THE EFFECT OF SURGICAL APPROACH ON GAIT DURING TOTAL HIP ARTHROPLASTY

Jonathon Spanyer, Toan Le, M.D., Kermit Davis III, PhD, Susan Kotowski, Chunhui He

University of Cincinnati Dept. Orthopedic Surgery; U.C. Low Back Biomechanics and Workplace Stress Laboratory.

BACKGROUND: Total Hip Arthroplasty (THA) has had significant clinical success by providing patients an overall improved quality of life, physical function, and relief of pain. But despite the relatively high success rates, gait characteristics of individuals may not return to normal for several years after surgery. Few studies have been conducted to examine the effects that antero-lateral (A-L) versus postero-lateral (P-L) surgical approaches may have on post-operative gait dynamics. Researchers hypothesized that an A-L surgical approach for THA would result in less altered gait kinematics after surgery than a P-L approach for the same procedure. METHODS: Data was collected for 19 controls and 1 experimental subject during simple pacing tasks. The joints of patients were marked with small reflective spheres, and three dimensional joint position data was collected using a six-camera infrared recording system. Ground reaction forces were also obtained using a force plate apparatus. RESULTS: Three dimensional hip and knee angles were calculated based on the position of the reflective markers at heel strike with the following results: Left Hip: CAvg 127.0^{o}, CStD 3.0^{o} (n=4), EAvg 124.2^{o}, EStD 5.6^{o} (n=3); Right Hip CAvg 93.6^{o}, CStD 1.0^{o} (n=6), EAvg 96.2^{o}, EStD 0.0^{o} (n=1); Left Knee: CAvg 175.4^{o}, CStD 1.5^{o} (n=4), EAvg 173.7^{o}, EStD 0.8^{o} (n=3); Right Knee: CAvg 167.0^{o}, CStD 3.6^{o} (n=6), EAvg 166.1^{o}, EStD 0.0^{o} (n=1); Average difference in COM coordinates (x, y, z) between control and experimental: Left Leg (0.000m, -0.021m, -0.040m); Right Leg (-0.025m, -0.006m, -0.038m). CONCLUSIONS: Preliminary results suggest that calculated values for hip and knee angles show no difference between the control and experimental group. Data from COM calculations show differences between the groups, but further testing will be required to confirm this claim. No support for the hypothesis can be shown without further testing.