

TABLE 11-1

ACETABULAR CUP PLACEMENT: FLURO VS COMPUTER NAVIGATED

| FLUOROSCOPIC DAA THA (N = 260) | | | |
|--|-------|-----------------|-----------------|
| Mean inclination: 42 | SD: 4 | Range: 34 to 50 | OR time: 86 min |
| COMPUTER NAVIGATED DAA THA (N = 160) | | | |
| Mean inclination: 39 | SD: 3 | Range: 33 to 46 | OR time: 75 min |
| SD: standard deviation OR: operating room | | | |

Computer navigation systems often use the anterior pelvic plane as a reference for anteversion and the anterior superior iliac spine (ASIS) for inclination. This has led to slower utilization trends by reconstructive surgeons and particularly for the approaches that have the patient in a lateral position. Having the patient in a supine position makes registration significantly easier and has even lead to reports of decreased operative times compared to DAA THA using traditional fluoroscopy for navigation.¹ There have been studies to question the validity of using the anterior pelvic plane (also known as the *frontal pelvic plane*) for cup placement based upon the pelvic plane's variability with standing, supine, and sitting positions as studied in x-rays of patients in these various positions.² Other studies have shown low frontal plane variability with various subject positions using navigation registration and improved accuracy and precision when looking at cup inclination and anteversion.³⁻⁵

We began using fluoroscopy and computer navigation in tandem to evaluate both technologies simultaneously. Cup inclination and leg length were consistent and precise, but this was not the case with regard to cup anteversion. This had to do with difficulty in registering the pubic symphysis and the ASIS in obese patients. In such patients, alternative references should be used to determine cup anteversion, such as the transverse acetabular ligament (TAL), which is a proven, consistent landmark for determining socket anteversion. Using TAL either visually or as a digitized reference with navigation leads to consistent accuracy in both cup inclination and anteversion.⁶

Our initial data from 2005 with computer navigated DAA THA is summarized in Table 11-1. Later, when we could digitize the plane of the TAL for anteversion, we abandoned fluoroscopy for acetabular component positioning in favor of computer navigation alone.

Not only are operating times less with computer navigation, but the mean cup inclination and its standard deviation are also comparable to fluoroscopy.¹ Based on these data, we believe that computer navigation can suffice in DAA THA, without the need for concurrent fluoroscopy. DAA surgeons can increase surgical efficiency with computer navigation, and avoid wearing the lead aprons that are needed during fluoroscopy, independent of whether or not a special traction table is used for the operation.