

A Randomized Study of Patient Outcomes following Mallet vs Automated Impactor THA

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Introduction

We previously reported that performing THA with the use of an automated impactor system resulted in reduced surgeon physiologic stress and energy expenditure compared to mallet-based THA. Here we investigate whether an automated impactor system also influences patient outcomes following THA.

Materials & Methods

An orthopaedic surgeon performed 35 primary THAs using press fit implants. Patients were randomized to one of two surgery groups that used either an automated impactor device (IMPACTOR) or traditional handheld mallet (MALLET). Groups were matched for age, sex, and body mass index (IMPACTOR group: N=17, 12 female, mean age=63.4, mean BMI=29.2; MALLET group: N=18, 12 female, mean age=62.7, mean BMI=29.1). Real-world pre- and post-operative measures of hip pain and function (Hip disability and Osteoarthritis Outcome Score; HOOS) and mental well-being (Patient Health Questionnaire; PHQ) as well as physical activity (daily steps and walking distance) were collected using a smartphone sensing app (MAE) developed by Research Science Consulting, LLC. Results reported here reflect data collected one month prior to surgery and 1-3 months post-operatively.

Results

Results revealed main effects of surgery such that hip pain scores decreased and hip function and mood scores improved following surgery (all P's<0.001). Likewise, daily steps and walking distance increased following surgery (daily steps: P<0.0001; walking distance: P < 0.005). Hip function scores, daily steps, and daily walking distance measures obtained at the 1-3 month timepoint post-operatively were greater for the IMPACTOR group (hip function: P = 0.03; daily steps: IMPACTOR: 7,448, MALLET: 7,243, P = 0.04; walking distance: IMPACTOR: 2.8, MALLET: 2.7 mi, P = 0.01). Although hip pain and mood scores were significantly different before and after surgery, these measures did not differ between IMPACTOR and MALET groups.

Conclusion

Performing THA with the use of an automated impactor system resulted in slight but significant improvements in hip function scores and physical activity when compared to mallet-based THAs. When considered in the context of previously reported improvements to surgeon well-being, these findings suggest that the incorporation of automated impactor systems during THA can be mutually beneficial to surgeon and patient alike.