

# Update on Adolescent Bariatric Surgery



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## KEYWORDS

• Adolescent bariatric surgery • Adolescent obesity • Obesity

## KEY POINTS

- Adolescent severe obesity is associated with significant health complications.
- Bariatric surgery has shown significant improvements in health outcomes and is well tolerated.
- Careful preoperative assessment and postoperative follow-up is necessary.

## BACKGROUND

Obesity is one of the most significant health problems facing children and adolescents today. Current data suggest that the prevalence of obesity among children and adolescents has plateaued and the rate of increase of obesity has slowed. Despite this, severe obesity has become the fastest-growing subcategory of obesity among children and adolescents.<sup>1,2</sup> Obesity is associated with a range of adverse immediate and long-term effects, including type 2 diabetes (T2D), obstructive sleep apnea, hypertension, nonalcoholic fatty liver disease, and dyslipidemia.<sup>3-5</sup> It is also clear that adolescent obesity predicts adult obesity and its many known metabolic complications. There is evidence that the increased risk of development of adult comorbidities is reduced if weight loss is achieved.<sup>6</sup>

Body mass index (BMI) norms in children vary with age and sex. Overweight in children is defined as a BMI between the 85th and less than 95th percentile, and obesity is greater than or equal to 95th percentile for age and sex. Severe obesity is defined as BMI greater than or equal to 120% of the 95th percentile or BMI greater than or equal

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to 35 kg/m<sup>2</sup>, whichever is lower (roughly the 99th percentile for age and sex).<sup>7–9</sup> Currently about one-third of children and adolescents in the United States are overweight (**Table 1**). The prevalence of adolescent (12–19 years) obesity in the United States increased from 11% in 1988 to 20% in 2012.<sup>1</sup> Severe obesity is seen in 8% of adolescent girls and 7% of adolescent boys.<sup>10</sup> The severity of obesity in adolescence is a predictor of whether obesity will persist into adulthood.<sup>11</sup> In one study about 75% of adolescents with severe obesity remained severely obese as adults.<sup>12</sup>

## ROLE OF BARIATRIC SURGERY

First-line treatment of obesity consists of structured diet and exercise programs. The American Academy of Pediatrics recommends a stepwise approach that begins with the primary care physician.<sup>13</sup> Use of medication and meal replacements is gaining interest; however, pharmacologic options are limited by the lack of safety and efficacy data in adolescents.<sup>14</sup> Behavioral treatment is the recommended starting point for treatment of pediatric obesity, although it is seldom effective for adolescents with severe obesity. In one example, after 3 years of behavioral treatment, the response was distinctly better for the 6 to 10 year olds with severe obesity and no weight improvement was seen for 14 to 16 year olds. Only 2% of the adolescents were able to achieve a clinically meaningful response (BMI Standard Deviation Score improvement of  $\geq 0.5$ ). These findings led authors to question the ethics of insisting on therapy that verges on futile, particularly given the potential for treatment failure to adversely affect already compromised self-esteem.<sup>15</sup>

Bariatric surgery, however, has proven to be more effective than nonsurgical obesity management for weight loss and the resolution of comorbid conditions, such as cardiovascular risk factors and diabetes.<sup>16</sup> The first gastric bypass, the precursor to the current Roux-en-y gastric bypass (RYGB), was performed by Mason and Ito<sup>17</sup> in 1967. Surgical weight loss techniques for adolescents were reported in the 1980s but did not gain momentum until the 2000s.<sup>18</sup> Data from the US National Inpatient Sample indicate that 2744 adolescent bariatric surgeries were performed in the United States from 1996 to 2003,<sup>19</sup> whereas more recent estimates show that approximately 1600 cases per year were done in 2009.<sup>20</sup> However, despite evidence showing health benefits of surgery, many remain reluctant to recommend surgery for adolescents with severe obesity. In 2010, nearly half of physicians surveyed said they would never refer an adolescent for bariatric surgery, and 65% suggested a minimal age of 18 years for a patient to undergo surgery.<sup>21</sup> The three most commonly performed adolescent bariatric procedures are RYGB, adjustable gastric band (AGB), and vertical sleeve gastrectomy (VSG). The US Food and Drug Administration has not approved the use of AGB in patients younger than 18 years of age.

**Table 1**  
Definitions and prevalence of obesity 1999–2012

Category	BMI Percentile	% Prevalence Ages 12–19 y
Normal weight	<85th	—
Overweight	$\geq 85$ th	33
Obesity	$\geq 95$ th	18
Class II obesity	$\geq 120\%$ of the 95th or BMI $\geq 35$ kg/m <sup>2</sup>	7
Class III obesity	$\geq 140\%$ of the 95th or BMI $\geq 40$ kg/m <sup>2</sup>	2

Data from Skinner AC, Skelton JA. Prevalence and trends in obesity and severe obesity among children in the United States, 1999–2012. *JAMA Pediatr* 2014;168(6):561–6.

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