Sensors Can Lift Ceiling Effect Associated with PROs & Comprehensively Assess Approach-Differences

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INTRODUCTION:
In contemporary THA practice of surgeons that employ more than one approach, complex hips (deformity, complex pathology) are likely to undergo posterior approach (PA). Whether such patients have similar outcome as patients will less complex morphology operated via anterior approach (AA) is unknown. This study aims to 1. Assess rate of functional return following THA using contemporary measures; and 2. Test for approach-specific differences.
METHODS:
A prospective, consecutive, cohort study of 70 THAs (Male/Female: 39/31; Age: 59±9; BMI:28±5; 46AA/24PA) under the care of 6 surgeons, from a single, academic center was studied. Patients underwent comprehensive assessments at regular intervals (pre-operatively, 2-/6-/12-/52- weeks post-THA). Complications and re-operations were recorded. At each assessment, performance-based, objective, measures (PBOMs) and PROMs (Oxford-Hip-Score (OHS)) were obtained. For PBOMs, patients were fitted with Inertia-Measuring-Unit (IMU) sensors and were asked to walk and perform sit-to-stand tasks. PBOMs of interest included walking speed, stride length, impact load asymmetry and pelvic-angular velocity. Approach-groups comparisons were performed.
RESULTS:
Mean OHS improved from 20±8 to 42±6 ($p<0.001$). OHS was similar between approach- groups at every stage ($p=0.9$). All PBOMs significantly improved post-THA ($p<0.001$). Pre-THA, all PBMOs were superior for the AA compared to the PA (velocity: 0.81 vs 0.67m/s; stride: 0.97 vs 0.87m; impact asymmetry: 14 vs 22%; angular pelvic velocity: 35 vs 27m/s; $p<0.001$). Post-operatively however, the approach differences in PBMOs were constantly reducing and reached lack of significance at 12-weeks for all (velocity: 1.1 vs 1.1m/s; stride: 1.2 vs 1.2m; angular pelvic velocity: 123 vs 124m/s) but impact asymmetry (11 vs 15%).
DISCUSSION AND CONCLUSION:
IMU sensors are valuable assessment tools providing objective assessments that lift ceiling effects associated with PROMs. Selective approach does not compromise care and may improve function as those that underwent PA showed good functional recovery, equalizing spatiotemporal gait and sit-to-stand activities within 12-weeks post-operatively.