

Article in co-publication

Previous weight loss experiences of bariatric surgery candidates: how much have patients dieted prior to surgery?

Lauren M. Gibbons^a, David B. Sarwer^{a,*}, Canice E. Crerand^a, Anthony N. Fabricatore^a, Robert H. Kuehn^a, Patti E. Lipschutz^a, Steven E. Raper^b, Noel N. Williams^b, Thomas A. Wadden^a

^aDepartment of Psychiatry, Weight and Eating Disorders Program, University of Pennsylvania School of Medicine, Philadelphia, Pennsylvania

^bDepartment of Surgery, University of Pennsylvania School of Medicine, Philadelphia, Pennsylvania.

Abstract

Objective: To describe the dieting histories of bariatric surgery candidates.

Research methods and procedures: One hundred seventy-seven individuals with extreme obesity who sought bariatric surgery completed the Weight and Lifestyle Inventory, a self-report instrument that assesses several variables, including weight and dieting history. Patients' dieting histories were further explored with an aided recall during a preoperative behavioral/psychological evaluation performed by a mental health professional.

Results: Participants who completed the Weight and Lifestyle Inventory reported an average of 4.7 ± 2.9 successful dieting attempts, defined as those that resulted in a loss of 10 lbs (4.5 kg) or more. These individuals reported a mean total lifetime weight loss of 61.1 ± 41.3 kg. Despite these efforts, their weight increased from 89.4 ± 27.4 kg at the time of their first diet (age 21.2 ± 10.1 years) to 144.5 ± 30.8 kg at the time they underwent their behavioral/psychological evaluation (age 43.0 ± 11.0 years). Results of the aided recall revealed that participants had made numerous other efforts to lose weight that were unsuccessful. Self-directed diets and commercial programs were used more frequently.

Discussion: Individuals who sought bariatric surgery reported an extensive history of dieting, beginning in adolescence, that was not successful in halting progressive weight gain. Thus, the recommendation often made by insurance companies that patients delay surgery to attempt more conservative treatment options may be unwarranted, particularly in the presence of significant obesity-related comorbidities. Weight loss histories should be routinely examined during a behavioral evaluation to determine whether additional attempts at non-surgical weight loss are advisable. Future studies also are needed to explore the potential relationship between dieting history and postoperative outcome. © 2006 NAASO. All rights reserved.

Keywords:

Extreme obesity; Bariatric surgery; Dieting history; Weight and Lifestyle Inventory; Weight loss

Introduction

Bariatric surgery appears to be the only effective long-term treatment for extreme obesity (defined as a BMI ≥ 40

This article will also appear in the March 2006 supplement of *Obesity Research*.

*Address correspondence to David B. Sarwer, Weight and Eating Disorders Program, University of Pennsylvania School of Medicine, 3535 Market Street, Suite 3022, Philadelphia, PA 19104.

E-mail: dsarwer@mail.med.upenn.edu

kg/m^2). Pharmacotherapy (e.g., orlistat, sibutramine) and lifestyle modification typically induce losses of 8–10% initial body weight [1–6]. Weight losses of this magnitude may ameliorate weight-related health and psychosocial difficulties experienced by some overweight or obese individuals but may not be sufficient to improve the health and quality of life of persons with extreme obesity. Furthermore, weight regain after discontinuation of these behavioral and pharmacological treatments is often considerable [5–7]. Consequently, bariatric surgery has become a more popular

and viable treatment option for persons with a BMI ≥ 40 kg/m² (or those with a BMI ≥ 35 kg/m² in the presence of significant obesity-related comorbidities). The number of individuals undergoing bariatric surgery in the United States has swelled from $\sim 16,000$ in the early 1990s to $\sim 103,000$ in 2003 [8].

In 1992, the NIH Consensus Development Conference on Gastrointestinal Surgery for Severe Obesity provided guidelines on identifying appropriate candidates for bariatric surgery. In addition to meeting the BMI criteria, the Consensus Development Conference indicated that bariatric surgery may be appropriate for “well-informed and motivated patients with acceptable operative risks” and that individuals “seeking therapy for severe obesity for the first time should be considered for treatment in a non-surgical program” [9]. In 2005, a panel of experts published a revised consensus statement that noted that “bariatric surgery candidates should have attempted to lose weight by non-operative means, including self-directed dieting, nutritional counseling, and commercial and hospital-based weight loss programs, but should not be required to have completed formal non-operative obesity therapy as a precondition for the operation” [10]. One common interpretation of both of these statements is that patients should have a history of failed attempts with more conservative weight loss interventions before considering bariatric surgery.

Little, however, is known about the dieting history of bariatric surgery candidates. Do most patients have a track record of failed weight loss efforts and turn to surgery as an appropriate last resort? Alternatively, has the increasing popularity of bariatric surgery for extreme obesity been fueled, in part, by individuals with relatively little dieting experience? Information on the dieting history of bariatric surgery patients takes on practical importance as an increasing number of insurance companies currently require patients to provide a documented history of failed weight loss attempts before issuing coverage for bariatric surgery. The present study was undertaken with these issues in mind and with the goal of describing the previous weight loss experiences of a sample of 177 bariatric surgery candidates.

Research methods and procedures

Participants

Participants were 138 (78%) women and 39 (22%) men (total $N = 177$) with extreme obesity who sought bariatric surgery at the Hospital of the University of Pennsylvania between May and September 2004. The majority (69.3%) of participants were European American, 23.9% were African American, and 5.1% were Hispanic. Three described their ethnicity as other. Participants had a mean weight of 140.0 ± 28.2 kg, height of 166.2 ± 9.5 cm, and BMI of 50.5 ± 8.2 kg/m². They reported a mean of 13.6 ± 2.3 years of education. A sizable minority (44.6%) reported that they

were married; 36.7% were single, 12.4% divorced, and 6.2% separated or widowed. These demographic characteristics are similar to those of participants in other studies of this population at this institution [11].

Procedure

All individuals seeking bariatric surgery at the Hospital of the University of Pennsylvania complete a behavioral/psychological evaluation with a mental health professional at the University’s Weight and Eating Disorders Program. This evaluation is undertaken to identify any potential psychiatric or behavioral contraindications to surgery [12]. In preparation for the evaluation, candidates complete the Beck Depression Inventory-II [13] to assess mood and the Weight and Lifestyle Inventory (WALI)¹ [14]. The WALI is a 20-page questionnaire that covers a variety of topics including family history of obesity, eating and activity habits, and psychosocial status and history.

Of particular interest in the present study was participants’ weight loss history. Applicants were asked to record each major weight loss effort (e.g., diet, exercise, medication, etc.) that resulted in a weight loss of 10 lbs (4.5 kg) or more, starting with the first effort and continuing to the most recent. For each effort, participants indicated their age and weight at the time, number of pounds lost, and the method used to lose weight. Respondents also rated their accuracy in recalling their weight loss history, using a scale of 1 to 10, on which 1 = not at all accurate and 10 = completely accurate. A previous study demonstrated acceptable test-retest reliability for both the total number of diets ($r = 0.77$, $p < 0.001$) and total number of pounds lost with these efforts ($r = 0.87$, $p < 0.001$) in participants who reported an accuracy rating of 7 or more [15]. Participants also were asked how many times in the previous year they had initiated a diet that lasted 3 days or more, as well as those lasting fewer than 3 days.

As part of the behavioral evaluation, weight loss history was further assessed with an aided-recall approach to determine the total number of diets participants had tried, regardless of whether they lost 10 lbs or more with the effort. Using a supplemental questionnaire, the mental health professional asked participants whether they had used any of the approaches listed in each of the 11 categories shown in Table 1 and the number of times they had done so. This aided recall was used in an effort to capture all of participants’ weight loss efforts, even if they had been short-lived or unsuccessful. The evaluators periodically met as a group to discuss any questions about how previous diets should be categorized.

¹ Nonstandard abbreviations: WALI, Weight and Lifestyle Inventory; FDA, Food and Drug Administration; OTC, over-the-counter.

Table 1
Categories of diets assessed by the aided recall

Self-directed (e.g., Atkins, South Beach, Grapefruit, Richard Simmons, etc.)
Commercial programs (e.g., Jenny Craig, LA Weight Loss, Weight Watchers, etc.)
Nutritional counseling (by a registered dietitian)
Physician supervised (by primary care physician, obstetrician/gynecologist, nurse, etc.)
Liquid meal replacements (e.g., Slimfast, Ensure, etc., liquid meal replacements three times per day)
Very-low-calorie diet or hospital-based program (e.g., Optifast, Medifast, behavior modification)
FDA-approved weight loss medication (e.g., sibutramine, orlistat, phentermine, fenfluramine, dl-fenfluramine, etc.)
OTC medications, herbal supplements (e.g., Herbal-life, Ephedrine, Dexatrim, etc.)
Personal trainer or exercise tapes
Prior weight loss surgery (e.g., vertical banded gastroplasty, liposuction, gastric balloon, or bypass)
Other (e.g., hypnosis, acupuncture, church programs)

FDA, Food and Drug Administration; OTC, over-the-counter.

Statistical analyses

Means (\pm SDs) and frequencies were computed for demographic and weight loss history variables. One-way ANOVAs were used to compare participants by gender and/or ethnicity with regards to continuous variables. χ^2 analyses were used to compare men and women with regard to previous weight loss attempts in each diet category. Paired samples *t* tests were used to compare the number of diet categories tried and the total number of diets reported with respect to values obtained by the WALI vs. aided recall.

Results

Demographic characteristics

As expected, men were significantly ($p < 0.001$) taller (174.7 ± 10.4 vs. 163.8 ± 7.7 cm) and heavier than women (158.3 ± 31.6 vs. 134.9 ± 25.0 kg). Men and women, however, did not differ significantly in BMI, age, or number of years of education.

Weight loss history assessed by the WALI

Of the 177 participants who completed the weight loss history items on the WALI, 83 were confident that their responses were accurate (as indicated by a score of 7 or more on the recall item). Responses of these 83 participants were selected for further analysis. (These 83 individuals did not differ from excluded participants on any demographic variable of interest.) They reported a mean total of 4.7 ± 2.9 diets, on each of which they lost 10 lbs or more. Over their lifetime, participants reported losing a mean total of 61.1 ± 41.3 kg in these attempts, equal to 12.4 ± 9.7 kg per diet. Despite these efforts, their weight increased from a mean of

89.4 ± 27.4 kg at the time of their first diet (at age 21.2 ± 10.1 years) to 144.5 ± 30.8 kg at the time they were evaluated for bariatric surgery (at age 43.0 ± 11.0 years).

Among these 83 participants, the number of efforts that resulted in a loss of 10 lbs or more ranged from 0 ($N = 5$) to 10 ($N = 7$). (The WALI inquires about a maximum of 10 diets.) As expected, age at the start of each diet increased steadily across the 10 possible efforts, from 21.2 ± 10.1 years at the first effort ($N = 69$) to 42.1 ± 10.6 years at the last effort ($N = 10$). Weight similarly increased with each diet. The mean starting weight at the first effort was 89.4 ± 27.4 kg, which increased to 122.6 ± 18.1 kg at the 10th effort. **Figure 1** shows the mean change in weight over time in 56 persons who reported at least four successful weight loss attempts.

In the previous year, participants reported starting 3.0 ± 3.4 diets on their own that lasted >3 days. They reported beginning an additional 2.8 ± 5.3 diets that lasted 3 or fewer days. Reported diets in the past year did not differ by gender, race/ethnicity, age, or BMI.

Weight loss history assessed by aided recall

As expected, responses to the supplemental questionnaire administered by the mental health professional revealed that participants had engaged in significantly more weight loss efforts than those reported on the WALI alone. Thus, the 83 participants who reported a mean total of 4.7 ± 2.9 successful diets on the WALI indicated, when queried, that they had attempted an average of 6.0 ± 1.7 of the categories of weight loss methods listed in **Table 1**. They reported trying to lose weight a total of 14.6 ± 9.1 times using these approaches. **Table 2** shows the percentage of persons who reported trying one or more approaches in each of the 11 categories, as determined by aided recall (using the supplemental questionnaire) compared with the WALI.

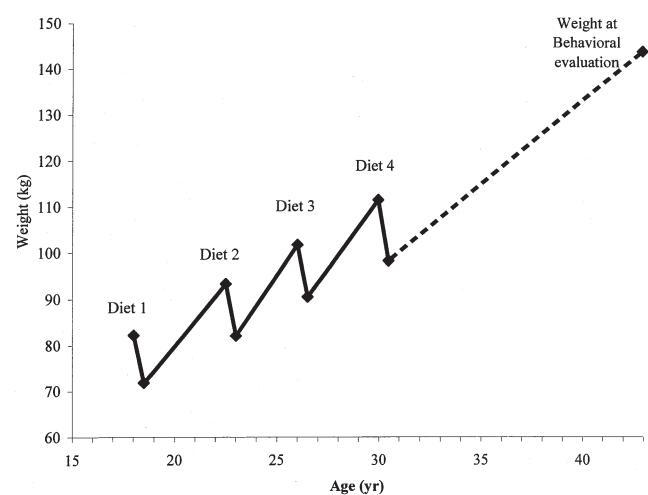


Fig. 1. Weight and dieting histories of 56 bariatric surgery candidates, all of whom had engaged in a minimum of four diets, as reported on the WALI.

Table 2

Percent of participants ($N = 83$) who reported they had tried the following categories of diets, as determined by the WALI vs. aided recall

Approach	WALI	Aided Recall
Self-directed	81.9%	92.7%
Commercial programs	77.1%	86.7%
Personal trainer or exercise tapes	38.6%	72.3%
OTC medications	44.6%	74.7%
FDA-approved medication	32.5%	69.9%
Liquid meal replacements	6.0%	54.2%
Physician supervised	3.6%	45.8%
Nutritional counseling	3.6%	55.4%
Very-low-calorie diet or hospital-based program	24.1%	31.3%
Prior weight loss surgery	1.2%	3.6%
Other	20.5%	
Total number of diet categories tried	3.3 ± 1.4	$6.0 \pm 1.7^*$
Total number of diet attempts	4.7 ± 2.9	$14.6 \pm 9.1^*$

WALI, Weight and Lifestyle Inventory; OTC, over-the-counter; FDA, Food and Drug Administration.

* Denotes a significant ($p < 0.001$) difference between the two methods of assessment.

Thus, the aided recall revealed a significant history of brief, failed weight loss attempts, beyond the numerous successful diets reported on the WALI.

Table 3 shows responses to the aided recall of all 177 participants assessed by the medical health professionals. It reveals that self-directed weight loss efforts were the most popular approach, used by ~94% of patients (see Table 3). Commercial programs also were reported by the vast majority of patients. Approximately seven in 10 patients reported using exercise, Food and Drug Administration (FDA)-approved weight loss medications, or over-the-counter (OTC) weight loss medications. Slightly more than one-half of the participants reported using liquid meal replacements, nutritional counseling, or a physician supervised program. Approximately 5% reported previous surgery for weight loss.

A greater percentage of women than men reported experience with self-directed diets [$\chi^2(1) = 7.22, p = 0.016$] and commercial programs [$\chi^2(1) = 5.21, p = 0.03$]. There were no other significant gender differences with regards to weight loss history as assessed during the behavioral/psychological evaluation.

Discussion

The great majority of candidates for bariatric surgery at our institution had made multiple efforts to lose weight using conventional methods. This finding was suggested by the results of the WALI, which inquired only about efforts that had resulted in a loss of 10 lbs (4.5 kg) or more and by findings from a structured interview, in which candidates were queried about their use of methods from 11 different classes of interventions. The 83 candidates who were confident in the accuracy of their responses to the WALI reported a mean total of 4.7 weight loss efforts on which they had lost a total of 61.1 kg. Despite these efforts, their weight increased from an average of 89.4 kg at the time of their first diet (at age 21.2 ± 10.1 years) to 144.5 ± 30.8 kg at the time they sought surgery at our institution (at age 43.0 ± 11.0 years). This weight gain occurred in the face of multiple additional, but unsuccessful, efforts to lose weight that were captured by the aided recall. These 83 candidates reported an average of approximately 10 additional efforts, using principally self-directed or commercial weight loss programs. In the total sample of 177 individuals, respondents reported over 15 previous efforts to lose weight, using methods from an average of six of the 11 classes of interventions.

The most commonly reported methods used to lose weight were self-directed diets and commercial programs, which were endorsed by the vast majority of participants. Nearly one-half of the 83 participants, confident in the accuracy of their weight history (as detailed in the WALI), described losing in excess of 10 lbs with OTC medications.

Table 3

Percent of participants ($N = 177$) who reported they had tried the following categories of diets, as determined by the aided recall

Approach	Total ($N = 177$)	Male ($N = 39$)	Female ($N = 138$)
Self-directed	93.8%	84.6%	95.7%*
Commercial programs	87.6%	76.9%	90.6%†
Personal trainer or exercise tapes	73.1%	63.2%	75.9%
OTC medications	71.0%	57.9%	74.6%
FDA-approved medication	69.5%	59.0%	72.5%
Liquid meal replacements	59.3%	61.5%	58.7%
Physician supervised	58.5%	55.6%	59.9%
Nutritional counseling	52.9%	57.9%	51.5%
Very-low-calorie diet or hospital-based program	33.5%	33.3%	33.6%
Prior weight loss surgery	5.3%	7.9%	4.5%
Total number of diet categories tried	6.0 ± 1.7	5.8 ± 2.0	6.3 ± 1.6

OTC, over-the-counter; FDA, Food and Drug Administration.

* Denotes a significant ($p < 0.016$) difference between men and women.

† $p < 0.03$.

Almost one-third of individuals had used FDA-approved medications to successfully lose weight, and nearly one-quarter had utilized very low calorie diets or hospital-based programs.

Insurance coverage for more conservative weight loss treatments is rare. Thus, dieters spend billions of dollars out of pocket each year in trying to lose weight [16]. The price, when the cost of personal time and treatment or product fees is considered, is prohibitive for many individuals. It is likely no coincidence that the most commonly reported types of diets are typically the least expensive. In a recent review, the price of three months of weight loss treatment in the form of organized self-help or commercial programs ranged from a minimum of \$0 (Overeaters Anonymous), to moderately priced Weight Watchers (\$167), up to \$2000 for 12 weeks of participation in Health Management Resources or OPTIFAST [17], two medically-based very-low-calorie diet programs. These programs cost upwards of \$3500 for 6 months [18].

The present results suggest that for individuals with extreme obesity who seek bariatric surgery, long-term maintenance of weight loss has been all but impossible. The inability to maintain weight lost through multiple previous dieting efforts is likely a large motivating factor in the decision to undergo bariatric surgery. Results also suggest that these individuals, on average, have made several efforts to lose weight in the previous year, with minimal success. Participants reported starting three diets (3.0 ± 3.4) in the past year that lasted for >3 days and an additional 2.8 ± 5.3 diets lasting 3 or fewer days. Thus, the obligatory recommendation, made by many insurance companies, that bariatric surgery be delayed until the candidate can demonstrate experience with more conservative weight loss treatment options may be unwarranted.

Conversely, for some patients, a complete lack of dieting experience may raise concerns with regards to postsurgical outcomes. Bariatric surgery, although a powerful tool in ameliorating several obesity-related health conditions, is not without significant medical risks. Furthermore, ~10% to 20% of patients fail to lose $>40\%$ excess weight [19]. Unsuccessful outcomes are often attributed to patients' inability to follow the postoperative dietary recommendations [19–23]. It may be that those individuals with a relative lack of experience with weight loss behaviors are less prepared to make the postoperative behavioral and dietary changes necessary for a successful long-term result. One study reported that more dieting experience was correlated with greater loss of excess weight 1 year postoperatively [24]. The assessment of dieting history in this study [24] was cursory, however, based on responses to two multiple choice and two free response questions.

At the very least, a relative absence of weight loss experience warrants further inquiry by the treating health professional(s) and should be taken into account when evaluating the risks and benefits of the procedure. This may be

particularly true for younger patients, those with a lower BMI, and those without significant comorbidities. Nevertheless, the specific relationship between dieting history and postoperative outcome has received little empirical attention.

The present investigation has several notable strengths. The data characterize the weight loss histories of men and women presenting for bariatric surgery. Results support the notion that this sample of individuals has attempted multiple different types of diets, on a number of occasions, over a long span of time. Despite several successful weight loss attempts, these individuals have had tremendous difficulty maintaining weight losses, which likely plays a role in motivating them ultimately to seek bariatric surgery.

This study also has several limitations. Data were retrospective, calling into question the accuracy of participants' reported histories as they were asked to record dieting efforts that occurred several years, even decades, prior. When including only those with an accuracy rating ≥ 7 , the sample was reduced from 177 to 83, which may not be representative of the larger patient population. Additionally, weight loss histories were self-reported and potentially influenced by demand characteristics. Patients may strive to convey that they have tried every possible weight loss approach before; thus, bariatric surgery is not only a last resort but also their only recourse.

More research is needed to characterize the weight loss histories of individuals seeking bariatric surgery. Validity could be enhanced with larger, prospective studies or corroboration of retrospective recall with physician weight records. Additionally, demand characteristics could be reduced by assessing weight loss histories anonymously, outside the context of a required behavioral evaluation before surgery. As noted above, the relationship between weight loss experience and postoperative outcome is unknown. There is some evidence to suggest that weight cycling is associated with clinically significant decrements in eating self-efficacy [25] and weight regain after obesity treatment [26]. Thus, dieting experience may be especially important in long-term outcome.

Finally, the effects of surgery are so immediately potent that the potential relationship between dieting history and postoperative outcome may only become evident when weight losses begin to plateau, ~2 years after surgery. Future studies are warranted to determine whether extensive dieting experience may enhance postoperative weight loss because patients are well practiced or, conversely, if preoperative weight cycling could adversely affect postoperative outcome.

Acknowledgment

This work was supported, in part, by the National Institute of Diabetes, Digestive, and Kidney Disease Grant K23-DK60023-04.

References

- [1] Wing RR. Behavioral approaches to the treatment of obesity. In: Bray GA, Bouchard C, James WPT, eds. *Handbook of Obesity*. New York: Marcel Dekker, Inc.; 1998, pp. 855–73.
- [2] Wadden TA, Butryn ML, Byrne KJ. Efficacy of lifestyle modification for long-term weight control. *Obes Res* 2004;12:151–62S.
- [3] Wadden TA. Treatment of obesity by moderate and severe caloric restriction: results of clinical research trials. *Ann Intern Med* 1993; 119:688–93.
- [4] Wing RR. Behavioral treatment of severe obesity. *Am J Clin Nutr* 1992;55:545–51S.
- [5] Davidson MH, Hauptman J, DiGirolamo, et al. Weight control and risk factor reduction in obese subjects treated for 2 years with orlistat: a randomized controlled trial. *JAMA* 1999;281:235–42.
- [6] James WP, Astrup A, Finer N, et al. Effect of sibutramine on weight maintenance after weight loss: a randomized trial: STORM Study Group: Sibutramine Trial of Obesity Reduction and Maintenance. *Lancet* 2000;356:2119–25.
- [7] Wadden TA, Sternberg JA, Letizia KA, Stunkard AJ, Foster GD. Treatment of obesity by very-low-calorie diet, behavior therapy and their combination: a five-year perspective. *Int J Obes* 1989;51:167–72.
- [8] Steinbrook R. Surgery for severe obesity. *N Engl J Med* 2004;350: 1075–9.
- [9] Gastrointestinal surgery for severe obesity: National Institutes of Health Consensus Development Conference Statement. *Am J Clin Nutr* 1992;55:615–9S.
- [10] Buchwald H. Bariatric surgery for morbid obesity: health implications for patients, health professionals, and third-party payers. *J Am Coll Surg* 2005;200:593–604.
- [11] Sarwer DB, Cohn NI, Gibbons LM, et al. Psychiatric diagnoses and psychiatric treatment among bariatric surgery candidates. *Obes Surg* 2004;14:1148–56.
- [12] Wadden TA, Sarwer DB, Womble LG, Foster GD, McGuckin BG, Schimmel A. Psychosocial aspects of obesity and obesity surgery. *Surg Clin North Am* 2001;81:1001–24.
- [13] Beck AT, Steer RA. *BDI Beck Depression Inventory Manual*. San Antonio, TX: Harcourt Brace & Company; 1993.
- [14] Wadden TA, Phelan S. Behavioral assessment of the obese patient. In: Wadden TA, Stunkard AJ, eds. *Handbook of Obesity Treatment*. New York: Guilford Press; 2002, pp. 186–226.
- [15] Wadden TA, Bartlett S, Letizia KA, Foster GD, Stunkard AJ, Conill A. Relationship of dieting history to resting metabolic rate, body composition, eating behavior, and subsequent weight loss. *Am J Clin Nutr* 1992;56:203–8S.
- [16] Melanson K, Dwyer J. Popular diets for treatment of overweight and obesity. In: Wadden TA, Stunkard AJ, eds. *Handbook of Obesity Treatment*. New York: Guilford Press; 2002, pp. 249–75.
- [17] Tsai AG, Wadden TA. Systematic review: an evaluation of major commercial weight loss programs in the United States. *Ann Intern Med* 2005;142:56–66.
- [18] Wadden TA, Osei S. The treatment of obesity: an overview. In: Wadden TA, Stunkard AJ, eds. *Handbook of Obesity Treatment*. New York: Guilford Press; 2002, pp. 229–48.
- [19] Latifi R, Kellum JM, De Maria EJ, Sugerman HJ. Surgical treatment of obesity. In: Wadden TA, Stunkard AJ, eds. *Handbook of Obesity Treatment*. New York: Guilford Press; 2002, pp. 339–56.
- [20] Brolin RE, Robertson LB, Kenler HA, Cody RP. Weight loss and dietary intake after vertical banded gastroplasty and Roux-en-Y gastric bypass. *Ann Surg* 1994;220:782–90.
- [21] Hsu LKG, Benotti PN, Dwyer J, et al. Nonsurgical factors that influence the outcome of bariatric surgery. *Psychosom Med* 1998;60: 338–46.
- [22] Pories WJ, Caro JF, Flickinger EG, Meelheim HD, Swanson MS. The control of diabetes mellitus (NIDDM) in the morbidly obese with the Greenville Gastric Bypass. *Ann Surg* 1987;206:316–23.
- [23] Sarwer DB, Wadden TA, Fabricatore AN. Psychosocial and behavioral aspects of bariatric surgery. *Obes Res* 2005;13:639–48.
- [24] Ray EC, Nickels MW, Sayeed S, Sac HC. Predicting success after gastric bypass: the role of psychosocial and behavioral factors. *Surgery* 2003;134:555–64.
- [25] Foster GD, Sarwer DB, Wadden TA. Psychological effects of weight cycling in obese persons: a review and research agenda. *Obes Res* 1997;5:474–88.
- [26] Elfhang K, Rossner S. Who succeeds in maintaining weight loss? A conceptual review of factors associated with eight loss maintenance and weight regain. *Obes Rev* 2005;6:67–85.