



# The Role and Concept of Abdominoplasty at the Final Stages of Bariatric Interventions in Patients with Morbid Obesity

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## Abstract

Today we can say that morbid obesity is almost the main subject of such an urgent direction in medicine as bariatric surgery, which is indicated for patients with a BMI over 35 kg/m<sup>2</sup>. This young rapidly developing area of surgical gastroenterology has not yet been sufficiently studied in the Russian Federation. However, according to the popularization of the method and the number of surgical interventions performed annually, this direction is rapidly gaining momentum. In comparison with 2003: the number of bariatric operations performed in Russia did not exceed 300-350 per year. According to the national bariatric registry for 2020, more than 16980 surgical interventions were performed in the Russian Federation. The National Bariatric Registry was created in 2013 on the initiative of the Stavropol doctor and President of the Society of Bariatric Surgeons of Russia concurrently - Bekhan Bayalovich Hatsiev, and it keeps records of absolutely all such operations and postoperative observations.

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## 1 Introduction

The most popular operation in Russia from 2013 to 2020 was longitudinal resection of the stomach (almost half of all types of operations). Gastric banding (the peak of popularity in 2013-2015) and mini gastric bypass surgery (actively gaining popularity recently) are located on the 2nd and 3rd places. 2020 was a record year for the number of entries in the national bariatric registry. In addition, this resource is one of the most complete among similar registries of other states. In 2020, he accumulated more than 90% of the total bariatric activity of the Russian Federation. This is the best indicator when compared with other national and international registries of bariatric surgery.

However, the numerous benefits that people receive after extremely rapid weight loss are accompanied by significant changes in appearance due to the formation of skin-fat folds throughout the body. Very often, such patients begin to turn to plastic surgeons, since otherwise, it is almost impossible to solve this problem [1, 2]. Yashkov, Yu.I. writes in his articles that "the situation should be considered optimal when a plastic surgeon works as part of a bariatric team" [3]. This review article discusses the role of abdominoplasty in the final stages of surgical treatment of patients with morbid obesity after bariatric surgery.

All this suggests that obesity surgery is proving its effectiveness. This review article discusses the role of abdominoplasty in the final stages of surgical treatment of patients with morbid obesity after bariatric surgery.

## 2 The Role of Abdominoplasty in the Treatment of Patients with Morbid Obesity

Over the past century and a half, the spectrum of diseases in the human community has been radically changed. If earlier people suffered and died mostly from infections, today there is a rampant epidemic of autoimmune disorders, allergies, insulin-dependent diabetes, and obesity. Moreover, the scale of the last two pathologies makes it necessary to take measures to eliminate them not only from the medical society but also at the state level in a number of countries. Although, as statistics and new data on the etiology and pathogenesis of obesity demonstrate, the problem is much more significant and deeper than it seemed before [1,4]. And in order to take certain steps towards correcting the situation in the context of modernity, there is a lot of research and social work to eliminate the causes and risk factors. The World Health Organization has officially dubbed obesity as a non-communicable epidemic that requires close attention, especially morbid obesity (hereinafter referred to as MO).

MO implies excessive deposition of fat mass, which is characterized by a BMI  $\geq 40$  kg/m<sup>2</sup> or a BMI  $\geq 35$  kg/m<sup>2</sup> in combination with serious complications associated with obesity [2]. That is, it can be a separate nosological unit and a motley syndrome with associated metabolic disorders [1,5]. This is one of the most serious causes of the development of arterial hypertension (hereinafter AH), sleep apnea syndrome, insulin-dependent diabetes, pathology of joints and spine, diseases of the digestive system, sexual disorders and even infertility. Obesity is accompanied by a decrease in

mental performance, causes psychological discomfort, a state of chronic depression and fatigue [2, 6].

These are well-known facts, but despite this, the scale of the problem is increasing. With the spread of MO, in parallel with the therapeutic and scientific side of solving the problem, a relatively young direction in surgery – bariatric surgery (hereinafter BS) began to develop actively. On the one hand, this happened due to the evidence of the ineffectiveness of conservative treatment in the long term in patients with MO: almost 95% of patients recover the lost mass within the first year [7-9], and insufficiently effective treatment of MO cannot be considered safe, since it does not eliminate the dangers of the disease itself. Therefore, we can safely say that MO is the main subject of BS, especially in economically developed countries, where, according to average estimates, MO occurs in 2-6% of the population [10].

The distribution of subcutaneous fat depends on many factors determined by gender and genetics. Male-type obesity involves the maximum accumulation of fat mass intraabdominal and under the skin of the anterior abdominal wall, in the pubic part. In women – in the hips, buttocks, mammary glands. The most common problem area is the anterior abdominal wall, where abdominoptoses are formed, known as "aprons". Patients with MO in the groin, on the anterior abdominal wall often develop a purulent rash, cellulite, and skin maceration, which are accompanied by wetness (wet rashes on the skin) and an unpleasant odor [11].

### **3 History of Abdominoplasty**

The first abdominoplasty operation was performed in 1890 by Demarse and Marx, and the removal of a wide fat fold on the abdomen was developed by Kelly in 1899. At the beginning of the XX century, namely in 1939, Thorek described the complex abdominoplastic operations applicable to him in the work "Plastic removal of adipose tissue". Abdominoplasty is an operation that solves the problems of abdominoptosis, hanging of skin and fat folds throughout the body after extreme weight loss, postoperative deformed scars, flabby and weakened abdominal muscles, hernias, diastases, etc. In some sources, the term "abdominal dermatolipectomy" can be found, which means, as a rule, the elimination of an exclusively skin-fat flap without manipulations with the muscular-aponeurotic framework [2].

Due to the lack of awareness of the population about the possibilities of BS and the etiopathogenesis of their disease, many patients with MO turn to plastic surgeons to eliminate skin-fat "aprons", believing that this is an effective way to lose weight. In fact, abdominoplasty in such cases is a time-consuming and technically complex event due to the significant amount of wound discharge and the possibility of suppuration after surgery, and postoperative monitoring requires much more time and attention than the patient would turn to plastic surgery after bariatric surgery or self-weight loss. Ie, cosmetic results obtained against the background of uncorrected obesity cannot be considered either satisfactory or effective for the long term. In patients who have lost weight on their own or with the use of BS, abdominoplasty proceeds with less difficulties, both technical and restorative [11,12].

Types of operations possible with parallel BS operations:

1. Elimination of postoperative hernias;
2. Simultaneous elimination of other concomitant pathologies in the patient;
3. Simultaneous performance of the main bariatric intervention (according to an individual treatment plan) or simultaneous performance of corrective operations in other problem areas;
4. Elimination of complications and side effects of previous operations (for example, elongation of the small intestine in case of malabsorption syndrome) [2].

Accordingly, abdominoplasty cannot be used as a solution to MO and associated pathologies, but it can perfectly complement BS.

In patients with BS, abdominoplasty can be multi-purpose and multifunctional. In some cases, the elimination of excess skin-fat mass on the anterior abdominal wall is possible simultaneously with the main bariatric intervention [13]. Such an operation, panniculectomy, is used to increase the physical activity of patients by removing a large number of overhanging and often macerated flaps, i.e. it has a functional symptomatic character. At the same time, the surgical community warns that there is no need to expand the indications for such operations: it is necessary to be sure that abdominoplasty in a particular case can really seriously alleviate the patient's condition and benefit.

Another case where abdominoplasty can be applied, if the patient's condition allows, is a combination with restorative interventions on the small intestine. In rare cases, after gastric bypass surgery, there is a risk of developing protein deficiency and other nutritional deficiencies - due to excessive weight loss. If such a problem is not solved by conservative methods or it begins to be recurrent, then similar operations are used. Otherwise, when an insufficient result of the operation is noted against the background of weight stabilization, abdominoplasty can be combined with increased malabsorption due to shortening of the general and alimentary loops or with a further decrease in the volume of the stomach [14].

A complex of physical, laboratory and instrumental diagnostic studies make it possible to exclude symptomatic hypertension and identify possible lesions of other target organs [15-17]. The doctor should remember the need to use in practice the skills of objective research, including measurement and assessment of blood pressure, palpation of the pulse on the radial, carotid and femoral arteries, determination of the boundaries and tones of the heart, measurement of height and body weight (which, unfortunately, are often omitted, especially at the initial admission in the clinic) [18-22]. Such patients are advised to consult an optometrist to examine the fundus and detect retinal angioretinopathy. The list of mandatory studies includes a clinical blood test with platelet count, determination of the concentration of cholesterol, sugar, electrolytes, blood creatinine, general urinalysis, ECG registration. According to the indications, ultrasound examination of the kidneys, intravenous urography, renography with captopril (if renal artery stenosis is suspected), kidney angiography, echocardiography (EchoCG), and daily monitoring of blood pressure are performed. Along with an increase in blood pressure, the most important

diagnostic signs of primary arterial hypertension proper are a tense, firm pulse, expansion of the boundaries of the heart to the left due to an increase in the left ventricle, ECG and EchoCG signs of left ventricular hypertrophy, noise over the carotid arteries with their narrowing and in the epigastric region with renal artery stenosis, changes in the fundus (angioretinopathy retina) in the absence of symptoms of damage to the aorta and its large branches [23,24].

## **4 The Technique of Performing Abdominoplasty after Massive Weight Loss**

On the day of the operation, the incisions and areas of the skin and subcutaneous tissue of the anterior abdominal wall are marked, which will be removed during the operation. Marking is better performed in a standing position since in the prone position the boundaries of the lateral excess flaps are lost. The lower incision line should provide correction of excess fat accumulations in the pubic area, and, as a rule, it is located 7, 0-10, 0 cm above the level of the genital slit in women.

Abdominoplasty is preferably performed under general anesthesia in the patient's back position. The peripheral vein is catheterized and a Foley catheter is installed. After the treatment of the surgical field, the skin is incised along the previously planned lines. Separately, the umbilical stalk is "cut out", which will be moved. The skin-fat flaps are mobilized 5-6 cm wider than the marking line for subsequent stitching of the flaps without tension. Then, after careful fitting and matching the edges of the incisions, excess skin-fat flaps are excised. To form the muscular-aponeurotic framework of the anterior abdominal wall, the aponeurosis is sutured along the midline with separate nodular sutures with non-absorbable threads. In the presence of postoperative hernias of the anterior abdominal wall, hernioplasty is performed more often using a mesh prosthesis, which is preferably located preperitoneal. Next, the navel is implanted into the newly marked place on the skin of the anterior abdominal wall. Subcutaneous sutures are applied with absorbable threads 3-0. Wound drainage is carried out by PCV tubes 5 mm in diameter through contrapertures in the suprapubic region. The operation is completed by applying an intradermal suture using absorbable threads.

At the first stages of the work, mainly transverse access or access in the form of an incomplete anchor is performed – dissection of the skin longitudinally upward to the navel level.

Advantages of Anchor access:

1. Creating an optimal contour of the abdomen with the formation of the waist;
2. Elimination of the massive "apron" creates a better visualization of the hernial defect and the edges of aponeurosis, which facilitates hernioplasty if necessary;
3. Free access to any part of the abdominal cavity through a hernial defect of the anterior abdominal wall or through a separate mini-laparotomy;

Wide excision of excess skin-fat tissue provides free access to any part of the abdominal cavity. If there was a hernia, then access to the abdominal organs was carried out through a hernial

defect of the anterior abdominal wall. From such access, it is quite convenient to perform longitudinal resection of the stomach, as well as any operation on the small intestine.

In practice, surgeons try to separate the edges of the flaps as little as possible in the area of the median incision and in the area of the lateral flaps. This helps to preserve the blood supply to the lateral flaps, preventing the development of marginal necrosis. This prevents the development of gray postoperative wounds. In order to strengthen the weak points of the anterior abdominal wall, the duplication of aponeurosis is also formed by monofilament threads with long resorption periods [12-15].

## 5 Conclusion

Bariatric Surgery (BS) is a young and rapidly developing area in obesity surgery in Russia. Abdominoplasty surgery can play a useful role in improving cosmetic results and the functional component of the life of patients with MO in combination with bariatric operations. However, it should be remembered that cosmetic results obtained against the background of uncorrected obesity cannot be considered either satisfactory or effective in the long term. In patients who have lost weight on their own or with the use of BS, abdominoplasty proceeds with less difficulties, both technical and restorative. The treatment of "post-bariatric" patients is a difficult task for a doctor, since it requires a step-by-step approach to choosing tactics, performing complex accesses, and using various high-tech surgical techniques. Careful planning of the operation allows you to minimize side effects and complications.

## 6 Availability of Data and Material

Data can be made available by contacting the corresponding authors.

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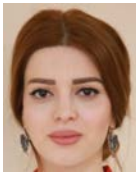
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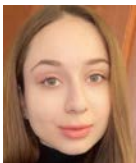
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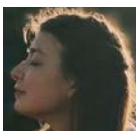
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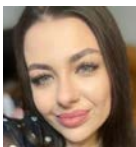
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