Studies on Body Image Changes After Bariatric Surgery in Adults

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17.1 Introduction

After the failure of various nutritional or dietetic treatments, patients with severe obesity frequently approach bariatric surgery for reasons related to both physical (e.g., weight loss, increased life expectancy) and psychological health (e.g., body image, quality of life, psychological well-being).

After bariatric surgery, the majority of patients show a rapid weight loss, mainly occurring in the first 6–12 months after the procedure, and most of the time the physical health concerns (e.g., type 2 diabetes, hypertension, sleep apnea) improve. In a similar way, also body shape and its functionality undergo extreme changes. These two factors suggest that, after this type of surgical intervention, patients with obesity may improve their quality of life, and reduce the intensity of body image dissatisfaction. However, many factors are able to affect negatively body image and to increase body image dissatisfaction after bariatric surgery.

The ability to cope with life style changes may affect psychological health and body dissatisfaction. After bariatric surgery, the introduction of new healthier habits concerning diet and physical activity are required to maximize long-term goals of weight loss and maintenance. Some patients may decrease or increase their body image dissatisfaction depending on their ability or not to lose weight and/or to maintain weight after loss [1]. Another factor that may affect body image dissatisfaction after weight loss due to bariatric surgery is related to the fact that rapid weight loss can cause excessive skin on the abdomen and other body sites, causing physical or psychological discomfort. For this reason, about 30% of bariatric surgery patients undergo plastic surgery to correct problems with excessive skin [2, 3]. These events may affect negatively body image increasing body image dissatisfaction.

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In this chapter, we reviewed the existing literature about body image dissatisfaction in patients both before and after bariatric surgery. A short overview about indications to bariatric surgery, its results and the characteristics of the most used types of bariatric procedures have also been included.

17.2 Indication to Bariatric Surgery, Results and Procedures

Bariatric surgery should be considered in the management of adult patients (age range 18–60 years) with severe obesity (BMI > 40 kg/m^2 or BMI > 35 kg/m^2 with comorbid conditions) who failed to lose weight or to maintain long-term weight loss, despite appropriate nonsurgical medical care [4, 5]. Comorbid conditions for which patients with BMI 35–40 kg/m^2 can be considered for bariatric surgery are those that significantly contribute to morbidity and mortality of the obese patient, and in which surgically induced weight loss is expected to improve the disorder (such as metabolic disease, cardio-respiratory disease, and severe joint disease). Bariatric surgery may also be considered, on individual basis, in patients with type 2 diabetes and mild obesity (BMI 30–35 kg/m^2) who do not achieve a substantial weight reduction with nonsurgical methods and in which the diabetes was not adequately controlled by maximal medical therapy [6]. In any cases, patients undergoing bariatric surgery need to be willing to participate in a postoperative long-term follow-up program. Bariatric surgery is contraindicated in patients with absence of a period of identifiable medical management, inability to participate in a long-term medical follow-up, major psychiatric disorders if not otherwise indicated by their caring psychiatrist, alcohol and/or drug abuse, reduced life expectancy, and the inability to care for themselves without adequate family or social support [4, 5].

The weight loss efficacy of bariatric surgery has been confirmed by the results obtained in long-term controlled studies, the main one being the Swedish Obese Subjects (SOS) study, a controlled study that compared the outcome of 2000 patients who underwent bariatric surgery by various techniques with that of a matched control group that received conventional treatment [7]. In the surgery group, after 10 years, the average weight loss from baseline stabilized at 16.1%, whereas in control subjects the average weight during the observation period increased by 1.6%. This substantial difference in weight loss was associated with a higher remission rate of metabolic disease, a highly significant reduction of the incidence of new cases of diabetes, a reduction of cardiovascular events, both fatal and non-fatal, and a reduction of the incidence of new cases of cancer in women. Finally, during a follow-up to 10 years, the cumulative overall mortality in the surgery group was significantly lower than that observed in control subjects (RR: 0.76; 95%CI: 0.59–0.99) [7]. In conclusion, these results provide sufficient evidence that modern bariatric surgery can bring down the increased mortality observed in severely obese patients, provided that the peri-operative mortality is maintained at low levels as reported in various studies (<0.5%). The superiority of bariatric surgery over lifestyle intervention for weight loss and

metabolic improvement has been confirmed by some randomized, controlled, clinical trials specifically performed in severely obese patients with type 2 diabetes mellitus [6].

Bariatric surgery is therefore in general safe and effective, but it can cause new clinical problems and is associated with specific diagnostic, preventive and therapeutic needs. Bariatric patients may face new specific multifaceted clinical problems after surgery. Eating habits need to adapt to the new gastro-intestinal physiology, and nutritional deficits may arise according to the type of bariatric procedure. Management of obesity associated disease needs to be modulated according to weight loss taking into account the possibility of changes in drug pharmacokinetics. Specific problems may arise in women during pregnancy, and the patients may experience some psychological difficulties in adapting to the profound changes in eating behavior and body image. Finally, weight regain can occur and should be prevented and managed. Multidisciplinary long-term follow-up is therefore recommended after bariatric surgery, and the provision of an adequate follow-up program is mandatory for bariatric centers [4]. However, giving the accumulating numbers of bariatric patients, follow-up should be at least in part transferred to primary care over time. Moreover, post-bariatric patients may confront obesity specialists, dieticians and nurses not specifically trained in bariatric medicine with thus far unknown problems in their professional activity. Referral to the bariatric center is often necessary and should be possible, but there is a growing need for dissemination of first level knowledge in managing bariatric patients. The basic notions needed to provide first level adequate medical care to post-bariatric patients have been recently summarized [8].

Several bariatric procedures have been introduced in the clinical practice in the last 50 years. Many of them have been abandoned because of insufficient results or severe side effects, and many others remained low in diffusion. According to the most recent survey from the International Federation for the Surgery of Obesity and Metabolic Disorders (IFSO), over 90% of the 579,517 bariatric procedures performed worldwide in 2014 consisted of three type of surgical intervention: sleeve gastrectomy (45.9%), Roux-en-Y gastric bypass (39.6%), and adjustable gastric banding (7.4%) [9].

Sleeve Gastrectomy is a restrictive procedure consisting in the section of the stomach with removal of approximately 2/3 of it. The section takes place parallel to the small curvature in order to create a stomach in a tubular form (Fig. 17.1). The operation reduces drastically the amount of food that can be ingested and causes a feeling of early satiety. However, the removal of a significant part of the stomach and/or modification of the speed of gastric transit also cause changes in the secretion of hormones secreted in the gastro-intestinal tract and having a regulatory action on energy balance and carbohydrate metabolism. Operative mortality is about 0.2% and it is frequently related to leakages at the level of the long gastric suture. Main postoperative specific complications are represented by dilatation of the pouch and gastroesophageal reflux. The results in terms of weight loss can be evaluated at around 60–70% of excess weight. Long-term results are good, but there is a significant number of cases in which patients show at least partial weight regain [10].

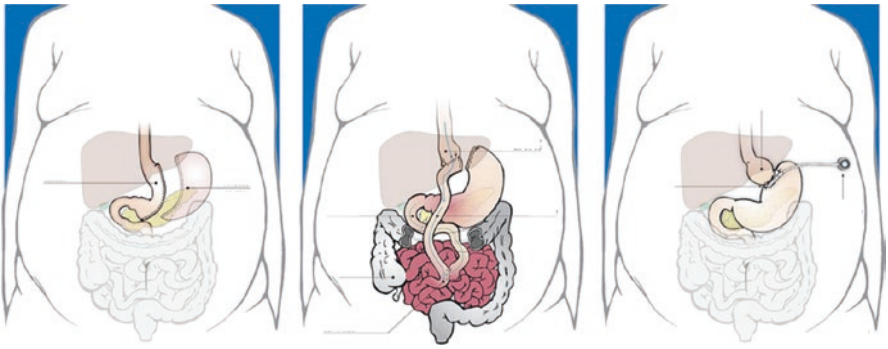

Fig. 17.1 The three major bariatric surgery procedures worldwide. Left: sleeve gastrectomy. Middle: Roux-en-Y gastric bypass. Right: adjustable gastric banding

Gastric bypass consists in the creation of a proximal gastric pouch (15–20 cm^3) which is excluded from the gastric remnant. The small pouch is sutured to the jejunum through a Roux-en-Y intestinal derivation (Fig. 17.1). The stomach and the duodenum are excluded from the transit of the food. Weight loss occurs in part through a restrictive mechanism, but also as the result of the modification of the secretion of entero-acting hormones regulating energy balance and glucose metabolism. The presence of a dumping syndrome following the intake of beverages and/or sweet foods can also participate to the determination of the weight loss. There is not a significant malabsorption of macronutrients (fat, carbohydrates, protein) but there is a certain degree of malabsorption for some micronutrients (Ca, Fe, and Vit. B12). The operative complications are about 2% and the operative mortality is about 0.5%. The main postoperative specific complications are represented by anastomotic leak (1%), anastomotic stenosis (1.5%), anastomotic ulcer (3%), and internal hernias (3%). Possible nutritional complications are represented by multifactorial anemia (more frequently microcytic iron deficiency anemia) and osteoporosis/osteomalacia. Prevention of these complications requires long-life nutritional supplementations. The results in terms of weight loss are evaluated around 55–65% of excess weight with acceptable weight maintenance rates [10].

Gastric banding consists in the placement of a band with a pneumatic internal chamber around the upper part of the stomach. The band is applied under the gastroesophageal junction, and creates a small pouch (25 mL). The chamber is connected to a silicone connecting tube ending with a reservoir placed subcutaneously on the abdominal wall and allows a percutaneous adjustment of the size of the band (Fig. 17.1). Gastric banding has the purpose of slowing down the meal, inducing a feeling of rapid satiety after the introduction of small quantities of food. The patient may be gradually accustomed to the presence of the banding by exploiting the possibility of calibration of the shrinkage. The operative complications are very rare (0.2%) and the operative mortality is very low (<0.1%). The main postoperative complications are represented by migration of the band within the stomach (<1%), gastric pouch dilatation and stomach slippage (3%), disconnection of the port and/

or connecting tube with leakage of the system (3%). Results in terms of weight loss are around 40–50% of excess weight. Long-term results are related to the eating behavior of the patient and there is a significant number of patients with some degree of weight regain [10].

17.3 Body Representation, Body Schema, Body Image and Body Image Dissatisfaction

To better understand the changes of body image and body image dissatisfaction in patients with obesity and after bariatric surgery is necessary to introduce some more general concept about body representation, i.e. the way we represent our own body in its complex physical and psychological components (see also Chap. 1 of the present book). Body representation involves two main aspects: (1) body image and (2) body schema; the first being considered a psychological concept and the second a neuropsychological one. Body schema and body image share the opportunity to represent the totality and complexity of the human body, however it is accepted that the two concepts are different even if interdependent. Indeed, while body schema is a complex perceptual scheme linked to processes related to the spatial localization of the body: body image includes the subjective-cognitive-affective components that integrate body representation.

More specifically, body schema refers to how the brain represents our own body in space and its position in the environment. Neuroscientists located the body schema in the right parietal lobe and attribute to this cortical area most of the disorders of body representation, such as the phantom limb, anosognosia, and unilateral neglect. The neurological model formulated the concept of body schema as a sensorimotor map of the body space mainly based on proprioception, and the body image as a pictorial description of the body based mainly on a visual exteroception [11]. Gallagher [12] advocates a principle distinctions between body schema, considered as a system of postural and sensory–motor capacities that usually functions without perceptual monitoring; and body image, broadly considered as a system of perceptions, attitudes and beliefs pertaining to one's own body. The body schema would be involved in action and interaction with the environment, with the body providing the material perspective on the outside world, whereas the body image would be involved in the sense of body ownership and self-consciousness. According to both Paillard [11] and Gallagher [12], subjective body image is present to consciousness, whereas the body schema is usually not, although inputs from the body schema to the body image can affect spatial perception, the perception of objects and the links with intentional actions.

On the other hand, the cognitive-emotional component is important in the representation of body image [13]. The psychological models conceptualize body image as a complex of inclinations and emotions addressed to our own body, which would result in the way in which we "live" our size, and how we feel our outward appearance in general [14]. From this point of view, body image is the cognitive-emotional-social model of the body, reflecting our subjective experiences, expectations,

desires, and emotions. Body image is also affected by the interaction with others in the social context, which, in some cases, may increase discomfort and resulting in an incessant and repeated comparison of our own body image with other people's bodies. Body image encompasses one's body-related self-perceptions and self-attitudes, including thoughts, beliefs, feelings and behaviors [15]. Cash [16] suggested that body image includes at least two components: perceptual body image (i.e., estimation of body size) and attitudinal body image (i.e., affective, cognitive, and behavioral concerns with body size). Body image is therefore a complex multidimensional construct, consisting of cognitive, emotional and behavioral elements, influenced by social and cultural factors.

Most of the research in the field of the relationships between body image and obesity adopted the psychological model. In particular, the problems associated with negative body image are those that have received substantial attention in the research literature and have witnessed a dramatic growth in empirical attention in the last decade [17].

More recently, it was suggested that the emergence of problems with body image and shape in individuals with obesity are related with the link between our body and our mind as described by the Embodied Cognition [18]. Within this theoretical framework, it is assumed that our conceptual system is the result of the interaction between two types of representational systems [19]: schematic (allocentric) and perceptual (egocentric). The egocentric frame of reference is related to the body of the subject and allows the representation of objects location relative to the body center. Within an egocentric frame of reference, we represent objects relative to ourselves. On the other hand, the allocentric frame of reference is related to a space external to the subject. Within the allocentric frame of reference, objects are represented independently of our current relation to them. Following this view, the role of the egocentric representations is "pragmatic": the representation of objects using egocentric coordinates is required for actions like reaching and grasping. Instead, the role of allocentric representations is "semantic": the representation of objects using allocentric coordinates is required for the visual awareness of its size, shape, orientation and meaning [20].

It has been suggested that patients with obesity are prone to be engaged more often in an allocentric view of their body than to represents it considering an egocentric perspective [21, 22]. Individuals with obesity and eating disorders may be locked to an "objectified body" that is no longer or minimally influenced by egocentric representations driven by perception. This phenomenon seems to depend on different factors. Believes and attitudes in considering our own body image, shape and weight, develop along life and is strongly influenced by social context. Subjective body image dissatisfaction in the interaction with the others, in relation to recognized social standard, tends to generate negative emotion and increase shame in obese individuals. Thus, is possible to assume that the contents of the body image is also related to cultural standard, and in the western society is more frequent for individuals with obesity to experience "fat or weight phobia" [23] and body image dissatisfaction [24, 25].

In summary, the dissatisfaction in relation to one's body image is due to the discrepancy between the perceived and desired body shapes, or between our real self and our ideal self, too often influenced by the proposed social models. Therefore, body image dissatisfaction does not depend only on perceptual distortion of the reality, but also on a continuous evaluation of mental images, emotions and thoughts that lead to asssociate body appearance with the personal value in the social context, thus conditining self-esteem.

17.4 Correlates Between Body Weight and Body Image Dissatisfaction in Severe Obesity

Dissatisfaction with its own physical appearance seems to be the rule rather than the exception in patients with severe obesity (see also Chaps. 13 and 14 of this book). The relationship between body image, thoughts, and emotions is a double way, as even our moods can affect the mental representation of our body. Usually, if we feel sad, failed, or disappointed, we will be more likely to consider our body "disappointing" as well, we tend to become hypercritical, as our own body is the cause of our failures ("they reject me because I'm ugly"... "he has not hired myself because I'm obese"). Individuals with obesity generally has a negative body image, which is why they are more easily anxious and embarrassed in various social situations, believes that their appearance reveals their personal inadequacy, contributing to the idea of being persons without willpower and without value.

Body image dissatisfaction is a serious psychosocial problem associated with obesity [26, 27] and certain characteristics and experiences of individuals with obesity appear to be associated with an increased risk of body image dissatisfaction [17, 28]. Research identified several demographic, psychological, and behavioral features associated with body image dissatisfaction, including gender [29, 30], ethnicity [31], body mass index (BMI) [30], binge eating [30, 32], self-esteem [30, 33], and depression [34]. Grilo and colleagues [30] examined a number of correlates of body image dissatisfaction in a series of patients with extreme obesity candidates to bariatric surgery, gastric bypass in particular. Overall, female gender, the presence of binge eating, and a lower self-esteem were confirmed to be significant predictors of body image dissatisfaction. Interestingly, these authors find that binge eating and self-esteem accounted for 56% of the variance of body image dissatisfaction among men, but only 33% of the variance among women. Moreover, they observed higher body image dissatisfaction in women than in men, thus extending this well-known gender difference also to candidates to bariatric surgery. Similarly, Annis and coworkers [35] find that self-esteem in adulthood was significantly and negatively associated with body image dissatisfaction. A positive history for stigmatizing experiences during childhood, adolescence, and adulthood seem also to be significantly associated with poorer body image and psychosocial functioning in women with overweight or obesity. In another study, depression, low self-esteem, and childhood teasing about weight or size jointly accounted for 28.4% of the variance in body image

dissatisfaction in women, while depression, self-esteem, and BMI accounted for 47.4% of the variance in men [36]. These findings confirmed that while there are common components that predict body image dissatisfaction for both sexes, body size might play a more important role in predicting body image dissatisfaction in men. Rosenberger and colleagues [37] investigated correlates of body image dissatisfaction in 131 female candidates to bariatric surgery with extreme obesity and revealed that three indices of psychological functioning (depression, low self-esteem, and perfectionism) accounted for 48% of the variance in body image dissatisfaction. These findings are generally consistent with previous studies investigating body image dissatisfaction in bariatric surgery candidates [30], and in women diagnosed with Binge Eating Disorders [36]. Even if perfectionism was not included as a factor in the previous studies, perfectionism emerged as a strong predictor of body image dissatisfaction in this group of patients. Previous studies also supported that perfectionism is an important feature associated to body image dissatisfaction in diverse groups of females with obesity and/or eating disorders [38–41].

In summary, body image problems should not be considered as universally present in patients with obesity. However, it is clear that body image dissatisfaction is probably the most common factor for psychosocial distress in the population with obesity [33], and especially in women [17, 42]. Poor psychosocial outcomes, such as low self-esteem, depression [43], eating disorders [44], and perfectionism [36] seem to be main variables associated with body image dissatisfaction [45]. Moreover, weight-based teasing [33, 46], childhood onset of obesity [46], internalization of sociocultural appearance standards [33], the presence of binge eating behaviors [47, 48], and shame [37] have also been identified as variables independently associated with body image dissatisfaction in obese candidates to bariatric surgery. Finally, the feeling of distress about its own physical appearance and body weight is the major factor driving the choice of bariatric surgery in about 30% of the obese individuals that candidates themselves to a bariatric procedure [49].

17.5 Body Image Changes Following Bariatric Surgery

Several studies examined the changes of body image dissatisfaction after bariatric surgery. Teufel [50] investigated body image in a longitudinal study 1-year after Laparoscopic Sleeve Gastrectomy. Patients with obesity included in this study had extremely poor body image before bariatric surgery compared to normative samples. However, overall a significant improvement was found after 1 year. Self-evaluation of the body and perception of body dynamics also improved, with individuals reporting a less negative evaluation of its own body and perceived improved body dynamics and vitality. Another study, showed as reductions in body image dissatisfaction associated with concurrent reductions in weight and improvements in weight-related quality of life among adults after gastric bypass surgery patients up to 92 weeks post-surgery [51].

Pecori [1] showed that post-surgical bariatric patients experienced less body image discomfort when compared to a control sample of patients with morbid obesity. The authors suggest that the improvements might reflect changes in attitudinal,

affective, and/or cognitive components of body image (i.e., attitudes and beliefs about an individual's body/appearance). Hrabosky [52] also identified significant changes in postoperative body satisfaction after bariatric surgery, with 83% of the patients reporting improvements in body satisfaction after 6 months and 85% reporting improvements after 12 months.

In a longitudinal study in bariatric patients treated with gastric banding, Dixon [53] found significant improvements in patients' appearance evaluation 12 months after surgery, and these improvements maintained out to 4 years. Body image outcomes were also related to excess weight loss, with greater weight loss being associated with higher appearance evaluation. A correlation between excess weight loss and better body image was also found by Sarwer [51], suggesting that weight loss after bariatric surgery is able to reduces body image dissatisfaction in most of the obese individuals. However, despite the above-presented results, it is possible to speculate that while larger weight loss is associated with improvements in multiple quality of life domains, it may not be directly associated with greater improvements in weight and shape concerns. Dixon and colleagues [53] found a discrepancy in changes in body image in persons who underwent laparoscopic adjustable gastric banding. They found improvements in overall body image satisfaction (as assessed by the Appearance Evaluation subscale of the Multidimensional Body-Self Relations Questionnaire, MBSRQ AE) but not changes in body image investment (as assessed by the Appearance Orientation subscale of the measure, MBSRQ AO). No less common are the cases where experience of body image dissatisfaction persists also after bariatric surgery, often associated with excess skin following rapid weight loss that requires body-contouring surgery. As mentioned above, body weight and shape change in a rapid manner and physical and psychological adaptation to the new shape may results in some cases difficult.

About 30% of bariatric surgery patients developed or maintains body image dissatisfaction after surgery and ask for a body-contouring surgery to correct problems with excessive abdominal skin [2, 3]. As reported in a systematic review, residual body image dissatisfaction due to increasing and/or sagging skin has been reported after surgery in as high as 70% of patients, even if 90% were pleased with their overall appearance. Interestingly, patients who reported greater satisfaction after surgery were found to have lost less weight than their dissatisfied counterparts, likely because their "skin problems" were less pronounced. As patients seek out body-contouring surgery to address skin issues, it is important to highlight that also plastic surgeons play an important role in discussing the benefits and costs related with weight loss after bariatric surgery [54].

Song [55] suggested that even if surgery generally improves body image, the profound weight loss following the procedure tend to produce dissatisfaction with other parts of the body. This suggests that as patients become closer to their ideal body image, dissatisfaction may shift to other body parts, being a consequence more of the personality traits and the psychological characteristics of the patients than obesity related [56].

It was finally suggested that body dissatisfaction could become more prominent with time postoperatively, with the occurrence of a disturbance identified as

the "phantom fat" syndrome [57]. However, literature examining the "phantom fat" phenomenon is extremely limited. It is relevant to notes that many patients after massive weight loss due to bariatric surgery report some form of body image dysmorphic disorder. For example, they frequently report that they are unable to recognize their own body after the dramatic and fast weight loss. It is possible to speculate that this phenomenon may depend by the fact that, after bariatric surgery, body schema of our own body in the brain persists to be linked with the mental representation of our body before surgery. A well-described similar phenomenon is the "phantom limb syndrome" that affects amputated patients who may persist in perceive the amputated limb and tend to behave as it is still present.

The fact that obese individuals tend to be engaged more in an allocentric view of their body, than to represent it considering an egocentric prospective [21, 22] may be viewed as a factor maintaining the disturbance of body image in obese individuals after bariatric surgery. Recently, virtual reality approaches were developed to manipulate the engagement of obese individuals toward an allocentric frame of reference and to move more often their attention toward egocentric coordinates. In such a way, adaptation of the mental representation of the body schema to the new body shape should be facilitated [58, 59].

Conclusion

In conclusion, body image dissatisfaction is extremely frequent in patients with severe obesity candidates to bariatric surgery, particularly in patients presenting with distinct physical and psychosocial characteristics. Usually, body image dissatisfaction tends to improve after surgery, but not in all the cases and not in a way that is always proportional to weight loss. Rapid and large weight loss, with associated skin excess formation, could worse body image dissatisfaction in some patients.

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