# The Regulatory Perspectives on Endoscopic Devices for Obesity

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**KEYWORDS**

• Obesity • Medical device • Regulatory • Intragastric balloon • Gastric emptying • Endoscopic • Weight loss

**KEY POINTS**

- There are 3 major pathways to legally market a device: premarket notification (510[k]), premarket approval, and de novo classification.
- The US Food and Drug Administration (FDA) principally relies on nonclinical and clinical studies to assess device benefits and risks.
- FDA-approved endoscopic weight-loss devices to date include the 3 intragastric balloons, ReShape, ORBERA, and Obalon, and the gastric-emptying device, the AspireAssist.
- The FDA has a published benefit-risk paradigm to aid in the development of clinical studies.
- The Patient Preference Calculator for Weight-Loss Devices indicates that 6% to 7% of patients consider a device with a profile similar to intragastric balloons to be better than no device, considering 6-month weight loss benefits; 11% to 22% consider a device with a profile similar to gastric-emptying devices to be better than no device considering the 12-month weight-loss benefit.

## INTRODUCTION

Obesity is a chronic, relapsing health risk defined by excess body fat. Excessive body fat increases the risk of death and major comorbidities, such as type 2 diabetes, hypertension, dyslipidemia, cardiovascular disease, sleep apnea, osteoarthritis, asthma, back pain, and some cancers.[1,2] Current treatment options for individuals with obesity

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range from diet and exercise with and without behavior modification to the higher-risk option of bariatric surgery. Pharmacotherapies are potential options for individuals who have failed to respond to lifestyle interventions and are either not able or willing to undergo bariatric surgery.

Drugs intended for weight loss or weight management are reviewed through the US Food and Drug Administration (FDA) Center for Drug Evaluation and Research (CDER). Currently, CDER has approved orlistat, lorcaserin, phentermine/topiramate, naltrexone/bupropion, and liraglutide.[3–7] Surgical options include the Roux-en-Y gastric bypass (RYGB), sleeve gastrectomy, and biliopancreatic diversion with duodenal switch. The RYGB procedure results in most of the stomach and duodenum being bypassed. Vertical sleeve gastrectomy permanently reduces the size of the stomach, whereas the biliopancreatic diversion with duodenal switch results in most of the small intestine being bypassed.

Medical devices used for weight loss are regulated in the FDA Center for Devices and Radiological Health (CDRH) and are reviewed by the Gastroenterology Devices Branch (GEDB) in the Division of Reproductive Gastro-Renal and Urological Devices (DRGUD). In general, the weight-loss-device landscape can be divided into 6 main categories: (1) restrictive procedures, (2) space-occupying, (3) bypass liners, (4) electrical stimulation, (5) gastric emptying, and (6) other therapies. CDRH has approved 2 restrictive devices: the LAP-BAND Adjustable Band and the REALIZE Adjustable Band.[8,9] Currently, there is mention of restrictive procedures carried out using endoscopic suturing devices.[10,11] To date, there are no endoscopic suturing devices with marketing authorization for obesity indications. Although the first device approved by the FDA for weight loss was a space-occupying device, the Garren Gastric Bubble in 1985, it was later voluntarily removed from the market due to safety concerns. The FDA did not approve any further space-occupying devices until the ReShape, ORBERA, and Obalon intragastric balloons (IGBs) in 2015 to 2016.[12–14] The laparoscopically placed MAESTRO Rechargeable System has also received FDA approval in 2015 with the mechanism of action of delivering electrical signals to the vagus nerve.[15] In 2016, the FDA approved the AspireAssist device that partially empties stomach contents 20 to 30 minutes after eating.[16] Currently, the FDA has not approved a bypass liner for weight loss. However, the FDA is aware that bypass liners and other weight-loss devices are available outside of the United States and/or are currently in clinical testing.[11,17,18]

The number and type of device-treatment options available globally, and specifically in the United States, demonstrate that more choices for obesity treatment are being developed to meet the needs of the patient population. Although reduction of excessive body fat may reduce the risks of obesity-associated comorbidities, such as metabolic disorders, at this time no device has been approved for use in the United States that is indicated for treatment of metabolic disorders.

Of the FDA-approved weight-loss devices, those placed endoscopically include the space-occupying IGBs and the gastric-emptying device. The FDA considers both the benefits and the risks associated with the device during the review process. Here, the clinical trial development, regulatory pathways, and considerations used during FDA review of weight-loss devices, and the benefit-risk analysis of the recently FDA-approved endoscopic weight-loss devices, are discussed. In addition, a strategic priority of CDRH is to increase patient input in decision making,[19] and CDRH previously developed a data-derived tool that estimates patient preference for obesity-treatment devices.[20] Thus, how devices with profiles similar to those that have been recently approved may be viewed in light of the patient preference study also is considered.[20,21]