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Prospective assessment of axial back pain symptoms before and after bariatric weight reduction surgery

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Abstract

BACKGROUND: The prevalence of obesity in developed countries has reached alarming levels, doubling in the United States since 1980. Although obese patients with chronic low back pain are frequently advised to lose weight, the association between these medical conditions remains unproven.

PURPOSE: This study prospectively assessed clinically reported changes in chronic axial low back pain symptoms after weight reduction from bariatric surgery for morbid obesity.

STUDY DESIGN: Prospective longitudinal study.

PATIENT SAMPLE: Fifty-eight consecutive patients with morbid obesity and chronic axial low back pain undergoing bariatric surgery over a period of 6 months. Patients were considered morbidly obese if they were 50% to 100% above their ideal body weight or having a body mass index (BMI) greater than 40.

OUTCOME MEASURES: Visual Analog Scale (VAS) for axial low back pain, Short Form-36 (SF-36) Health Survey, and Oswestry Disability Index (ODI).

METHODS: Patients undergoing weight reduction surgery were assessed preoperatively and postoperatively at 12 months with validated clinical measures for axial back pain and disability (VAS, SF-36, and ODI). Bariatric surgery parameters included demographic data, weight, and BMI. Statistical analysis included paired *t* tests and multiple regression techniques.

RESULTS: Of the initial 58 patients, 38 (65%) completed both preoperative (Pre-Op) and postoperative (Post-Op) questionnaires at 12 months. These 38 subjects included 30 women and 8 men, with an age range of 20 to 68 years (mean 48.4±10.1). Overall, these patients showed a decrease in mean weight from 144.52±41.21 kg Pre-Op to 105.59±29.24 Post-Op ($p<.0001$) and BMI from 52.25±12.61 kg/m^2 Pre-Op to 38.32±9.66 Post-Op ($p<.0001$).

Patients demonstrated a statistically significant mean 44% decrease in axial back pain on the VAS scale ($p=.006$; 5.2±3.35 Pre-Op, to 2.9±3.1 Post-Op). Analysis of the SF-36 major components revealed that patients experienced significant increases in mean physical health by 58% ($p<.0001$; 44.5±20.09 to 70.24±26.84) and in median mental health by 6% ($p=.03$; 70±7.14 to 73.39±11.78). Patients also showed statistically significant 24% decrease in Post-Op ODI score for physical disability ($p=.05$) from 26.75±16.56 Pre-Op to 20.35±18.71 Post-Op ($p=.05$).

CONCLUSION: This study suggests that the substantial weight reduction after bariatric surgery may be associated with moderate reductions in preexisting back pain at early-follow-up. This effect did not appear to be the result only of an overall improvement in well-being associated with weight loss. However, larger randomized controlled clinical studies with longer-term follow-up are needed to definitively determine a causal relationship.

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Introduction

The prevalence of obesity in developed nations has reached alarming levels, affecting all socioeconomic groups, irrespective of age, sex, or ethnicity. In the United States, the prevalence of obesity, defined as a body mass index (BMI) greater than or equal to 30 kg/m^2, has doubled since 1980 [1–6]. Although the burden obesity places on society can be difficult to quantify, there is no question that this disorder leads to shorter life expectancies, limitations in activities of daily living, reduced workforce productivity, and added medical costs [7–12].

The effects of an increased body mass on the musculoskeletal system have primarily been studied in the lower extremity joints. In a retrospective review, among 204 subjects who received either a total hip or knee replacement, 72% were obese compared with only 26% of obese in the general population [13]. Similarly, in another population-based case control study, the authors determined odds ratio for a BMI less than 20 kg/m^2 and greater than 36 kg/m^2 relative to a normal BMI of 24–25 kg/m^2. They found that the risk of knee osteoarthritis increased from 0.1 for a BMI <20 kg/m^2 to 13.6 for a BMI of 36 kg/m^2 or higher [14].

However, the effects of obesity on the lumbar spine are more controversial [15,16]. Some studies have reported an association between obesity and lumbar spondylosis [15,17–19], whereas others have shown no association [20–22]. Chronic axial low back pain, such as obesity, is common, affecting more than 70% of adults episodically and 2% to 7% chronically [23,24]. The etiology of lumbago is diverse, and investigations into its risk factors have failed to identify factors with a strong correlative impact. Consequently, it is still unclear what types of strategies could be developed to prevent or alleviate axial pain symptoms.

As obese patients are at risk for osteoarthritis in weightbearing joints, such as knee, hip, and feet, the concept that obesity predisposes a patient to lumbar spondylosis and back pain may seem intuitive [13,14,25]. Casual recommendations made by clinicians that obese patients with chronic back pain lose weight to ameliorate their symptoms may be prudent [26]. However, there has been little scientific evidence to substantiate the notions that obesity contributes to the onset of back pain either acutely or chronically; and weight loss results in a reduction of the severity or periodicity of these complaints.

There have been several studies that have examined the association between radiographic evidence of lumbar spondylosis and obesity. In a longitudinal prospective study, O'Neill et al., recruited 681 women and 499 men older than 50 years to study the association between the presence of anterior osteophytes on lateral lumbar radiographs and risk factors such as obesity and physical activity levels [17]. They noted that increasing BMI was associated with more frequent findings of osteophytes at the lumbar spine [17]. Biering-Sorensen and colleagues noted that the absolute weight and BMI are significantly higher among patients in their seventh decade with spondylosis [18]. However, other reports have shown no association between BMI and low back–related problems [20–22]. In one study, Manchikanti et al. found that the incidence of clinically evident facet joint disease mediating pain was similar between obese and nonobese patients [16].

This study attempts to explore the association between changes in BMI and clinical symptoms of axial low back pain. Because patients undergoing bariatric surgery frequently experience dramatic and reliable weight loss of between 30 and 60 kg in the first year after operative intervention, they are an ideal longitudinal cohort for assessing the effects of weight reduction on low back pain. Thus, a cohort of morbidly obese patients undergoing bariatric surgery with mechanical low back pain was followed over a period of 12 months to assess the effect of weight loss on their chronic axial back pain and disability.

Methods

Study design

After Institutional Board Review approval, 58 patients with chronic axial low back pain scheduled to undergo a bariatric surgery at the University of Southern California, were consecutively and prospectively enrolled in the study over a period of 6 months. To be eligible, patients had to be at least 18 years of age, and needed to have a BMI greater than 40 kg/m^2. Patients with a BMI between 35 and 39.9 kg/m^2 were also included if they were 50% to 100% more than their ideal weight. They also had to report a two-year history of chronic mechanical low back pain with or without radiculopathy that causes significant disability. Patients were excluded from the study if they underwent a successful diet or exercise program in the last five years, if they suffered mainly from radicular pain with minimal low back pain, or had prior lumbar or bariatric surgery. Preoperative data were collected one week before undergoing their bariatric surgery. Demographic data included age, height, medical comorbidities, weight, and BMI. Outcome measures included the Visual Analog Scale (VAS) scored for axial low back pain, the Short Form-36 (SF-36) standard quality-of-life questionnaire, and Oswestry Disability Index (ODI) as a measure of lumbar symptoms. Postoperative demographic data were collected from the patients' visit to their bariatric surgeon at 12 months. Also, an independent observer helped in gathering the responses to the outcome measures questionnaires by contacting the patients at the end of this 12-month period.