

EXPERIENCE WITH FLUOROSCOPIC AND CT-BASED NAVIGATION FOR TOTAL HIP ARTHROPLASTY

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Introduction

Acetabular component malposition increases the incidence of hip joint instability, wear, wear-associated osteolysis, and revision for instability and loosening. Further, less invasive surgical techniques may increase the risk of acetabular component malposition and component position may be even more critical when hard bearings are used. Surgical navigation has the potential to improve acetabular component positioning during total hip arthroplasty.

Surgical navigation can be performed without images, based upon intra-operative fluoroscopic images, or based upon a pre-op CT data set. Image-free methods of hip navigation have the disadvantage that navigation accuracy cannot be confirmed at surgery and improper landmarks can lead to significant errors. The current study compares experience with CT and fluoroscopic-based navigation in total hip arthroplasty.

Materials and Methods

91 Total Hip Arthroplasties were performed using fluoroscopic navigation. 84 Total Hip Arthroplasties were performed using CT-based navigation. Cup abduction was aimed for 41 degrees. In the CT cases, anteversion was aimed for 28 degrees. Cup abduction was measured on post-operative radiographs.

Results

Cup abduction on the fluoroscopically navigated hips averaged 40.3 degrees with a standard deviation of 2.3 degrees. Cup abduction on the CT-based navigated hips averaged 42.3 degrees with a standard deviation of 2.8 degrees.

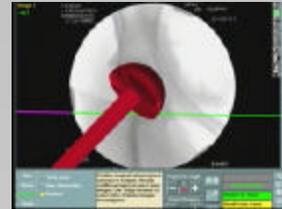
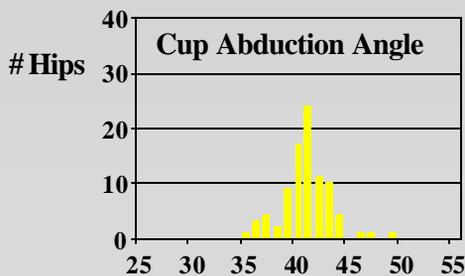


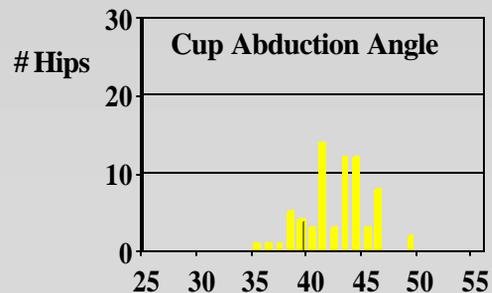
Figure 1. Fluoroscopic navigation in Total Hip Arthroplasty



Figure 2. CT-based navigation in Total Hip Arthroplasty



■ Fluoro-based (n=89 of 91)



■ CT-based (n=70 of 84)

Conclusions

Both Fluoroscopic and CT-Based navigation eliminated all poorly positioned cups. CT based navigation is faster in surgery. Fluoroscopic-based navigation is especially useful in revisions, where CT image quality may be poor and in cases where further intraoperative imaging is required.