

## Role of bariatric surgery in the pelvic floor disorders

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**Core tip:** Pelvic floor disorders are very frequent among women. Weight loss can help them to achieve urinary and faecal continence again. In this narrative review, the possible mechanisms of pelvic floor disorders in obese women, their symptoms and the role of bariatric surgery in changing their quality of life are presented.

### Abstract

Pelvic floor disorders are very frequent among women. Weight loss can help them to achieve urinary and faecal continence again. In this narrative review, the possible mechanisms of pelvic floor disorders in obese women, their symptoms and the role of bariatric surgery in changing their quality of life are presented. We retrieved the included results of our study after performing a systematic, electronic search in PubMed (December 17, 2012) and Scopus (December 17, 2012). The main mechanism causing the development of pelvic floor disorders is chronically increased abdominal pressure as it overts structural damage or neurologic dysfunction predisposing to prolapse and incontinence. The symptoms include a sensation of vaginal fullness or pressure, uterine descent, sacral back pain with standing, vaginal spotting from ulceration of the protruding cervix or vagina, coital difficulty, lower abdominal discomfort, and voiding and defecatory difficulties. Evidence indicates that massive weight loss (45 to 50 kg) improves incontinence in morbidly obese women after bariatric surgery. Faecal incontinence is also improved after bariatric surgery. This review highlights the role of bariatric surgery in weight reduction of obese women that could act as a treatment for the pelvic floor disorders faced by those women offering improvement in incontinence as well as quality of life.

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### INTRODUCTION

Overweight and obesity are defined as abnormal or excessive fat accumulation that presents a risk to health. Body mass index (BMI) is a simple index of weight-for-height that is commonly used to classify overweight and obesity in adults. It is defined as a person's weight in kilograms divided by the square of his height in meters ( $\text{kg}/\text{m}^2$ )<sup>[1]</sup>. According to the World Health Organization, obesity is classified as class I for a BMI between 30 and 34.9  $\text{kg}/\text{m}^2$ , class II for a BMI between 35 and 39.9  $\text{kg}/\text{m}^2$ , and class III for a BMI  $\geq 40$   $\text{kg}/\text{m}^2$ <sup>[1,2]</sup>. Current data estimate that obesity is increasing worldwide especially in the developed countries<sup>[1,2]</sup>. A rise is also noticed in the younger population (18 to 29 years) and especially in women<sup>[2]</sup>. The impact of obesity on quality of life is broad causing even pelvic floor disorders among other conditions.

Pelvic floor disorders (urinary or faecal incontinence and pelvic organ prolapse) are common conditions affecting many obese women today. The exact prevalence of pelvic floor disorders in the general population is approximately 11%, but it should be higher in obese women<sup>[3]</sup>. In the different studies, pelvic floor disorders affect between 2% and 42% of women, depending on the definition of the condition and the study population<sup>[4-6]</sup>.

The aim of this narrative review is to present the role of bariatric surgery operations in the improvement of the pelvic floor disorders that many obese women are facing, as well as the effect on the quality of life of obese women.

## METHODS

### Data sources

We retrieved the included results of our study after performing a systematic, electronic search in PubMed (December 17, 2012) and Scopus (December 17, 2012). Both PubMed and Scopus search strategy included the combination of the key words: (bariatric surgery or pelvic floor disorders) and incontinence and prolapse. Cochrane database (December 17, 2012) was also searched in order to look for any reviews on this argument. The reference list was also hand-searched for additional studies.

### Study selection criteria

Studies reporting data on the role of bariatric surgery in pelvic floor disorders were included in this review. Abstracts in scientific conferences and studies published in languages other than English, German, French, Italian and Spanish were excluded from this review. Studies which referred to male patients were also excluded.

### Results

The search performed in PubMed and Scopus retrieved a total of 11 and 14 search results, respectively, among which 10 studies (7 retrospective studies, 1 letter to the editor and 2 reviews) which were identified as eligible for inclusion in this review. No additional studies were identified through hand-searching of references.

Possible mechanisms explaining the correlation between obesity and pelvic floor disorders.

The main mechanism causing the development of pelvic floor disorders is chronically increased abdominal pressure as it overts structural damage or neurologic dysfunction predisposing to prolapse and incontinence<sup>[7-10]</sup>. Elevated abdominal and intravesical pressures are also found in patients with increased sagittal abdominal diameter and elevated BMI<sup>[1,2]</sup>, while significant weight loss improves stress urinary incontinence<sup>[11,12]</sup>. Animal studies showed an association between obesity and urinary incontinence by evaluating urethral sphincter incontinence, urethral length or tone<sup>[13]</sup>. Some studies suggest that neurogenic disease caused by obesity might lead to pelvic floor disorders<sup>[11-13]</sup>. For example, a study proposed that the risk for abnormal median nerve conduction was 3.5-fold greater in obese workers, while a higher incidence of lumbar disk herniation is also found in obese patients<sup>[14,15]</sup>. Other etiologic mechanisms are either the direct injury and denervation to the pelvic floor musculature or defects in the supporting system of the endopelvic fascia and ligaments<sup>[16]</sup>. Conditions such as menopausal status, chronic constipation, chronic cough, and heavy lifting major predisposing factors<sup>[17]</sup>.

### Symptoms

More than 90 percent of morbidly obese women experience some degree of pelvic floor disorders, and 50 percent of these women report that symptoms adversely impact quality of their life<sup>[18]</sup>. In these women, obesity was found to be strongly correlated in predicting pelvic floor disorders in the same extent as obstetric history<sup>[18]</sup>. Although signs of pelvic organ prolapse are frequently observed, the condition seldom causes symptoms especially in younger ages<sup>[19]</sup>. However, vaginal or uterine descent at or through the introitus can become symptomatic. Symptoms may also include a sensation of vaginal fullness or pressure, sacral back pain with standing, vaginal spotting from ulceration of the protruding cervix or vagina, coital difficulty, lower abdominal discomfort, and voiding and defecatory difficulties<sup>[19]</sup>. An association between obesity and urinary incontinence exists, while the association between obesity and other pelvic floor disorders is less clear. However, Chen *et al*<sup>[20]</sup> showed the presence of any pelvic floor disorder in 75% of the obese patients compared with 44% in non-obese ( $P < 0.0001$ ). More obese patients experienced stress urinary incontinence, urge urinary incontinence, and anal incontinence, but not pelvic organ prolapse. The severity of those symptoms were higher in more obese patients<sup>[20]</sup>.

### Bariatric surgery

Bariatric surgery is suggested to be the only consistently-effective long-term treatment for morbid obesity<sup>[21]</sup>. The name "Bariatric surgery" is derived from the Greek words baros and iatriki denoting respectively "heavy weight" and "medicine". In the United States, figures from 2010 indicate that the number of bariatric surgical operations carried out that year was 218000<sup>[22,23]</sup>. Bariatric surgery is associated with long-term weight loss and decreased overall mortality. It could lead to a mean weight loss of between 14% and 25% (depending on the type of procedure performed) at 10 years, and a 29% reduction in all cause mortality when compared to standard weight loss measures<sup>[24]</sup>. Bariatric surgery includes a variety of procedures and its efficacy is based on both the restriction of the quantities of ingested food (vertical banded gastroplasty, adjustable gastric band, sleeve gastrectomy, gastric balloon and the malabsorption of the nutrients through the shunted gut (biliopancreatic diversion, endoluminal sleeve)<sup>[25-35]</sup>. However, the main factor in the success of any bariatric surgery is still a strict post-surgical change of life attitude to a healthier pattern of eating. Since weight is a modifiable risk factor for incontinence, weight reduction may be an effective treatment. Studies of weight loss have examined its effects and explored the pathophysiologic mechanisms of improvement in pelvic floor disorders.

### Role in urinary incontinence

A number of studies have shown improvements in urinary incontinence after bariatric surgery<sup>[8,12,36,37]</sup>. Evidence indicates that massive weight loss (45 to 50 kg) improves

incontinence in morbidly obese women after bariatric surgery<sup>[11,12]</sup>. Women who achieved a weight loss of 5%-10% or greater had at least a 50% reduction in incontinence frequency<sup>[38]</sup>. It is reported that an average weight loss of 69% of excess body weight could lead to significant changes in sagittal abdominal diameter (32 to 20 cm,  $P < 0.0001$ ) and intravesical pressure (17 to 10 cmH<sub>2</sub>O,  $P < 0.001$ )<sup>[37]</sup>. In another study, a weight loss greater than 50% leads to a reduction in stress urinary incontinence from 61% to 11.6% ( $P < 0.001$ )<sup>[11]</sup>. Similar studies reported improvement in urodynamic parameters after bariatric surgery operations<sup>[8,12]</sup>. Greater weight loss was associated with greater improvement of incontinence; as from the patients who lost more than 18 BMI points, 71% regained urinary continence<sup>[39]</sup>.

Surgically induced weight loss has a beneficial effect on symptoms of pelvic floor disorders in morbidly obese women. In a questionnaire based study, it was shown that the prevalence of pelvic floor disorders symptoms improved from 87% before surgery to 65% after surgery<sup>[40]</sup>. There was also a significant reduction in total mean distress scores after surgery, which was attributed mainly to the significant decrease in urinary symptoms. Moreover, reductions in the scores were noted for the other pelvic floor disorders, while quality of life total scores also improved. Age, parity, history of complicated delivery, percent excess body weight loss, BMI, type of weight loss procedure and presence of diabetes mellitus and hypertension had no predictive value for postoperative outcomes in the same study<sup>[40]</sup>. Cuicchi *et al*<sup>[41]</sup> evaluated clinically and instrumentally pelvic floor disorders before and after bariatric surgery in obese women and found that a clear association exists between BMI and urinary incontinence. Weight loss after bariatric surgery resulted in improved urinary incontinence, fecal incontinence, and symptoms of pelvic organ prolapse<sup>[41]</sup>. After a mean BMI reduction of 10 kg/m<sup>2</sup>, the prevalence of pelvic floor disorders decreased to 48%, with a significant improvement in quality of life. The prevalence of urinary incontinence decreased from 61% to 9.2% and was associated with the decrease in postoperative BMI ( $P = 0.04$ )<sup>[41]</sup>. A recent study also showed that weight loss after bariatric surgery can result in resolution of symptoms in nearly half of women with stress urinary incontinence and three quarters of women with overactive bladder and is associated with significant improvement in quality of life<sup>[42]</sup>. On the other hand, according to McDermott *et al*<sup>[43]</sup> the prevalence of pelvic floor disorders did not improve greatly after surgery. More specifically, even with significant weight loss (BMI, 43.7 kg/m<sup>2</sup> to BMI, 29 kg/m<sup>2</sup>), there was no significant difference in the prevalence of pelvic floor symptoms before and after surgery (94% to 81%, respectively) the first postoperative year. However, significant weight loss improved the degree of bother and quality of life related to these symptoms as it was shown by PFDI-20 and PFIQ-7 scores<sup>[43]</sup>.

### Role in faecal incontinence

The role of obesity in faecal incontinence is less well

defined. The prevalence of faecal incontinence in the general population is reported to be 2% to 9%<sup>[5,44]</sup>. Obesity appears to be correlated with higher rates of faecal incontinence and diarrhoea. However, in morbidly obese patients undergoing evaluation for bariatric surgery, the prevalence of anal incontinence was notable at 32%, while incontinence of liquid stool was 21.1% and solid stool was 8.8%<sup>[45]</sup>. The effects of bariatric surgery on these conditions are not well defined. A systematic review showed that faecal incontinence improved after Roux-en-Y gastric bypass in studies with preoperative data, while the effects of bariatric surgery on diarrhoea were unclear<sup>[46]</sup>. It should be mentioned that one of the major disadvantages of the biliopancreatic diversion with duodenal switch operation is diarrhea. Although duodenal switch is associated with more bowel episodes than gastric bypass, the difference is not statistically significant. More specifically, bowel habits were found to be similar in patients who achieved 50% estimated body weight loss with duodenal switch surgery or gastric bypass<sup>[47]</sup>.

### Quality of life

Recently data were analyzed from 421 female patients undergoing bariatric surgery, based on a screening questionnaire [“Minnesota Multiphasic Personality Inventory, 2<sup>nd</sup> ed., Restructured Form (MMPI-2-RF)”]. The women were dichotomized as those with pelvic floor disorders ( $n = 121$ ) and those without pelvic floor disorders ( $n = 300$ )<sup>[48]</sup>. Women with pelvic floor disorders were found to be more psychiatrically vulnerable. More specifically, they were significantly older and more likely to evidence a history of substance abuse/dependence and depression. A trend was also found for previous inpatient hospitalization, outpatient behavioral health treatment, and psychotropic medication usage<sup>[48]</sup>. For this reason, one could understand that bariatric surgery could offer better continence control, quality of life and psychological balance.

## CONCLUSION

Bariatric surgery can lead to significantly weight reduction of obese women. This method also acts as a treatment for the pelvic floor disorders that those women face by offering improvement in incontinence and quality of life.

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