

Body Image After Sleeve Gastrectomy: Reduced Dissatisfaction and Increased Dynamics

Martin Teufel · Nicole Rieber · Tobias Meile ·
Katrín Elisabeth Giel · Helene Sauer ·
Katharina Hünemeyer · Paul Enck · Stephan Zipfel

Published online: 11 June 2012
© Springer Science+Business Media, LLC 2012

Abstract

Background Individuals with severe obesity commonly report poor body image. Improvement in body image has been found after conservative weight reduction programs as well as after bariatric surgery (gastric bypass, biliopancreatic diversion, or gastric banding). However, no studies investigating body image after laparoscopic sleeve gastrectomy (LSG) are available.

Methods Of 70 consecutive patients who planned to undergo LSG at a comprehensive obesity center, 62 patients were included in the study and evaluated before surgery. Their mean body mass index (BMI) was 51.3 kg/m² and the patients' mean age before surgery was 43.8 years. One-year follow-up data were obtained for 51 patients (82.3 %). Body image was assessed using the body image questionnaire (BIQ-20), and depression was assessed using the Patient Health Questionnaire (PHQ-9).

Results Patients reported poor body image before surgery. One year after LSG, negative evaluations of the body and perceptions of body dynamics and vitality had markedly improved, without reaching healthy levels. No correlations between body image and weight-related parameters (BMI, percentage of excess weight loss) or mood after 1 year were found.

Conclusions Body image improves after LSG. This improvement might reflect changes to patients' attitudes, beliefs, and thoughts rather than real weight lost. Further studies should investigate the factors that mediate improvement of body image after bariatric surgery.

Keywords Obesity · Bariatric surgery · Laparoscopic sleeve gastrectomy · Body image · Body perception · Weight loss · Negative affect

M. Teufel (✉) · N. Rieber · K. E. Giel · H. Sauer · P. Enck ·
S. Zipfel
Department of Internal Medicine,
Psychosomatic Medicine and Psychotherapy,
University Hospital Tübingen,
Osianderstrasse 5,
72076 Tübingen, Germany
e-mail: martin.teufel@med.uni-tuebingen.de

T. Meile
Department of General, Visceral and Transplant Surgery,
University Hospital Tübingen,
Hoppe-Seyler-Straße 3,
72076 Tübingen, Germany

K. Hünemeyer
Department of Internal Medicine and Psychosomatics,
University Hospital Heidelberg,
Im Neuenheimer Feld 410,
69120 Heidelberg, Germany

Introduction

The World Health Organization has stated that obesity is the epidemic of the twenty-first century, affecting a significant number of persons in developed countries [1]. In recent decades, obesity has dramatically increased worldwide, and 20 % of the population in Germany is obese. Severe obesity, defined as body mass index (BMI) >40 kg/m², is associated with a large number of diseases, such as diabetes mellitus type 2, arterial hypertension, cardiovascular disease, arthropathy, and sleep apnea syndrome [2]. Guidelines for obesity surgery confirm a BMI-based spectrum of indications (BMI >40 kg/m² or >35 kg/m² with secondary diseases) [3].

Modern western culture denigrates excess weight and stigmatizes obese individuals [4]. In severely obese patients, impaired body image and high dissatisfaction with somatic morphology are commonly observed [5, 6]. Obesity is linked

to poor body image, but not all obese persons are equally vulnerable. Risk factors include the degree of overweight and being female [7]. Findings concerning changes in body image after bariatric surgery are inconsistent. Improved body image has been found in patients who underwent biliopancreatic diversion [8], gastric bypass surgery (LGB) [9–11], or both [12], and partial improvement has been found after laparoscopic adjustable gastric banding (LAGB) [13–15]. However, Hotter et al. found a persistently negative body evaluation after LAGB [16].

These inconsistent findings may be due to the use of different instruments. The planning of investigations is crucially important. Masheb et al. showed that self-evaluation based on shape and weight is similar, but not identical, to dissatisfaction with shape and weight [17]. As weight decreases after surgery, patients' ideal body size also decreases [18]. This dysfunctional belief may be important to maintaining a negative body image after surgery. Therefore, it is crucial to use a comprehensive questionnaire that assesses the various dimensions of body image. The Body Image Questionnaire (BIQ-20) used in our study was developed to integrate these aspects of physical self-concept (perceptions, attitudes, beliefs, and thoughts) [19].

The influence of different surgical techniques on body image is unknown. Research is growing in the field of altered gut–brain communication after LGB, LSG, or LAGB, but the differing effects of these techniques on the brain and the reward system have rarely been investigated [20, 21]. An altered reward system may positively influence the self-evaluation of shape as well as dissatisfaction with the body. On the other hand, factors like different rapidity of weight loss, different maximum excess weight loss, or different intensity of aftercare and nutritional challenges after surgery may impact trends in body image and therefore result in different findings after different surgeries.

There is also evidence that improvement in body image is more closely correlated to a reduction of depressive symptoms after bariatric surgery than to the percentage of excess weight loss (%EWL) [8, 17]. An assessment of depression should accompany an investigation of body image.

Corresponding to the literature available, we hypothesized an improvement in body image 1 year after LSG. Furthermore, we expected a relationship between body image and depression. To our knowledge, no previous studies have evaluated changes in body image longitudinally, before, and after laparoscopic sleeve gastrectomy (LSG). The present study investigated changes in body image before LSG and 1 year after LSG as well as the relationship between body image changes, weight, and depression by assessing preoperative data and 1-year follow-up data.

Methods

Study Design

Patients who planned to undergo LSG were recruited between 2008 and 2010 at the Comprehensive Obesity Center of the University Hospital. The following comprised the exclusion criteria for participating patients: psychosis, bipolar disorder, or substance addiction, according to the DSM-IV.

T0 measures took place as a part of the pre-surgical assessment. The patients were assessed by an experienced clinical interviewer. A structured interview, as well as psychological and physical examinations, was performed. The semi-structured assessment usually took 30 to 50 min and covered among other topics actual comorbid disorders, actual eating habits, and social background. According to the findings, a further 10 to 50 min followed for psycho-educational purposes about LSG. Surgical appointments occurred before as well as 1, 3, 6, and 12 months after surgery. Questionnaires were completed at two measurement points—before surgery (T0) and 12 months after surgery (T1). Body weight was recorded by the nursing staff. The ethics committee of the University Hospital approved the study protocol. All patients provided written informed consent. Data from 51 patients were included in the analyses (see Fig. 1 for a summary of the recruitment).

Measures

Body Image

Body image was assessed with the BIQ-20. The BIQ-20 is the most important German-language instrument for assessing

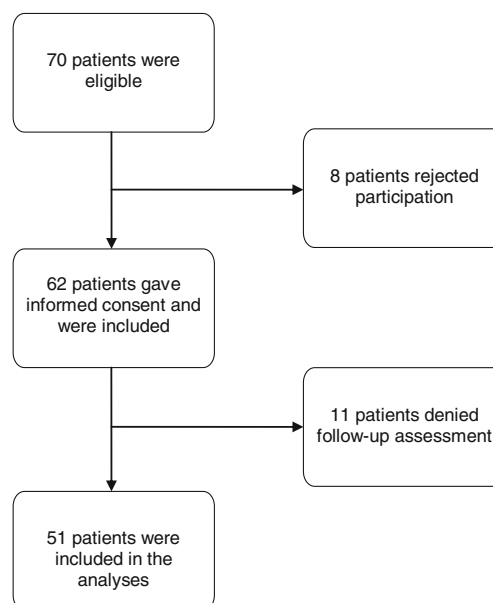


Fig. 1 Patients included in the analyses

body image distortions and has proven validity, sensitivity, and specificity. The BIQ-20 consists of 20 items divided into two independent scales: Negative Evaluation of the Body (NEB) and Perception of Body Dynamics (PBD) [19]. NEB determines a self-evaluation of appearance, emotional well-being in the body, and bodily coherence. Items on this scale include “Often I feel burdened by my body” and “I wish I had a different body.” The PBD measures feelings of vitality, perceptions of health, and interests in bodily activities (e.g., dancing, sexuality). Items on this scale include “In general, I feel robust and strong” and “I feel powerful.” Each item is scored 1 to 5, providing two subscale scores. Young healthy adults report average NEB scores of 20 in women and 17.5 in men and average PBD scores of 37 in women and 39 in men [19].

Depression

We used the German version of the Patient Health Questionnaire (PHQ-9) to assess depression. The Patient Health Questionnaire (PHQ) is a screening tool for mental health disorders. The *depression* module determines severity of depression. This module consists of nine items (mood, sleep, fatigue, appetite, self-confidence, concentration, interest in doing things, psychomotorics, and suicidal tendency). Each item is scored 0 to 3, providing a 0 to 27 severity score. Scores of 5 and 10 represent cutpoints for minor and major depressive syndromes [22, 23].

Statistical Analyses

SPSS 19.0 (SPSS, version 19, Chicago, IL, USA) was used to analyze the data. We examined the normal distribution of data with the Kolmogorov–Smirnov test. Dependent *t*-tests were used to identify within-subject differences (T0, T1) for continuous, normally distributed variables (*Negative Evaluation of the Body*). Data that were not normally distributed were analyzed using the non-parametric Wilcoxon signed-rank test (*Perception of Body Dynamics*). A chi-square test was calculated to identify differences in the presence of *depressive syndromes* by entering the T0 frequency of depressive syndromes as expected values. Pearson’s correlation was used to test correlations between two continuous, normally distributed variables. Spearman’s rank correlation was used for data that were not normally distributed. Statistical significance was set at an α -level of .05 for differences calculated between T0 and T1. Statistical significance was set at an α -level of .01 in correlational analyses due to adjustments for multiple testing.

Results

The sample of 51 patients consisted of 33 women (64.7 %). All patients were of European ethnic background (Caucasian). A total of 14 participants (27.5 %) lived alone, 13

Table 1 Description of participants (before surgery)

Sex	33 female (64.7 %); 18 male (35.3 %)
Age (years), mean (SD)	43.76 (9.14); min. 23, max. 65
BMI (kg/m ²), mean (SD)	51.28 (8.68); min. 35.0, max. 77.9
NEB, mean (SD)	38.81 (7.34)
PBD, mean (SD)	25.60 (8.02)
Depression	
None	36.00 %
Minor depressive syndrome	22.00 %
Major depressive syndrome	42.00 %

BMI body mass index, M mean, SD standard deviation, NEB negative evaluation of the body, PBD perception of body dynamics

(25.5 %) lived with a husband/cohabitant, 17 (33.3 %) lived with a husband/cohabitant and children, and one (2 %) lived with children but without a husband/cohabitant. Three participants (5.9 %) lived in the homes of their parents. At T0, seven patients (13.7 %) were treated with psychotherapy, two patients (4 %) were treated with selective serotonin reuptake inhibitors (SSRIs), one patient (2 %) was treated with pregabalin, and four patients (7.8 %) were treated with SSRIs and psychotherapy. The description of the sample is presented in Table 1.

The patients lost 15.36 BMI points after 1 year (61.9 % EWL). NEB was significantly reduced after 1 year ($p < 0.001$), whereas PBD ($p = 0.002$) increased during the same period. There were no differences between women and men for these parameters (Fig. 2).

The depression score was reduced from an initial 8.12 at T0 to 4.51 at T1. We found a significant reduction in the frequency of depressive syndromes according to PHQ-9 (chi-square, $p = 0.002$) (Fig. 3).

We found no correlations in the pre-/post-differences for the two scales of the BIQ-20 with weight-related parameters or mood (Table 2).

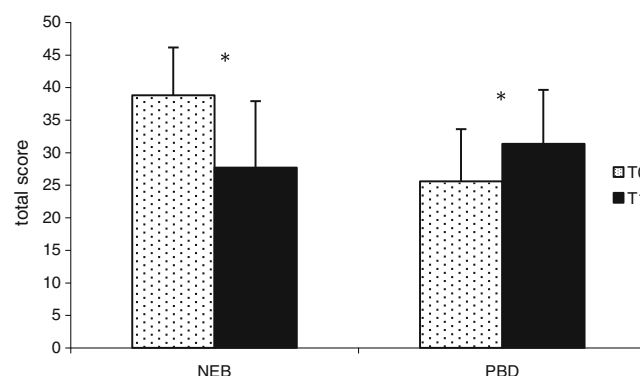


Fig. 2 Body image before (T0) and 1 year after laparoscopic sleeve gastrectomy (T1). NEB negative evaluation of the body, PBD perception of body dynamics

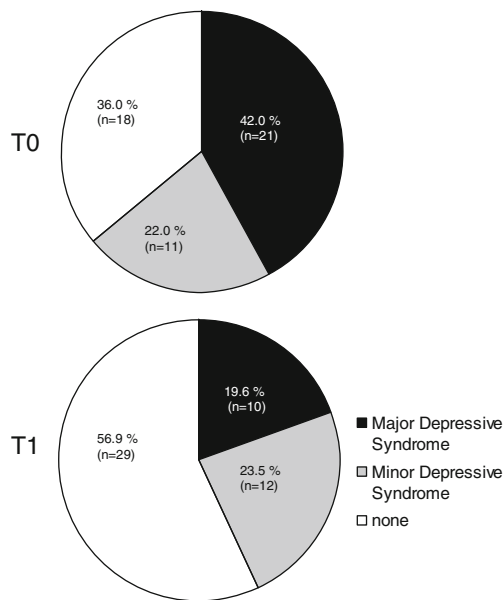


Fig. 3 Frequency of major and minor depressive syndromes according to the Patient Health Questionnaire (PHQ-9) before (*T0*) and 1 year after laparoscopic sleeve gastrectomy (*T1*)

Discussion

The present longitudinal study was the first to investigate body image in patients after LSG using a 1-year follow-up. This study also surveyed the relationship between body image, depression, and weight loss. We hypothesized an improvement in body image 1 year after LSG and expected a relationship between body image and depression.

The obese individuals included in the study reported extremely poor body image before bariatric surgery compared to normative samples [19]. An overall improvement was found after 1 year. Self-evaluation of the body and perception of body dynamics improved at 1-year follow-up. NEB was reduced from a significantly negative score to a score comparable to a clinical sample of outpatients with psychosomatic disorders [19]. The improvement of PBD showed a trend toward normalization. However, both scales remained poor compared to non-obese individuals [19]. This could be due to variables like surplus skin resulting from bariatric surgery, the continuing presence of overweight/obesity, as well as traits

like low self-esteem, or a decrease in the ideal body size, which should be addressed in future studies.

We found no differences in either scale of the BIQ-20 between women and men before surgery and after 1 year. These findings do not correspond to previous research, which indicates that being female represents a risk factor for impaired body image [7, 19]. We suppose that the men included in the study suffer from a higher burden due to severe obesity than men not seeking bariatric surgery.

The available literature on body image in patients who underwent bariatric surgery (other than LSG) is inconsistent, with results ranging from comprehensive improvement to persistent negative body evaluation [8–14, 16]. This inconsistency may be due to the merging of different surgery techniques as well as the various methods used to assess body image. We could not show a relationship between body image and weight. These findings correspond to those in body image research on obesity in conservative treatment regimes: Hill and Williams found a high correlation between BMI and body dissatisfaction [24], although most studies did not find a relationship [6, 25–27]. Other conflicting findings suggest that obese individuals overestimate, underestimate, or accurately report body image [7]. Size estimation and silhouette chart techniques assess only part of the entire body image concept [10]. The important question is what the judgment of obese individuals means to them and how it affects their lives. Therefore, methods should measure not only sensory deficits but also the effect of people's attitudes, beliefs, and thoughts on their image of their body [7]. The BIQ-20 used in our study was developed to integrate these aspects of physical self-concept [19].

Negative affect, which was postulated to be an important factor in body dissatisfaction [17], had no significant effects on body image in our study after adjusting for multiple testing. However, obvious trends in correlation between low depression at T1 and an improvement in the two subscales, NEB and PBD, were found. The results support theories that negative self-evaluation and dissatisfaction with shape and weight may be factors in the maintenance of depression. Nevertheless, in obesity, additional variables such as physical limitations and social handicaps play a particular role in maintaining a depressive mood [28].

Table 2 Correlational analyses of the pre-/post-differences of “negative evaluation of the body”/“perception of body dynamics” and weight-related parameters or mood

		BMI T0	BMI T1	%EWL	Depression T0	Depression T1	Depression pre/post-differences
NEB pre/post-differences	Correlation coefficient	0.089	0.229	−0.220	0.322	0.362	0.009
	Significance	0.554	0.126	0.141	0.029	0.013	0.952
PBD pre/post-differences	Correlation coefficient	−0.179	−0.250	0.257	−0.266	−0.327	0.044
	Significance	0.228	0.091	0.082	0.071	0.025	0.771

Risk factors for an impaired body image such as gender and physical appearance [7] as well as traits like perfectionism or self-esteem have been described [29]. Nevertheless, other important variables that increase obese individuals' susceptibility to body image problems have yet to be identified. Likewise, the role of variables, such as the onset of obesity and experiences of teasing and stigma, as well as protective factors and factors that explain the importance of body image to the health and well-being of obese individuals, has yet to be described [7]. Without a deeper understanding of body image in obese individuals, it remains difficult and speculative to explain processes in the context of rapid physiologic and psychological changes after bariatric surgery. Knowledge about altered gut–brain communication is growing [21, 30], but we are far from identifying how, for example, lower gut hormones in different surgical techniques may modulate body image. Because %EWL is not the mediator of body image changes, different surgical techniques may have different psychological consequences on body evaluation. Changes in neurocognitive functions and related reward systems may contribute to differing judgments of their bodies by obese individuals with less negative attitudes, beliefs, and thoughts on their image [20]. Studies comparing different types of interventions should follow.

Research increasingly focuses on body image in the context of body contouring. Surplus skin resulting from bariatric surgery is a common issue that may cause functional and esthetic impairments in patients. This situation increases the desire for body contouring surgery, with high expectations for esthetic outcome as well as improved life satisfaction [31, 32]. As weight decreases, so does ideal body size [18]. Body contouring leads to dissatisfaction with other parts of the body, suggesting that as patients become closer to their ideal, this ideal may shift [33]. Pecori et al. showed in a small sample that patients who underwent body contouring had similar improvements in body image in a 2-year follow-up as patients who underwent biliopancreatic diversion only [34]. Overall, the most important improvement in the body image seems to be due to the initial bariatric procedure, which may be enhanced by body contouring.

In our study, we assessed a homogeneous sample in terms of surgical technique (LSG) and measurement points (before LSG and 1 year after LSG). However, limitations remain. Rates of loss to follow-up are high in the field of bariatric surgery. In our study, 17.7 % of the patients were lost to follow-up after 1 year, and their outcomes are unknown. The study is further limited because, e.g., side effects, complications, and times of inpatient treatment as well as variables such as the onset of obesity, self-esteem, desired weight, and experiences of teasing and stigma were not recorded. This initial and preliminary study investigating body image after

LSG focuses on a 1-year follow-up after surgery. Further follow-up intervals should be employed to describe the body image over the mid and long term. The study was not designed as a randomized controlled design. A total of 14 of the 51 patients were treated with psychotherapy and/or psychotropic medication. Because of the limited number of participants, it is difficult to clearly state the influence of these interventions on outcome parameters.

To conclude, the body image of patients who underwent LSG markedly improved after 1 year. Individuals reported less negative evaluation of the body and perceived improved body dynamics and vitality. However, the roles of various factors, such as negative affect and altered physiology after different surgeries, remain unclear. Studies investigating other psychological and physiological mediating factors are required to provide the interventions needed.

Acknowledgments This work was supported by (1) the “Kompetenznetz Adipositas (Competence Network of Obesity)”, funded by the German Federal Ministry of Education and Research, Obesity, and the Gastrointestinal Tract (OGIT) Research Association (01GI0843), and (2) the Center for Nutritional Medicine, Tübingen & Hohenheim, Germany (ZEM 1AI). The authors would like to thank the patients and all collaborators (especially Zoe Rheinsberg and Angelika Komblum) who made this study possible.

Conflict of Interest All authors certify that there is no actual or potential conflict of interest in relation to this article.

References

1. WHO. Obesity: preventing and managing the global epidemic. Report on a WHO consultation. World Health Organ Tech Rep Ser. Volume 894, 2000.
2. Tsigos C, Hainer V, Basdevant A, et al. Management of obesity in adults: European clinical practice guidelines. *Obes Facts*. 2008; 1:106–16.
3. Runkel N, Colombo-Benkmann M, Huttel TP, et al. Evidence-based German guidelines for surgery for obesity. *Int J Colorectal Dis*. 2011;26:397–404.
4. Giel KE, Thiel A, Teufel M, et al. Weight bias in work settings—a qualitative review. *Obes Facts*. 2010;3:33–40.
5. Stunkard AJ, Wadden TA. Psychological aspects of severe obesity. *Am J Clin Nutr*. 1992;55:524S–32S.
6. Foster GD, Wadden TA, Vogt RA. Body image in obese women before, during, and after weight loss treatment. *Health Psychol*. 1997;16:226–9.
7. Schwartz MB, Brownell KD. Obesity and body image. *Body Image*. 2004;1:43–56.
8. Adami GF, Meneghelli A, Bressani A, et al. Body image in obese patients before and after stable weight reduction following bariatric surgery. *J Psychosom Res*. 1999;46:275–81.
9. Hrabosky JJ, Masheb RM, White MA, et al. A prospective study of body dissatisfaction and concerns in extremely obese gastric bypass patients: 6- and 12-month postoperative outcomes. *Obes Surg*. 2006;16:1615–21.
10. Neven K, Dymek M, leGrange D, et al. The effects of Roux-en-Y gastric bypass surgery on body image. *Obes Surg*. 2002;12:265–9.

11. Sarwer DB, Wadden TA, Moore RH, et al. Changes in quality of life and body image after gastric bypass surgery. *Surg Obes Relat Dis.* 2010;6:608–14.
12. Madan AK, Beech BM, Tichansky DS. Body esteem improves after bariatric surgery. *Surg Innov.* 2008;15:32–7.
13. De Panfilis C, Cero S, Torre M, et al. Changes in body image disturbance in morbidly obese patients 1 year after laparoscopic adjustable gastric banding. *Obes Surg.* 2007;17:792–9.
14. van Hout GC, Fortuin FA, Pelle AJ, et al. Psychosocial functioning, personality, and body image following vertical banded gastroplasty. *Obes Surg.* 2008;18:115–20.
15. van Hout GC, Hagendoren CA, Verschure SK, et al. Psychosocial predictors of success after vertical banded gastroplasty. *Obes Surg.* 2009;19:701–7.
16. Hotter A, Mangweth B, Kemmler G, et al. Therapeutic outcome of adjustable gastric banding in morbid obese patients. *Eat Weight Disord.* 2003;8:218–24.
17. Masheb RM, Grilo CM, Burke-Martindale CH, et al. Evaluating oneself by shape and weight is not the same as being dissatisfied about shape and weight: a longitudinal examination in severely obese gastric bypass patients. *Int J Eat Disord.* 2006;39:716–20.
18. Munoz D, Chen EY, Fischer S, et al. Changes in desired body shape after bariatric surgery. *Eat Disord.* 2010;18:347–54.
19. Clement U, Lowe B. Validation of the FKB-20 as scale for the detection of body image distortions in psychosomatic patients. *Psychother Psychosom Med Psychol.* 1996;46:254–9.
20. Bueter M, le Roux CW. Gastrointestinal hormones, energy balance and bariatric surgery. *Int J Obes (Lond).* 2011;35 Suppl 3:S35–9.
21. Berthoud HR, Shin AC, Zheng H. Obesity surgery and gut–brain communication. *Physiol Behav.* 2011;105:106–19.
22. Spitzer RL, Kroenke K, Williams JB. Validation and utility of a self-report version of PRIME-MD: the PHQ primary care study. Primary care evaluation of mental disorders. Patient Health Questionnaire. *JAMA.* 1999;282:1737–44.
23. Gräfe K, Zipfel S, Herzog W, et al. et al [Screening psychischer Störungen mit dem "Gesundheitsfragebogen für Patienten (PHQ-D)". Ergebnisse der deutschen Validierungsstudie]. *Diagnostica.* 2004;50:171–81.
24. Hill AJ, Williams J. Psychological health in a non-clinical sample of obese women. *Int J Obes Relat Metab Disord.* 1998;22:578–83.
25. Wilfley DE, Schwartz MB, Spurrell EB, et al. Using the eating disorder examination to identify the specific psychopathology of binge eating disorder. *Int J Eat Disord.* 2000;27:259–69.
26. Matz PE, Foster GD, Faith MS, et al. Correlates of body image dissatisfaction among overweight women seeking weight loss. *J Consult Clin Psychol.* 2002;70:1040–4.
27. Sarwer DB, Wadden TA, Foster GD. Assessment of body image dissatisfaction in obese women: specificity, severity, and clinical significance. *J Consult Clin Psychol.* 1998;66:651–4.
28. Teufel M, Becker S, Rieber N, et al. Psychotherapy and obesity: strategies, challenges and possibilities. *Nervenarzt.* 2011;82:1133–9.
29. Rosenberger PH, Henderson KE, Grilo CM. Correlates of body image dissatisfaction in extremely obese female bariatric surgery candidates. *Obes Surg.* 2006;16:1331–6.
30. Vincent RP, Ashrafian H, le Roux CW. Mechanisms of disease: the role of gastrointestinal hormones in appetite and obesity. *Nat Clin Pract Gastroenterol Hepatol.* 2008;5:268–77.
31. Kitzinger HB, Abayev S, Pittermann A, et al. After massive weight loss: patients' expectations of body contouring surgery. *Obesity Surgery* 2011.
32. Kitzinger HB, Abayev S, Pittermann A, et al. The prevalence of body contouring surgery after gastric bypass surgery. *Obesity Surgery* 2011.
33. Song AY, Rubin JP, Thomas V, et al. Body image and quality of life in post massive weight loss body contouring patients. *Obesity.* 2006;14:1626–36.
34. Pecori L, Serra Cervetti GG, Marinari GM, et al. Attitudes of morbidly obese patients to weight loss and body image following bariatric surgery and body contouring. *Obes Surg.* 2007;17:68–73.