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Eating Disorders and Bariatric Surgery

This is the final peer-reviewed author's accepted manuscript (postprint) of the following publication:

*Published Version:*

Ballardini, D., Pozzi, L., Dapporto, E., Tomba, E. (2022). Eating Disorders and Bariatric Surgery. Charm : Springer Nature Switzerland AG [10.1007/978-3-030-81174-7\_12].

*Availability:*

This version is available at: <https://hdl.handle.net/11585/884180> since: 2022-05-05

*Published:*

DOI: [http://doi.org/10.1007/978-3-030-81174-7\\_12](http://doi.org/10.1007/978-3-030-81174-7_12)

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## Eating Disorders and bariatric surgery

Ballardini Donatella<sup>1</sup>, Pozzi Livia, Dapporto Elena, Tomba Elena

**Abstract:** *Many studies have shown that patients with severe obesity who are candidates for bariatric surgery are frequently affected by Eating Disorders which can persist even after surgery. Furthermore, bariatric patients can develop EDs and dysfunctional eating behaviours in the post bariatric phase: EDs (BED, AN, BN, NES), LOC, grazing, picking, emotional eating, craving and sweet eating. The presence of eating disorders and dysfunctional eating behaviours may influence the outcomes in terms of weight loss and metabolic parameters. After the description of an illustrative clinical case of a patient with pre-surgical BED and post-surgical BN, the need for a multidisciplinary and structured diagnostic-therapeutic program for the bariatric patient is discussed in order to prevent or treat feeding and eating disorders. The importance of a multidisciplinary team (physician, dietician, psychotherapist, psychiatrist) is also highlighted in the management and treatment of these patients.*

**Key words:** Bariatric surgery, Eating Disorder, obesity, dysfunctional eating, body perception, multidisciplinary assessment, case report

### 1. Introduction

Recently, an increasing proportion of patients with severe obesity undergo bariatric surgery. This intervention is recommended in subjects with a Body Mass Index (BMI) of 40 kg/m<sup>2</sup> and over, or 35 kg/m<sup>2</sup> in the presence of one or more associated medical comorbidities. This treatment option relates to the fact that non-surgical therapies, including drug treatment, dietary treatment and lifestyle interventions, produce modest and short-term benefits in patients with severe obesity (1, 2)

Bariatric treatment produces significant weight loss and the improvement or resolution of the associated medical comorbidities, along with significant physical, psychological and social functioning improvements (3,4). Despite this, the results of weight loss present an important

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variability, even with the most effective bariatric surgery modalities (5). Indeed, a significant proportion of patients who are undergoing bariatric surgery does not achieve the expected weight loss or regains weight in the following decade after surgery (6). The Toronto Bariatric Surgery Psychosocial (Bari-PSYCH) cohort study (7) assessed patients who underwent Roux-en-Y gastric bypass, showing a significant weight reduction in the first post-operative year, while, between the second and third post-operative year, a significant weight regain was observed. Two years after surgery, 21.9% of patients had regained more than 10% of Total Weight Loss (TWL) in the first year, 11.5% had regained more than 15% of TWL and 4.9% of patients had regained more than 25% of TWL (7).

Many studies show that post-operative eating disorders and problematic eating behaviours may represent a major obstacle to achieve and maintain the weight loss in patients undergoing bariatric surgery. Therefore, the outcomes of bariatric intervention, although often significant, are not universal: between 20% and 30% (8) of patients have sub-optimal weight loss experience or significant weight regain within the first post-operative years. Also, patients undergoing bariatric surgery present both short-term and long-term malnutrition risks (9). All these outcomes probably involve both physiological processes and behavioural and psychological factors. Evidence suggests that pre-operative psychosocial status and psychological functioning may contribute to suboptimal weight loss, nutritional deficits or post-operative psychosocial distress. Several studies suggest that the presence of pre-operative psychopathology is associated with suboptimal weight loss, post-operative complications and limited positive psychosocial outcomes (8).

## **2. Eating disorders and problematic eating behaviours**

Within the first post-operative year, a decline in eating psychopathology is generally associated with bariatric surgery. Eating disorders are frequently observed in patients awaiting bariatric surgery which in turn tend to improve after surgery. More specifically, within the first year after surgery the episodes of objective binge eating episodes tend to disappear (7, 10). However, many studies advise that the relapse of dysfunctional eating behaviours could occur beyond this initial year (10, 11). After bariatric surgery the weight regaining risk would remain for life. Behavioural factors could play a modulating role: an increase in dietary impulses, severe decrease in post-operative psychological well-being, problems related to alcohol or drug use seemed to be predictors of significant weight regain in a study where a group of patients with extreme obesity underwent Roux-en-Y gastric bypass. Therefore, involvement of patients by encouraging the use of self-monitoring strategies play a protective role in weight regain (12).

Bariatric surgery creates anatomical and physiological modifications that could impact on patients' capacity to introduce large amounts of food. However, the development of eating disorders and the onset of problematic eating behaviours have been reported in the literature (13, 14). Post-operative anatomical and physiological alterations can impact significantly on patients' diet and eating behaviour. Patients may develop new forms of dysfunctional eating behaviour such as loss of control over eating. These binge episodes, characterized by a feeling of loss of control perceived by the patient followed by negative emotional experiences and guilt, could be objective, but also subjective, which means that they occur in the absence of large amounts of consumed food (15). The prevalence rates of Binge Eating Disorder (BED)(16) in candidates for bariatric surgery range

from 2% to 53%, with variations related to the method used during the investigation (clinical interview or self-report questionnaires) (17). After depression syndrome, BED is the second most widespread psychiatric comorbidity in candidates for bariatric intervention population (18), while post-operative BED prevalence rates (DSM-5 criteria) appear low, ranging from 0% to 10.3% (19). Prevalence rates of subjective experiences of loss of control over eating range from 6% to 64% (20). In a 12-month follow-up study, BED, Night Eating Syndrome (NES) (16) and uncontrolled food consumption reduced after surgery, while patients with pre-operative BED changed their eating patterns, switching to eat meals smaller in volume, but increased in frequency (21).

Pre-operative BED seems to attenuate weight loss. However, in another study (Chao et al., 2016) (22) conducted twenty-four months after bariatric surgery, surgically treated BED patients lost 18.6% of their initial weight compared to 23.9% of patients without BED ( $p= 0.049$ ). The authors thus recommend that patients with this condition, as well as other eating disorders, receive specific psychological support.

After bariatric surgery patients may experience unplanned and frequent consumption of small amounts of high-calorie foods, which circumvent the action mechanism of bariatric surgery (23, 24). The most frequent clinical conditions of such problematic eating behaviours are described below. *Grazing* is defined as the repetitive consumption of small and/or modest amounts of unplanned food not related to hunger. The term "repetitive" has been defined as eating more than twice in a limited period during the day (e.g. morning, evening or during the day) without prolonged intervals between food episodes. It is possible to differentiate between *compulsive grazing*, in which there is a loss of control present in every episode, and *non-compulsive grazing*, in which the act of eating occurs repeatedly in a distracted and unconscious manner. Since small meals consumption is a recommended therapeutic indication, because of the limited gastric capacity, an adequate assessment of food patterns is therefore essential in order to recognize if the food choice and consumption are controlled and if patients recognize hunger and satiety stimuli appropriately (23). The prevalence of grazing in pre-operative patients is estimated at 26.4% (25) whereas in postoperative patients it is estimated at 46.6% (26).

*Picking* or *nibbling* indicate the consumption of small amounts of food between meals, carried out in a repetitive and unconscious way. Very often, the patient is not able to reconstruct precisely the manner and amount of food ingested at the beginning of the episode and/or during the episodes; the feature of control loss is absent.

Another aspect of differentiation between *picking* and *grazing* is identified by the fact that in both subtypes of *grazing* patients are able to reconstruct the situation or the way in which the episodes begin; moreover, the period of time in which the episodes occur is not always marked by planned meals. (23)

*Grazing* or *picking* or *nibbling* eating behaviours are maladaptive phenomena, common in the post-bariatric population, probably exacerbated by prescriptive eating patterns in patients with premorbid altered eating difficulties. All these problematic eating behaviours occur more frequently after surgery with prevalence rates as high as 47.1% (24), a correlation with poor weight loss has also been reported (27).

There is a lack of data on the prevalence of Bulimia Nervosa (BN) preceding bariatric surgery, perhaps because of the denial or minimization of symptoms for reasons of admissibility to surgery (23). Using DSM-5 criteria, 343 patients who were candidates for bariatric surgery have been evaluated (Williams et al., 2017) and the 7.6% met the criteria for BN. In the entire sample, the most frequent compensatory behaviour was fasting (20.4%), followed by excessive physical exercise (11.7%), use of laxatives (5.6%) and self-induced vomiting (1.8%) (28). The presence of BN after bariatric surgery is rare and BN rates are little known. In the post-operative phase patients may experience spontaneous or induced vomiting, which may occur in response to the consumption of poorly tolerated foods, too rapid meal or insufficient chewing or, sometimes, may be a useful tool to alleviate symptoms of excessive gastric replenishment. Often, surgeons themselves advise or encourage the patient to relieve these unpleasant physical symptoms through self-induced vomiting. In patients who have significant weight and body image concerns, vomiting may become a strategy for a faster body weight loss. Therefore, a careful assessment about the reason and the expected outcome of the vomiting is necessary in order to understand whether it is considered as compensatory behaviour or not (24). Another post-operative common clinical syndrome that can be used as a compensatory measure is *dumping* syndrome. Since this phenomenon may occur as a result of a high consumption of sweets and/or large amounts of food causing strong diarrhoea, it is important to assess whether patients experience such feature as a possible loss of control with compensation mechanism. The use of other compensation mechanisms such as the abuse of laxatives and diuretics following bariatric surgery seems to be rare (29).

There are numerous case reports of patients undergoing bariatric surgery who develop symptoms attributable to Anorexia Nervosa (AN) symptomatology: significant weight loss, excessive fear of weight gain, major dietary restrictions and disorders of weight and body image (30)

It is frequent that medical teams in charge of post-surgical follow-up encourage the patients to limit the volume of meals, to strictly adhere to dietary programs, to weigh the food, to break the food into small pieces and avoid specific foods for better food management. These recommendations can be overindulged by patients up to developing eating behaviours and typical rituals of people suffering from AN.

Other eating behaviours that should be considered in bariatric and post-bariatric population are *emotional eating*, *craving* and *sweet eating*.

*Emotional eating*, that is eating in response to emotional distress and stress, is present in 38-59% of surgical candidates (31) and has been linked to other behaviours such as binge eating (32). Such food consumption associated to emotional states seems to improve after bariatric surgery (33), but data in the literature on this behaviour are limited since there are mostly short-term follow-up studies in which the use of validated measures is not always available. *Craving* is an eating behaviour that leads to the consumption of food or a specific food, as a result of intense physiological or psychological impulses other than physiological hunger. *Craving* phenomena are more frequent in candidates for bariatric surgery compared to normal-weight patients and are present in most post-bariatric patients. Guthrie H et al. (2014) (34) found that only about 10% of post-operative patients do not report craving.

*Sweet eating* is generally characterized by excessive intake of high-calorie sweet foods, but its definition varies from one study to another, making difficult to compare data among studies. The lack of a shared definition in the literature may also explain the discordant results on the effect that *sweet eating* has on weight in post-bariatric patients (23).

Finally, a recent study by Lydecker and colleagues (2019) (35) evaluates the behaviour of secretive eating, Loss Of Control (LOC) and psychopathology related to eating disorders through the Eating Disorder Examination-Bariatric Surgery Version (EDEBSV) in 168 adults who experience LOC following bariatric surgery (6 months later). As a result, 37% of patients report behaviour of secretive eating, of which 54% meet the criteria for BED and 25% report subthreshold symptoms of BED. Symptoms of eating disorders (frequency of LOC episodes, overall severity, dietary restriction, overestimation of body weight/body shape and dissatisfaction with the body) were higher among patients with secretive eating behaviour, while weight-related variables (BMI and % of TWL) were not significantly associated with secretive eating.

The lack of significant differences for weight variables suggests that secretive eating may be more related to body dissatisfaction than to weight loss after surgery (35).

Another eating disorder that should be mentioned in this section is Night Eating Syndrome (NES), which is included in DSM-5 (APA 2013) (16) as one of "other specified feeding and eating disorders". NES is clinically defined by the presence of evening hyperphagia, nocturnal ingestion, morning anorexia and sleep problems. It seems to be associated with a higher risk of psychopathology, mood disorders, anxiety and sleep problems (36)

There are inconsistent data on NES prevalence in post-operative patients, while pre-operative prevalence is up to 17.7% (37). Little is known about the impact of bariatric surgery on this syndrome. Some authors argue that since this disorder involves a shift in the circadian pattern of eating that disrupts sleep, it may continue after bariatric surgery. Moreover, it does not consist in the objective ingestion of large amounts of food. According to some studies the symptoms of NES seem to decrease after bariatric surgery. To date, there is no evidence that pre-operative NES has a negative impact on weight loss after surgery (38).

### **3. Body perception and body misperception in obese patients**

The success of bariatric surgery is defined by the occurrence of a rapid and intensive weight loss, which typically improves body image. However, changes in body image are quite complex and such a physical change is not always associated with a self-image adjustment. In fact, several studies report that many patients may continue to internally perceive themselves as being fat, configuring a phenomenon called "mind-body lag" or "allocentric lock". Faccio and colleagues (2016)(39) observed that although patients are satisfied in term of weight loss outcomes, after the bariatric intervention they show considerable difficulties in adapting their identity to the new body; even after a year, patients tend to think and behave as obese people. The impact of the external world on body image, cognitive, emotional, and behavioural changes that occur in relation to body image and coping mechanisms to mitigate the undesirable changes of body image (e.g. the development of excess skin) should be assessed (40).

Neuroscience data underscore that amygdala seems to play a crucial role in processing allocentric sensory input to long-term memory structures. The social stigma related to being obese may be

associated with negative emotions that are stored in the amygdala and repeatedly rise in bariatric surgery patients brain, even once the body condition has changed (41, 42)

In the same study, Perdue et al. (2018) (41) assessed forty female patients between 18 and 30 months post-operative bariatric surgery, investigating whether evolving self-view, health locus of control, tendency toward alexithymic thoughts, and health quality of life may present significant relationships. The "Evolving Self-View After Bariatric Surgery" (ESV) is a specific measure created to identify patient's orientation as "obese" or "ex-obese" person. Despite weight loss, the majority of women identified themselves in the "obese" category (n=28, 70%) compared to the women in the sample who defined themselves in the "ex obese" category (n=12, 30%). Such results seem to confirm the multifactorial nature of obesity, characterized by biological, environmental and psychological components. In particular, obese identity seems associated to greater difficulties in describing feelings, a tendency to feel less energetic, less calm and happy. Therefore, it seems important not only to define pre-operative psychological issues that can influence post-operative conditions, but also to provide psychological support to facilitate greater adaptation in the post-operative phase.

If therefore the maintenance of an obese "self-identity" could affect the quality of life and satisfaction with the results of slimming, patients undergoing bariatric surgery may present dissatisfaction with body image also related to overestimation of body weight or shape. Weight or shape overvaluation is a concept that occurs when self-assessment or self-esteem is based mainly and/or excessively on one's own weight or body shape (43). This is recognized as a fundamental and central cognitive feature of many eating disorders (44,16). In BED, overestimation of the body image is not a diagnostic criterion, but when present it has been associated with greater level of psychopathology and severity (45, 46, 47) and is a predictor of worse treatment outcomes (48). Unfortunately, little is known regarding overvaluation among individuals who undergo bariatric surgery and those with post-operative eating disorders. Ivezaj et al. (2019) (49) recently published a study on the role of weight or body shape overestimation in post-bariatric surgery patients with Loss-Of-Control (LOC) eating. In particular, the frequency of body overvaluation and the association between overvaluation and clinical patterns were examined. Weight and clinical patterns in patients with or without clinical levels of overevaluation of body and shape following bariatric surgery were also compared. The study was conducted in a sample of 145 adults after 6 months of sleeve gastrectomy and all participants had experienced regular LOC episodes. Half of the patients reported clinical levels of body and weight overestimation which was also found to be associated with greater eating disorder psychopathology, depression symptomatology and disability/poorer functioning. Future research is needed to examine the prognostic significance of overestimating body weight and shape before or after a bariatric operation in individuals with or without an eating disorder.

The assessment of problems in weight and shape in post-operative bariatric patients represents a complex clinical process. The fear of weight gain in this population is realistic. Clinicians encourage these patients to monitor weight and control those factors that may promote weight gain. Weight loss is often accompanied by important aesthetic and functional side effects, that can cause high body dissatisfaction and disappointment with the expected weight and shape improvement.

Conventional body satisfaction assessment may not capture the complex nuances of body dissatisfaction in a population marked by specific changes in body shape.

#### 4. Case report

This section presents an illustrative clinical case of a patient with a severe eating disorder who underwent Gastric Banding (GB) at the age of 20 years (pre-operative BMI: 38 Kg/m<sup>2</sup>). This case brings up noteworthy clinical features for further discussion and reflection.

A 27-year-old woman, normal weight (BMI: 22 Kg/m<sup>2</sup>), arrived at a specialized outpatient treatment clinic for feeding and eating disorders, referred by her general practitioner.

She referred to suffer of Bulimia Nervosa and to be afraid of being affected for many years during which for a long time she attributed her symptomatology to the GB. She had recourse to vomit after more abundant meals than her post-operative diet indicated. She could not tolerate that sense of stuffing and declared to vomit for this reason. Later on, she began using vomiting also to manage objective binge eating episodes. The patient reported a complete "loss of control" of her symptoms, feeling like in a tunnel and looking for an adequate treatment to recover.

Specialized multidisciplinary assessment including medical and nutritional assessment, integrated to psychiatric, psychological and psychotherapeutic assessment was conducted. Figure 1 describes the model of the structured multidisciplinary diagnostic-therapeutic process which integrates medical and nutritional therapy with psychiatric, psychological and CBT-based psychotherapeutic therapy (50).

The following psychometric instruments to support respectively psychiatric diagnoses and Eating Disorder-related psychopathology and general psychopathology severity were used: Structured Clinical Interview for DSM-5, Clinical Version (SCID-5-CV) and SCID 5 Personality disorders (SCID-5-PD) (51), Eating Disorder Inventory-3 (52), Eating Attitude Test (53), Three Factor Eating Questionnaire (54).

Figure 2 provides a graphic representation of the patient's complex anamnesis.

It was given a diagnosis of BN (DSM-5) (16) with at least three binge eating episodes per day, both subjective and objective, followed by self-induced vomiting. The patient reported an eating pattern characterized by several small meals between episodes of loss of control. This symptomatology worsened in the last year and its onset occurred about three years after a restrictive eating pattern period. After GB intervention the patient managed to follow a strict diet, with rare episodes of loss of control followed by vomiting. The patient complained about gastro-oesophageal reflux associated with a retro-sternal burning and pharyngitis. Sleep is very disturbed with two or three awakenings per night. The menstrual cycle is regular. Her blood tests showed critical clinical concerns, such as a serious microcytic hypochromic anaemia (Hb 8,0 g / dl, VN 12,0-16,0) associated to Iron, Folic Acid and Vitamin B<sub>12</sub>, Vitamin D deficiency, a slight rise in transaminases; electrolytes, inflammatory and coagulation parameters were in normal ranges; kidney function not impaired. Cardiological evaluation described a satisfactory hemodynamic compensation in a condition of healthy cardiovascular system, except for moderate bradycardia and hypotension. Instead, significant alterations occurred in the oesophagus and stomach, gastric sac extensive dilatation



above the bandage, class B reflux esophagitis (55) and hyperaemia of the gastric wall; the search for *Helicobacter pylori* resulted negative. The gastroenterologist indicated gastric banding removal, initially refused by the patient because of the fear of gaining weight without it.

It should be noted that it was not possible to refer to the medical record of the GB operation since it was carried out in a private hospital of a different region. Pre-operation assessment consisted only in two interviews (with surgeon and psychologist). During the assessment the patient omitted to declare her frequent binge eating episodes fearing that she would be refused for the surgery. Since at age of 16 years, the patient presented binge eating episodes, without conduct of elimination or compensatory methods; the symptomatology pattern described by the patient could fulfil a retrospective diagnosis of BED (DSM-5 criteria) (16). Moreover, the patient did not attend the follow-up visits after the surgical operation. She managed to control her diet for a few years even though she had sporadic binges (no more than 1 episode per month) which were always followed by vomiting. Three years before, after the interruption of a romantic relationship, the binge episodes intensified in frequency, became planned and the vomiting became self-induced. The patient started perceiving a significant body dissatisfaction and reported "*I am still an obese person as before the bariatric surgery*". She has never been motivated for entering in specialized ED clinical program treatment; only recently she asked her family doctor help for a specialized treatment support.

Clinical and psychometric assessment highlighted the following psychopathological features: body dissatisfaction, drive for thinness, bulimia and worry about food, low self-esteem, poor psychological well-being (in particular impairment in autonomy, environmental mastery, personal growth, positive relations with others, purpose in life, self-acceptance) and high social insecurity. In addition to the symptoms of the Eating Disorders, the clinical evaluation made by the psychotherapist pointed out previous traumatic experiences related to bullying and the sudden death of the grandmother (the main caregiver in her childhood). Her childhood was characterized by parental emotional neglect, lack of attention and insecure attachment - mainly related to the aspects of physical as well as emotional care – feeling of loneliness and guilt linked to the extremely conflictual parental divorce. Affective instability, difficulty in emotional identification, constant feeling of emptiness and high fear of being abandoned, obsessions related to food and body shape were present at the time of taking charge. Moreover, interpersonal relationship difficulties seemed to be characterized by personal insecurity, vulnerability to the judgment of others and isolation.

The treatment consisted of a psychotherapeutic therapy, integrated with a psycho-nutritional rehabilitation. The psychotherapeutic treatment, cognitive and cognitive-behavioural orientated, had the following objectives: establishing and maintaining a therapeutic alliance; managing and decreasing the severity of ED symptomatology (in particular, binges and vomiting episodes); promoting adaptive relational and communicative skills; interventions oriented to the internal processing of the traumatic experiences; promoting mentalisation functions. Psycho-nutritional treatment included, in its first treatment phase, *in loco* GB; consequently, a motivation phase oriented to the GB removal (removed after five months). Then, treatment was oriented to support nutritional problems and any worries and phobias that emerged after GB removal. Figure 3 presents in detail the psycho-nutritional rehabilitation process.

After a 2-year follow-up, the patient maintained remission from the eating disorder and a BMI of 22.5 kg/m<sup>2</sup>.

The patient provided consent for this case report.

## 5. Discussion

The clinical detection of any eating disorder and problematic eating behaviours in patients who are candidates for bariatric surgery, as well as their possible maintenance or exacerbation following surgery, is little investigated. Moreover, such lack of data is perhaps underestimated (24). The clinical case presented offers several clinical insights here discussed in detail.

First of all, conducting a clinical evaluation to determine whether surgery is safe and appropriate is crucial. This assessment should include an adequate period of time during which the patient should be observed, and it should be repeated before surgery, especially when a candidate has been on a waiting list for a long time. The assessment should be structured and performed by an experienced multidisciplinary team composed of physician, dietician, surgeon, psychologist and psychiatrist (56). Medical history, physical examination and laboratory investigations, mental health assessment and interviews to determine the patient's motivation for bariatric surgery should be included. Also, it is important that patient understands the procedures, the possible complications and post-operative therapeutic needs. This must be assessed in order to improve the shared decision making as well as determine whether the patient has the necessary and appropriate social support. Psychosocial analysis is needed to evaluate the environmental, cultural, economic and working conditions that may support or hinder the patient's compliance with the post-operative program.

A critical element during this clinical evaluation relates to the clinicians' skills to understand when patients minimize eating psychopathology and other psychopathological symptoms in order to receive authorization to proceed to surgery (as our patient reported). Ambwani et al. (2013) (57) studied the prevalence of such "socially desirable response style" measured using two scales on socially desirable response styles, in particular the Marlowe-Crowne's Social Desirability Scale (MCSD) and the Inventory Positive Impression Management (PAI-PIM). Among the participants (N=359), 33-40% of them scored higher than the cut-off score established for the Inventory Positive Impression Management; 62-67% scored one standard deviation above the normative average on Marlowe-Crowne's social desirability scale. Therefore, such data support that many bariatric surgery candidates present a response style associated with lower reporting on psychological problems which in turn may interfere with an accurate assessment of the patient's functioning. These patient attitudes should be evaluated not as a desire to "lie", but rather as a "symptom" of the patient's own suffering from which the diagnostic responsibility of the bariatric team clinicians derives.

Psychological and psychiatric eligibility criteria for bariatric intervention should be further explored. Psychopathology can compromise a patient's ability to manage not only the surgery, but the complex and demanding post-surgical phase, both in the short and long term. Patients with a higher degree of obesity present also a higher rate of mental illness, addiction disorders and sexual abuse (58) and have a higher likelihood of suffering from depressive disorders. Therefore, studies suggest that patients should be screened for depressive disorders, with particular attention to suicidal ideation, mania, anxiety disorders, psychosis, substance use and abuse, history of sexual abuse, family history of mental health problems and any previous psychiatric treatment experiences.

To date, there are no clear and shared guidelines for the psychological evaluation (56), procedures, techniques, timing and duration of the bariatric patient assessment. For this reason, it is necessary to keep the clinical behaviour more protective for the patient. As already reported, eating disorders are frequent in patients who are candidates for bariatric surgery, so their screening is necessary. BN, BED and NES are all clinically relevant clinical disorders and syndromes that should be considered when defining eligibility for surgery. The presence of BN should represent an absolute contraindication for surgery, whereas BED is not contraindicated it should be carefully examined (for example, the presence of emotional triggers for eating and the medical history). In the presented case, the onset of BED pattern developed subsequently a history of childhood eating disorders characterized by loss of food control, childhood obesity, stigmatization and weight teasing in the early adolescence and severe grief in adolescence. Clinicians must considerate the possibility that bariatric intervention may favour the development of an eating disorder or a switch towards another form of eating disorder. In the case of our patient, the urge to thinness, high body dissatisfaction, loss of food control since childhood, failed dietary attempts may all be considered as predisposing factors to BN.

Post-bariatric therapeutic indications (e.g. dietary restriction, use of laxatives for the constipation, vomiting to manage gastric discomfort) can exacerbate eating behaviours and pathologic practices in order to control weight fluctuations. This, in association with the presence of *emotional eating*, LOC eating and an increase in impulsive behaviours in response to emotions and negative experiences, would further explain the development of an ED or a relapse. (59, 60)

Many authors evaluated the frequency and behavioural characteristics associated with a form of post-operative binge eating disorder that could be defined as "Bariatric Binge-Eating Disorder". This condition fulfils all criteria for DSM-5 binge-eating disorder, except for the requirement of an unusually large amount of food, consumed during loss of control eating (15, 37, 60).

Another important debate relates to bariatric surgery in children, adolescents and young adults. In the developmental phase, eating disorders are generally common, in particular for eligible patients for bariatric surgery such disorders are present in a substantial percentage, almost 25% (61). Adolescence is a complex period characterized by biological, psychological and social development changes and bariatric surgery in adolescents may be therefore associated to potentially different outcomes from those considered for adults. Bariatric surgery for adolescents and young people involves medical and ethical dilemmas that are certainly superior than those in adults. Systematic reviews identified significant health benefits (61) but long-term data are still scarce in particular regarding both nutritional and psychological complications, social and life outcomes (62).

Mackey (2018) evaluated the rates of psychiatric diagnoses in a clinical population of adolescents undergoing bariatric surgery; in particular, seventy-one percent of adolescents qualified for a psychiatric disorder (anxiety, 26%; depression, 42%; ADHD, 22%; eating disorders, 8%). The presence or absence or number of diagnoses before surgery was not associated with weight loss outcomes after surgery (63).

Adolescents with Loss Of Control (LOC) over eating seem to gain greater advantages from surgical treatment, precisely because of the possibility to recover an adequate dimension of social life in a relatively short time. In adolescence, the shape and body image represent a pivotal factor in the acceptance by peers and therefore the opportunity to reduce the risk of depressive syndrome,

isolation, suicidal ideation and chronic eating disorders may constitute a noteworthy treatment option (64).

Recently, Goldschmidt et al. (2018) studied LOC over eating in a group of patients (n=234) aged 13-19 years. The emerged results underscored that although pre-surgical LOC over eating was not related to relative weight loss after surgery, post-operative LOC over eating may adversely affect long-term weight outcomes. LOC over eating episodes decreased in the first six months post-surgery, but increased thereafter. Therefore, targeting such behavioural feature may justify further empirical and clinical attention, suggesting the need for longer follow-up studies (65).

## **6. Conclusions**

Bariatric surgery currently represents one of the most important and innovative therapeutic strategies for people affected by severe obesity. Bariatric approach can drastically reduce cardiovascular risk and mortality in obese patients, promoting weight loss and several metabolic and weight-related improvements, both in adults and in pediatric age patients. Despite this, further researches are still needed to establish clinical evaluation criteria for patients eligible for the intervention and the post-bariatric management. Particular attention must be paid to the psychopathology, to pediatric age patients and young adults. It should also be highlighted that most of the studies presents short and limited follow-up periods; moreover, a notable rate of patients abandon post-bariatric follow-up: as a result, a possible limitation of significance may occur.

In consequence, an adequate post-surgical nutritional rehabilitation is needed, as well as a psychological and psychiatric re-assessment, specifically indicated for patients affected by eating disorders and depressive syndromes in order to start a specific therapeutic program.

Specific diagnostic-therapeutic program should be structured for the post-bariatric patient, referring to pre-bariatric assessment, post-surgery monitoring which considers metabolic aspects and weight issues, as well as mental health and quality of life issues.

Finally, to provide post-surgery improvements it is important to entrust the bariatric patient management to an experienced multidisciplinary team which should include, in addition to the surgical team, professionals as psychiatrists, psychotherapists, physicians and dietitians (specifically trained for the ED identification). The post-bariatric patient not only needs specific nutritional support (essential for malnutrition prevention), but also a long-term multidisciplinary support, in order to avoid dysfunctional behaviours consequent to cognitive and dietary restriction, needed after the intervention. So, it would be desirable to organize a long-term nutritional counseling, associated with an accurate assessment of eating behaviours, in all bariatric patients, in order to early identify the possible development of ED patterns or subthreshold EDs and problematic eating behaviours.

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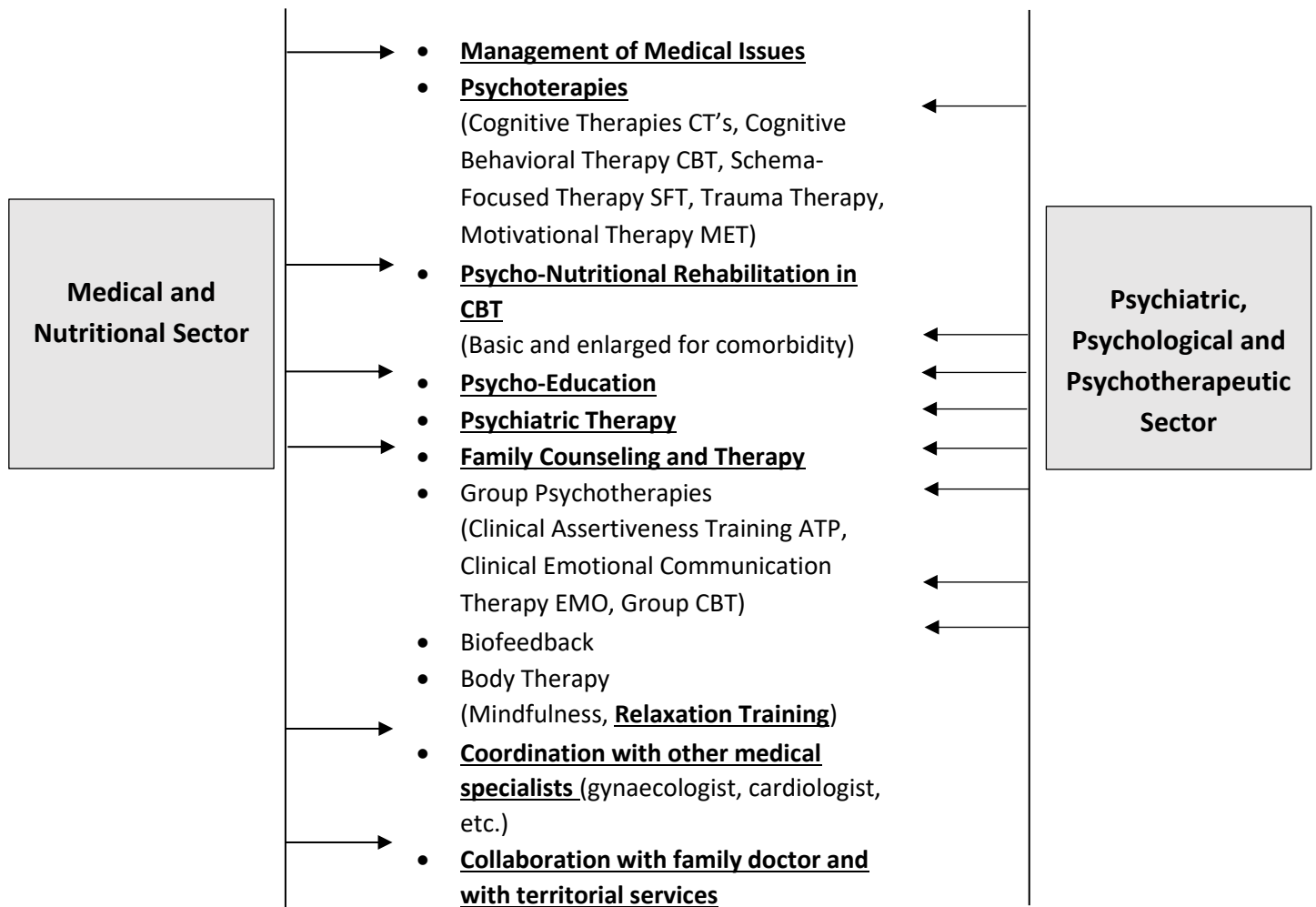
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## Specialized Multidisciplinary Outpatient Treatment for Eating Disorders



*Ballardini, D. & Schumann, R. (2011). La riabilitazione Psico-Nutrizionale. Carocci, Roma*

**FIGURE 1** - The model of the structured multidisciplinary diagnostic-therapeutic process. The model integrates medical and nutritional therapy with psychiatric, psychological and psychotherapeutic (CBT) therapy. Patient's therapies are underlined (*Ballardini, D. & Schumann, R. (2011). La riabilitazione Psico-Nutrizionale. Carocci, Roma*)

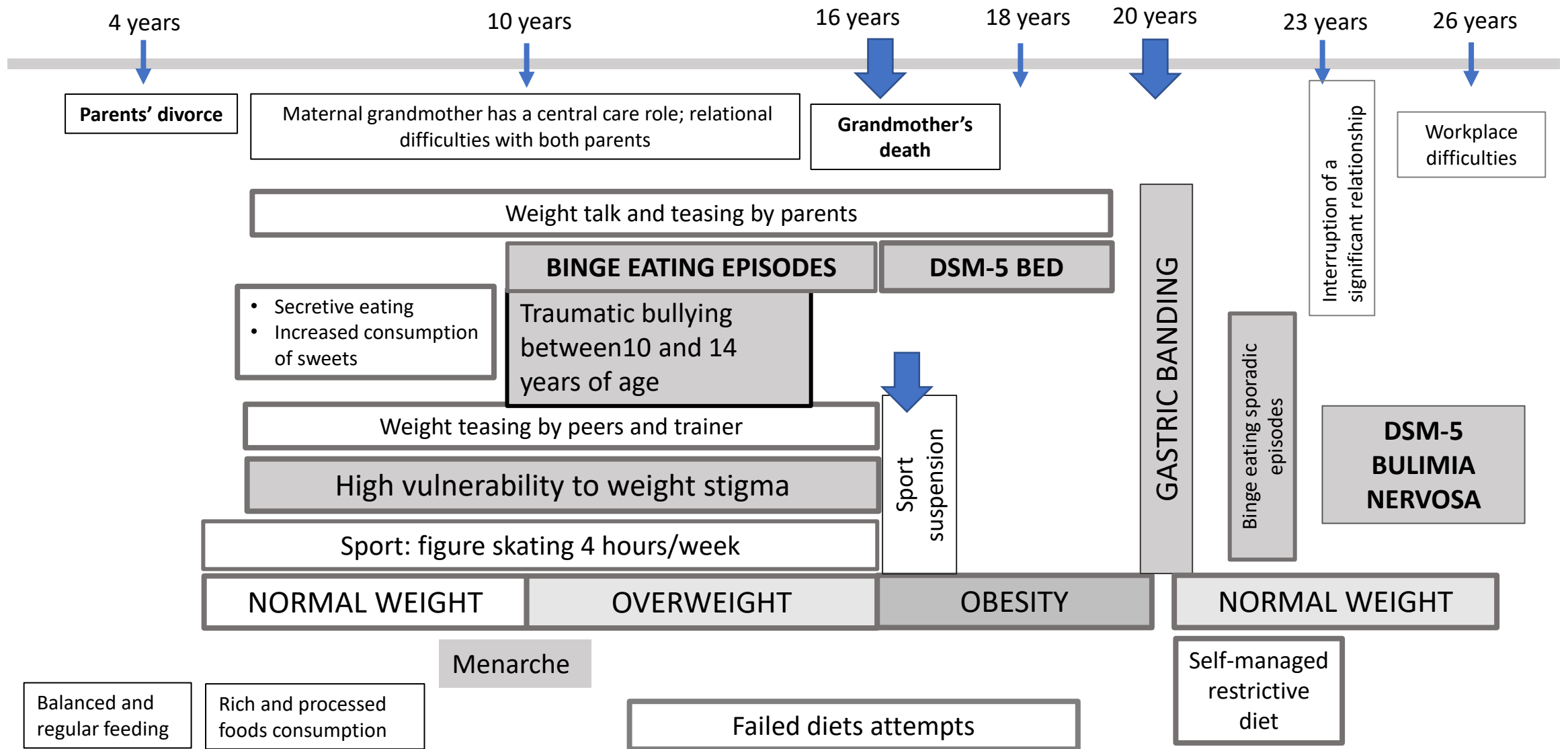


FIGURE 2. A graphic representation of the patient's complex anamnesis.

**FIGURE 3. Psycho-Nutritional Rehabilitation (PNR) Treatment/Project/PROCESS (Fasi del Progetto di trattamento PNR..... del caso clinico descritto di female paziente di 27 con bendaggio gastrico affetta da Bulimia Nervosa (DSM-5)**

