

A Longitudinal Analysis of Weight Changes Before and After Total Hip Arthroplasty (THA): Weight Trends and Patterns

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INTRODUCTION:

The prevalence of obesity among primary THA recipients in the United States (US) has tripled in the last two decades. Studies designed to track weight changes in these patients longitudinally over multiple years, including preoperative and postoperative periods, are limited. The present study aimed to: 1) delineate preoperative (i.e. one-year prior) and postoperative (i.e. one-year after) weight trends for patients undergoing primary THA by measuring clinically significant weight changes; and 2) compare weight trends among patients according to body mass index (BMI) categories.

METHODS:

All patients who underwent primary, elective, unilateral THA between January 2016 and December 2019 at a single, large tertiary healthcare system in the US were prospectively enrolled using an institutional database (n=8,612). Exclusion criteria included: (1) missing BMI measurements one-year before THA (*preoperative BMI*; 12 ± 3 months prior), at the time of THA (*index BMI*; 1 month to 0 days prior), or one-year after THA (*postoperative BMI*; 12 ± 3 months after) (n=4,283); (2) bilateral or revision THA (n=0); and (3) those whose surgical indication was not primary osteoarthritis were excluded (n=1,318). The primary outcome was clinically significant weight change (>5% change in BMI) during the one-year preoperative and one-year postoperative periods. The study cohort was stratified into three groups – weight gain (≥5% increase in BMI), weight loss (≥5% decrease in BMI), and weight stable (BMI change <5%). Preoperative BMI was the chosen as the anchoring point to define patients' baseline BMI. The following BMI categories were used: underweight (<18.50 kg/m²), normal weight (18.50 to 24.99 kg/m²), overweight (25.00 to 29.99 kg/m²), obese class I (30.00 to 34.99 kg/m²), obese class II (35.00 to 39.99 kg/m²), and obese class III (≥40.00 kg/m²).

RESULTS:

Out of 3,011 patients included, 67% (n=2,004) maintained a stable preoperative weight (BMI change < ±5%) during the one-year preoperative period, while 16% (n=482) gained and 17% (n=525) lost weight, respectively. When grouped by preoperative BMI classification, up to 37% of obese class III patients lost weight during the one-year before THA. There was a positive, linear relationship between the proportion of patients who lost weight before THA and increasing BMI classification (**Figure 1**). During the one-year postoperative period, 64% (n=1,928) maintained a stable weight, while 23% (n=679) gained and 13% (n=404) lost weight, respectively. A larger proportion of patients lost weight after THA with increasing BMI classification, except for obese class III patients (**Figure 2**). Concerning longitudinal preoperative and postoperative weight trends, a majority of patients (43.83%) had a stable weight throughout the study period (**Figure 3**). Only 1.79% and 2.98% of patients lost weight and gained weight, respectively, throughout both preoperative and postoperative time periods.

DISCUSSION AND CONCLUSION:

The majority of patients maintain a stable BMI one-year before and one-year after THA. A proportionally larger number of obese patients lost weight before THA compared to non-obese patients; however, an insignificant number of patients appear to lose weight longitudinally during the one-year before and one-year after THA. Orthopaedic surgeons may use our findings to provide realistic expectations for patients undergoing primary THA. Importantly, considering the detrimental health effects of elevated BMI, including worsening osteoarthritis and cardiovascular function, orthopaedic surgeons should continue to educate and emphasize weight management in THA recipients.

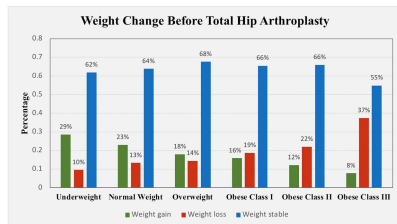


Fig. 1: Weight changes during the one-year before total hip arthroplasty by BMI classification; BMI: Body Mass Index

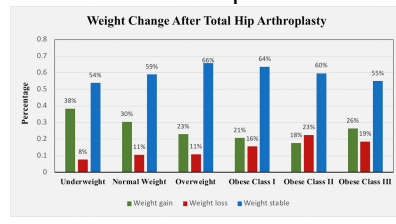


Fig. 2: Weight changes during the one-year after total hip arthroplasty by BMI classification; BMI: Body Mass Index

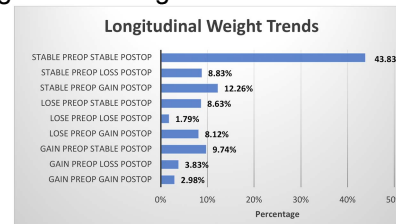


Fig. 3: Longitudinal weight trends for patients who had total hip arthroplasty according to clinically significant preoperative and postoperative weight changes.