the patient to a trusted bariatric surgery center. For the postsurgical patient, I reinforce the lifestyle commitments, ensure ongoing vitamin and mineral supplementation, and help monitor for possible complications.

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# For knee pain, how predictive is physical examination for meniscal injury?

## EVIDENCE-BASED ANSWER

No single clinical examination element, or combination of such elements, reliably detects meniscal injury. The McMurray test is best for ruling in meniscal pathology. Assuming a 9% prevalence of meniscal tears among all knee injuries (a rate reflecting national primary care data), the posttest probability that a patient with McMurray's sign has a meniscal injury ranges from <30% to 63% (strength of recommendation [SOR]: **B**). In contrast, the absence of any positive physical examination findings effectively rules out meniscal pathology, yielding a posttest probability of 0.8% for lateral meniscus injury, 1.0% for medial meniscus injury, and 3.8% for any meniscal injury among primary care populations (SOR: **B**).

## EVIDENCE SUMMARY

The accuracy of physical examination findings for meniscal injury varies widely among meta-analyses. In a meta-analysis of 13 studies, no physical examination test—including assessment for joint effusion, McMurray test, joint line tenderness, or the Apley compression test—yielded clinically significant positive or negative likelihood ratios for a meniscal tear (**Table**). The McMurray test performed best, but at 9% to 11% pretest probability of