

# A Novel Acetabular Alignment Guide for THR using Selective Anatomic Landmarks on the Pelvis

**ABSTRACT:** This paper presents a novel approach for acetabular alignment during the implant of a prosthetic hip joint in a natural pelvis. The alignment instrument uses selective anatomic bony landmarks on the pelvis, which are accessible in surgery, to guide the placement of the acetabular component in the appropriate orientation. A closed form solution, involving both a forward and reverse analysis, is presented to relate the parameters of the device with the abduction and anteversion angles. Using mathematical models, this device should allow the surgeon to place the acetabular component with an orientation between  $10.9^\circ$  and  $19.1^\circ$  anteversion and  $35.7^\circ$  and  $44.3^\circ$  abduction with 95% confidence in a male/left specimen for the commonly accepted target of  $15^\circ$  anteversion and  $40^\circ$  abduction. This device is currently being used successfully by one of the authors in THR surgery. **KEYWORDS:** Total hip replacement; Dislocation; Alignment guide; Pelvic landmarks; Acetabular component orientation