

Robotic-Arm Assisted Total Hip Arthroplasty in Developmental Hip Dysplasia

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Background

Total hip arthroplasty (THA) indicated for developmental dysplasia of the hip (DDH) is associated with higher rates of failure and revision compared with standard THA. Decision making is influenced by complex anatomy unique to each patient. A series of tradeoffs often exist, such as whether to implement true or false positioning of the acetabulum. The precision afforded by a robotic approach offers a middle ground in decision making. Robotic-arm assisted THA includes preoperative planning via three-dimensional CT modeling and image-based navigation for surgical orientation. Integrating DDH cases with strategic robotic technology shows potential for longer lasting fixation and stability.

Purpose:

This video demonstrates how to formulate a robotic-based reconstructive plan and execute these objectives surgically in patients with DDH.

Methods

Classification systems and anatomic irregularities are reviewed. Potential complications and how to decrease these risks via robotic technology are discussed. The literature on manual and robotic outcomes is summarized. The case presentation of a 43-year-old woman with progressive left groin pain and lateral hip pain who has a medical history of bilateral DDH is reviewed. The patient underwent right-sided THA and elected to proceed with left-sided THA to improve her pain and the stability of her gait.

Results

The preoperative plan was precisely achieved via robotic haptics. Postoperative clinical outcomes showed improved range of motion, decreased limb-length deficiency, and absence of a limp while ambulating.

Conclusion

Robotic THA for DDH can minimize failure and revision rates. Disadvantages include a steep learning curve and higher costs; however, these complex cases benefit from meticulous preoperative choices and confident intraoperative orientation.