

## Short Communication

# Changes to Body Mass Index Following Total Ankle Replacement

Johnson-Lynn SE\*, Ramaskandhan J and Siddique MS

Department of Orthopaedics, Freeman Hospital, UK

\*Corresponding author: Johnson-Lynn SE, Department of Orthopaedics, Freeman Hospital, Freeman Road, UK

Received: March 24, 2017; Accepted: April 24, 2017;

Published: May 01, 2017

## Abstract

Obesity is an increasing problem in the UK and many patients presenting for total joint replacement are classified as obese (BMI >30). The effect of total joint arthroplasty on post-operative weight is unclear. Obese patients following total knee replacement tend to continue to put on weight but this has not previously been found to be the case following total ankle replacement. We present the largest series to date of 172 consecutive total ankle replacement patients with pre-operative and post-operative data on BMI. Mean pre-operative BMI was 28.49 (range 18.06-47.49). 56 (33%) patients were classified as obese pre-operatively, with a BMI of 30 or greater.

Mean post-operative BMI was 28.33 (range 18.52-49.07). The mean difference between pre- and post-operative BMI was -0.15, this was not statistically significant (p=0.55). For the patients who were obese pre-operatively, the difference between pre- and post-operatively BMI was -1.20, this approached but did not reach statistical significance (p=0.073). No significant change in BMI was observed in patients following total ankle replacement, including those who were obese pre-operatively. This contrasts with previous studies of patients following total knee replacement, who tended to continue to put on weight following surgery.

**Keywords:** Total ankle replacement; Body mass index; Ankle arthritis

## Introduction

Obesity (BMI >30) is an increasing problem in the UK and many patients presenting for total joint arthroplasty are classified as obese. The effect of obesity on outcomes following treatment of end stage ankle arthritis is unclear. Some previous authors have demonstrated that obesity is a risk factor for complications following total ankle replacement and ankle arthrodesis, including venous thromboembolism and infection [1]. However, other groups conclude that total ankle replacement is safe in obese patients, with no increased complications [2,3] but a risk of lower post-operative patient-reported outcomes [4]. There is also evidence of reduced long-term survivorship of total ankle replacements in obese patients, particularly those presenting with primary osteoarthritis [5], although short term component stability and survivorship do not appear to be affected [6]. Patients undergoing total ankle replacement have shown no significant change in BMI following surgery [7,8]. We report post-operative changes in BMI for a large cohort of patients who underwent total ankle replacement between March 2006 and August 2011.

## Methods

A cohort of 172 consecutive patients (64 female) received a mobile-bearing total ankle replacement using the MOBILITY Total Ankle System (De Puy International, Leeds, United Kingdom) between March 2006 and August 2011. All surgery was performed at a single centre, by a single surgeon (M.S.S). 10 patients received a calcaneal osteotomy for hind foot deformity at the same time. 5 patients had previously undergone a subtalar fusion. Data was

collected prospectively, following patient consent and Caldicott approval, as part of the hospital registry providing data for ongoing audit of lower limb arthroplasty outcomes, therefore Research Ethics Committee approval was not required for this study. Data on BMI was collected prospectively at pre-operative assessment and annually following surgery. Mean follow-up was 3.8 years (range 1-5 years).

3 patients required revision within 5 years, there were 2 superficial wound infections and 6 medial malleolar fractures.

Statistical analysis using paired t-tests was performed using Graph Pad Prism 7.

## Results and Discussion

Mean pre-operative BMI was 28.49 (range 18.06-47.49). 56 (33%) patients were classified as obese pre-operatively, with a BMI of 30 or greater.

Mean post-operative BMI was 28.33 (range 18.52-49.07). The mean difference between pre- and post-operative BMI was -0.15, this was not statistically significant (p=0.55). For the patients who were obese pre-operatively, the difference between pre- and post-operatively BMI was -1.20, this approached but did not reach statistical significance (p=0.073).

The UK has the third highest rate of overweight and obese (BMI >30) adults in Europe, with a 28% of adults being classified as obese and 62% overweight (BMI >25). Many patients presenting for total joint arthroplasty are classified as obese - one third of patients in our cohort. Obesity is known to increase risks of ischaemic heart disease, stroke, type II diabetes and many types of cancer. Population studies

have demonstrated obesity as a risk factor for both hip and knee osteoarthritis, although there has been no investigation of a direct link to ankle arthritis [9,10].

Although some previous authors have demonstrated that obesity is a risk factor for complications following total ankle replacement and ankle arthrodesis, including venous thromboembolism and infection [1], obesity has not been shown in other studies to have a detrimental effect on patient-reported outcomes. Bouchard and colleagues have concluded that total ankle replacement is safe in obese patients, with no increased complications. They found that obese patients had poorer physical function, on average, pre-operatively, as measured by SF36, however they experienced similar improvements to non-obese patients on both AOS and the physical components of the SF36 score. There is, however, evidence of reduced long-term survivorship of total ankle replacements in obese patients, particularly those presenting with primary osteoarthritis [5], although short term component stability and survivorship do not appear to be affected [6].

There is a tendency for patients who are already obese to continue to gain weight and previous studies of obese patients who have undergone total knee replacement show that the procedure does nothing to halt this process [11]. In contrast, observations in patients undergoing total ankle replacement have shown no significant change in BMI following surgery [7,8]. Our data adds to the evidence that obese patients are not likely to go on to reduce their BMI following total ankle replacement without further specific interventions.

## Conclusion

No significant change in BMI was observed in patients following total ankle replacement, including those who were obese pre-operatively. This contrasts with previous studies of patients following total knee replacement, who tended to continue to put on weight following surgery.

## References

1. Werner BC, Burrus MT, Looney AM, Park JS, Perumal V, Cooper MT. Obesity Is Associated with Increased Complications after Operative Management of End-Stage Ankle Arthritis. *Foot and Ankle International*. 2015; 36: 863-870.
2. Bouchard M, Amin A, Pinsker E, Khan R, Deda E, Daniels TR. The Impact of Obesity on the Outcome of Total Ankle Replacement. *Journal of Bone and Joint Surgery (American Volume)*. 2015; 97: 904-910.
3. Raikin SM, Kane J, Ciminiello ME. Risk Factors for Incision-Healing Complications Following Total Ankle Arthroplasty. *Journal of Bone and Joint Surgery (American Volume)*. 2010; 92: 2150-2155.
4. Gross CE, Lampley A, Green CL, DeOrio JK, Easley M, Adams S, et al. The effect of obesity on functional outcomes and complications in total ankle arthroplasty. *Foot and Ankle International*. 2016; 37: 137-141.
5. Schipper ON, Denduluri SK, Zhou YING, Haddad SL. Effect of obesity on total ankle arthroplasty outcomes. *Foot and Ankle International*. 2016; 37: 1-7.
6. Barg A, Knupp M, Anderson AE, Hintermann B. Total ankle replacement in obese patients: Component stability, weight change, and functional outcome in 118 consecutive patients. *Foot and Ankle International*. 2011; 32: 925-932.
7. Baker JF, Perera A, Lui DF, Stephens MM. The effect of body mass index on outcomes after total ankle replacement. *Irish Medical Journal*. 2009; 102: 188-190.
8. Penner MJ, Pakzad H, Younger A, Wing KJ. Mean BMI of Overweight and Obese Patients Does Not Decrease After Successful Ankle Reconstruction. *Journal of Bone and Joint Surgery (American Volume)*. 2012; 94: 1-7.
9. Felson DT, Anderson JJ, Naimark A, Walker AM, Meenan RF. Obesity and Knee Osteoarthritis: The Framingham Study. *Annals of Internal Medicine*. 1988; 109: 18-24.
10. Cooper C, Inskip H, Croft P, Campbell L, Smith G, Mclearn M, et al. Individual Risk factors for Hip Osteoarthritis: Obesity, Hip Injury and Physical Activity. *American Journal of Epidemiology*. 1998; 147: 516-522.
11. Kahn TL, Snir N, Schwarzkopf R. Does Body Mass Index Decrease Over Time Among Patients Who Undergo Total Knee Arthroplasty Compared to Patients With Osteoarthritis? Data From the Osteoarthritis Initiative. *Journal of Arthroplasty*. 2016; 31: 971-975.