

## Significant Weight Loss After Adjustable Gastric Band Surgery: Can Yoga Function In A Major Role?

Raj Majithia<sup>1</sup>, Emil Oweis<sup>2</sup>, Frederick C. Finelli<sup>3</sup> and Timothy R. Koch<sup>3\*</sup>

<sup>1</sup>Section of Gastroenterology, Washington Hospital Center, Washington, USA

<sup>2</sup>Department of Internal Medicine, Washington Hospital Center, Washington, USA

<sup>3</sup>Center for Advanced Laparoscopic and Bariatric Surgery, Washington Hospital Center, Washington, USA

### Abstract

**Background:** The percentage of individuals in the United States who are obese is increasing. Diet and activity programs in clinical trials provide both modest weight loss (average 7 kg at 1 year) and poor maintenance of weight loss; therefore patients with medically-complicated obesity consider surgical options. Adjustable gastric banding is a newer, lower risk bariatric surgery and we hypothesized that a hobby, as a behavioral modification program, would improve post-operative weight loss after gastric banding.

**Methods:** This is a retrospective database review of 74 patients at the Washington Hospital Center who underwent gastric adjustable band surgery from August 2008 to May 2010. We identified pre-operative weight, body mass index, ideal body weight, excess body weight lost at 6 months and 1 year, and presence or absence of a hobby.

**Results:** At 6 months, compared to published diet and activity programs, only 4 gastric band patients did not have significant weight loss. Among 70 patients with significant weight loss, 40 patients had a hobby (mean weight loss 17.3 kg) compared to 30 patients with no hobby (mean weight loss 13.6 kg). At 1 year, 10 patients did not have significant weight loss; among 64 patients with significant weight loss, 37 had a hobby compared to 27 without (chi-square test:  $p < .05$ ). At 1 year post-operative date, the average weight losses for patients with a hobby and those without were 19.3 kg and 16.9 kg, respectively.

**Conclusion:** There was a significant association between improvements in weight loss 1 year after gastric band surgery in patients who had a hobby compared to those without. The results support the proposal that yoga could serve as a post-operative behavioral modification program to improve weight loss after adjustable gastric band surgery.

**Keywords:** Obesity; Bariatric surgery; Behavioral modification

### Introduction

The prevalence of obesity in the United States has continued to rise from 22.9% in 1988-1994 [1], to obesity now being identified in 32% of adult men and 35% of adult women [2]. With obesity's importance in the development of metabolic syndrome, the treatment of and prevention of obesity is the key for the prevention of a broad group of malignant, metabolic, cardiovascular, and neurological disorders including diabetes mellitus, myocardial infarction, peripheral vascular disease, and cerebral infarction.

The origins for this major health epidemic are presently under investigation. However, potential explanations for the rise in the prevalence of obesity include a sedentary life style, increased number of daily meals, the presence of an eating disorder, a changing job market, or an effect of a yet unidentified environmental agent or exposure [3].

Among the several strategies for weight loss in obese individuals, diet and activity programs that include exercise are thought by many individuals to be useful. Weight loss of approximately 5-15% in obese individuals has been reported to reduce the risk factors associated with obesity [4]. In a meta-analysis comparing diet and exercise to diet alone for weight loss, Curioni et al. found that diet and exercise were associated with clinically meaningful initial weight loss that was partially sustained at one year, with an average of 7 kg of weight loss [5].

Because there is either insufficient weight loss or poor maintenance of weight loss with the use of diet and activity programs, bariatric surgery has become a major treatment option in those patients with

medically-complicated obesity. An estimated 220,000 bariatric procedures are performed every year in the United States and Canada [6]. Among the surgical approaches for treatment of medically-complicated obesity, the 'divided' Roux-en-Y gastric bypass (RYGB) is the most commonly performed bariatric surgical procedure in the United States and Canada. A small percentage of individuals have no significant weight loss after RYGB, and the risk of significant weight regain after RYGB is as high as 40% among post-operative individuals [7]. The origins for failure of weight loss after RYGB had been examined and include binge eating, low physical activity, and low self-esteem [8]. It is unclear whether behavioral modification methods reduce the risk of weight regain after RYGB.

Gastric adjustable band surgery is a newer, low risk bariatric surgery that is being used in patients with medically complicated obesity. In selected patients, the gastric adjustable band surgery can lead to sustained weight loss with minimal operative risks and postoperative

**\*Corresponding author:** Timothy R. Koch, Washington Hospital Center, Center for Advanced Laparoscopic and Bariatric Surgery, 106 Irving St., NW, POB North, Suite 3400, Washington, DC 20010, USA, Tel: 202-877-7788; Fax: 877-680-8198; E-mail: [timothy.r.koch@medstar.net](mailto:timothy.r.koch@medstar.net)

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nutritional risks. The causes of postoperative weight loss failure after adjustable gastric band surgery are not well defined.

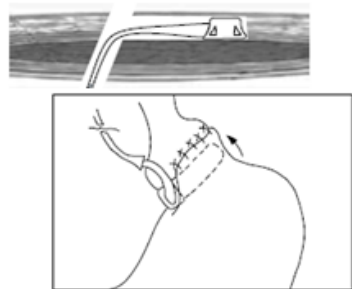
In evaluating this area of clinical research the question is raised as to whether yoga may function as a postoperative behavioral modification program. This will require clinical trials of the utilization of yoga after bariatric surgery. There are however preliminary reports of the effect of yoga on obesity. In an initial study among overweight participants from the state of Washington, yoga practice for 4 or more years was associated with an 18.5 lb lower weight gain [9]. There was an average of a 1.6% decrease in body mass index reported from a 6 day study of yoga with a low fat, vegetarian diet [10]. The control of binge eating is one mechanism by which yoga could be helpful in the treatment of obesity. A positive effect was reported in a 12 week study of a yoga treatment program for the prevention of binge eating in 25 obese patients [11]. However, one study has reported that there is a lower prevalence in the use of yoga therapy among obese adults [12]. This supports the concern that there has not yet been an effective approach to control of, treatment of, or prevention of obesity through the use of yoga.

Therefore, obesity is clearly a growing national health epidemic that requires significant attention in order to develop better long term solutions. This present study was designed to obtain preliminary evidence to support or disprove our hypothesis that a behavioral modification method (a hobby) will improve post-operative weight loss after adjustable gastric band surgery. Such a result would support the proposal that yoga could serve as a post-operative behavior modification program to improve weight loss after adjustable gastric band surgery.

## Methods

This was a retrospective database review of patients at the Washington Hospital Center who underwent adjustable gastric band surgery from August 2008 to May 2010. The project was approved by the Institutional Review Board at the Medstar Research Institute and followed the clinical research guidelines required by the institute. Each patient was de-identified and all personal information was removed from the reviewed records.

In the performance of a laparoscopic adjustable gastric banding, the surgical dissection is designed to make a small pouch (see Figure 1) below the gastro esophageal junction, but to keep the band above the peritoneal reflection of the lesser sac with a tunnel made through



**Figure 1:** Gastric Adjustable Band. The band is placed laparoscopically around the upper part of the stomach, approximately 4 cm below the gastro esophageal junction. The ring or band is connected to an access port by tubing and its volume can be adjusted by accessing the port, which has been attached to the abdominal musculature. (Adapted with permission from Allergan, Inc. from [http://www.allergan.com/assets/pdf/lapband\\_dfu.pdf](http://www.allergan.com/assets/pdf/lapband_dfu.pdf))

the retro-gastric attachments [13]. A total of 74 patients were included into the study analysis after undergoing adjustable gastric band surgery during the study period.

The patients' body mass index, date of surgery, baseline demographics, and percent excess body weight (EBW) lost at 6 months and at 1 year were recorded. Based upon findings that diet and exercise are associated with a mean weight loss of 7 kg at one year [5], significant weight loss after placement of an adjustable gastric band was defined by weight loss of greater than 3.5 kg at 6 months and greater than 7 kg at 1 year.

Gastric band fills were performed at 2-3 month intervals with addition of 0.5-2.0 ml of sterile saline; each patient was tested post-fill to exclude the onset of dysphagia while drinking liquid. The primary endpoint of this study was: the number of patients with significant weight loss in patients who had a hobby compared to the number of patients without a hobby. Statistical analysis was performed by an unbiased party. Statistical analysis was performed using Pearson's chi square test model. Statistical significance was considered to be a P value of < 0.05.

## Results

Seventy four patients underwent adjustable gastric band surgery during the study period. There were 17 male patients and 57 female patients. Their mean age was 47.9 years-old and their mean body mass index was 46.2 kg/m<sup>2</sup>.

Seventy patients had significant weight loss at 6 months and 64 patients had significant weight loss at 1 year. These results support a failure rate of 14% one year after placement of an adjustable gastric band, using our definition of significant weight loss.

Of the 70 patients who achieved significant weight loss at 6 months, 40 patients had a hobby compared to 30 patients who did not have a hobby. Average weight loss at 6 months post-operative date for our patients with a hobby and those without was 17.3 kg and 13.6 kg respectively (see Table 1).

At 1 year after adjustable gastric band placement, 10 patients did not have significant weight loss. Of the remaining 64 patients who obtained significant weight loss, 37 had a hobby compared to 27 without (see Table 2) ( $p < .05$ ). At 1 year post-operatively, the average weight loss for patients with a hobby was found to be 19.3 kg compared to 16.9 kg for patients without a hobby. Using Pearson's chi square test (see Table 3), at 1 year, significant weight loss was obtained by more patients with a hobby compared to those patients without a hobby ( $\chi^2=2.694$  with 1 degree of freedom:  $p < .05$ ).

## Discussion

Obesity is associated with the development of a broad group of malignant, metabolic, cardiovascular, and neurological disorders. Adequate treatment of obesity is therefore a major therapeutic goal in the United States. The present study demonstrates that patients with a hobby at 1 year after adjustable gastric band surgery have an increase in the likelihood of significant weight loss, compared to patients without a hobby. To our knowledge, this is the first study to examine the impact of a hobby on weight loss after adjustable gastric band surgery. The use of a hobby in this study is considered equivalent to a type of behavioral modification therapy.

McTigue et al. have reported that counseling with diet and/or physical exercise and behavioral interventions resulted in only small to

	Patients	Percent	Hobby	No Hobby
Inadequate	4	11%	2	2
Significant Weight Loss (>3.5 kg)	70	89%	40	30
Average Weight Loss (kg)			17.3	13.6

Table 1: 6 Month Weight Loss.

	Patients	Percent	Hobby	No Hobby
Inadequate	10	15%	3	7
Significant Weight Loss (>7 kg)	64	86%	37	27
Weight Loss (kg)			8.16 – 34.1	7.25 – 33.11
Average Weight Loss (kg)			19.3	16.9

Table 2: 1 year Weight Loss.

	Hobby	No Hobby	X <sup>2</sup> p<0.05
Inadequate Weight Loss	3 Patients	7 Patients	
Significant Weight Loss (>7 kg)	37 Patients	27 Patients	2.694

Table 3: Chi Square Analysis of Patients at 1 Year of Weight Loss.

moderate degrees of sustained weight loss (3 to 5 kg) over at least 1 year [14]. However, the results of the studies could not be grouped, and those reporting some success in weight maintenance were commented on individually. Anderson et al. has reported maintenance of an 11% reduction in initial weight at 1 year of follow-up [15]. Systematic reviews in this area include only cohort studies and are therefore somewhat limited in their applicability.

The prevalence of obesity in the United States continues to rise; obesity has now been identified in 32% of adult men and 35% of adult women [2]. Of significant importance, the rates of obesity in children are also increasing. Due to the major health risks of obesity, clinical guidelines and further research need to focus on the prevention and management of this health epidemic. The epidemiology of and potential etiologies for this major health crisis are presently under investigation. Potential explanations for this rise in the prevalence of obesity include a sedentary life style, increased number of daily meals, the presence of an eating disorder, a changing job market, or an effect of a yet unidentified environmental agent or exposure [3]. In patients with medically-complicated obesity, bariatric surgery remains the major choice in long-term management.

Though a clear etiology for morbid obesity has not been identified, it is safe to assume that the causality is multifactorial. With the results of this study, we suggest that yoga could serve as a program, which could reduce both the stress eating and binge eating aspects of obesity. Yoga in addition could be of benefit in improving patients' self-esteem. The potential role of yoga in the promotion of post-operative weight loss and the prevention of post-operative weight regain remains to be

explored in a follow up clinical study involving patients after bariatric surgery.

#### Conflict of Interest

The authors of this publication disclose no conflicts of interest relevant to this submission.

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Dr. Timothy R. Koch, Washington Hospital Center, USA