

Surgeons Experience Greater Physiologic Stress and Strain in Direct Anterior Approach than Posterior Approach for Total Hip Arthroplasty

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INTRODUCTION: Direct anterior approach (DAA) and posterior approach (PA) for total hip arthroplasty (THA) have advantages and disadvantages, but their physiologic burden to the surgeon has not been quantified. This study was conducted to determine whether differences exist in surgeon physiological stress and strain during DAA in comparison to PA.

METHODS: We evaluated a prospective cohort of 144 consecutive cases (67 DAA and 77 PA). Five, high-volume, fellowship-trained arthroplasty surgeons wore a smart-vest that recorded cardiorespiratory data while performing primary THA with DAA or PA. Heart rate (beats/minute), stress index (correlates with sympathetic activations), respiratory rate (respirations/minute), minute ventilation (liters/min), and energy expenditure (calories) were recorded, along with patient body mass index and operative time. Continuous data was compared using T-test or Mann Whitney U tests, and categorical data was compared with chi-square or Fischer's exact tests. Further testing was performed with multivariate linear regressions.

RESULTS:

There were no differences in patient characteristics. Compared to PA, performing THA via DAA had a significantly higher surgeon stress index (17.4 versus 12.4; $p < 0.001$), heart rate (101 versus 98.3; $p = 0.007$), minute ventilation (21.7 versus 18.7; $p < 0.001$), and energy expenditure per hour (349 versus 295; $p < 0.001$). However, DAA had significantly shorter operative time (71.4 versus 82.1; $p = 0.001$).

DISCUSSION AND CONCLUSION: Surgeons experience significantly higher physiological stress and strain when performing DAA compared to PA for primary THA. This study provides objective data of energy expenditure that can be factored into surgical planning, case preferences, and scheduling, and it provides insight into work done by the surgeon.