

An intelligent instrument for improved leg length and hip offset accuracy in total hip arthroplasty

Jesse Wolfstadt, Tomas Amenabar, Oleg Safir, David Backstein, Allan Gross, Paul Kuzyk

Introduction

Leg length discrepancies following total hip arthroplasty have been associated with nerve palsies, gait abnormalities, and lower back pain.(3) LLD represent the most common reason for litigation against orthopedic surgeons in the United States(3) and are related to poorer functional outcomes and patient dissatisfaction.(7) Failure to restore femoral offset following THA has been linked to decreased range of motion and abductor strength(11), impingement(9), limping(1), higher dislocation rates(2), increased polyethylene wear(13) and cup strain(5), and loosening of implants.(14) Computer navigation has shown to improve the accuracy of LL and OS during total hip arthroplasty.(4; 8) As well, computer navigation has shown to decrease the number of outliers from desired alignment during acetabular cup placement.(6; 8) However, computer navigation in THA has been hindered by increased surgical time and high cost.(10) Our research objective was to prove the accuracy of the PelvAssist™ system for determining LL and OS. Our hypothesis was that PelvAssist™, an imageless intraoperative intelligent instrument, could improve the accuracy of LL and OS during primary total hip arthroplasty. We studied this hypothesis in cadavers by comparing the LL and OS measured intra-operatively with PelvAssist™ to post-operative radiographic measurements, as well as the expected changes based on the geometry of the implants.