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MINI REVIEW

Does the use of robotic technology in hip arthroplasty provide superior clinical outcomes?

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Total hip arthroplasty (THA) is a very successful surgical procedure and continues to evolve as we attempt new techniques and improve outcomes of the patients.[1-4] Robotic surgery in total joint arthroplasty is one of them.[5]

A recent survey was done among the members of the American Association of Hip and Knee Surgeons.[6] A unique finding of this study was that a larger proportion of orthopedic surgeons considered themselves "innovators" or "early adopters".

In another survey, 588 participants answered questions regarding robotic-assisted orthopedic surgery to determine population characteristics and public perceptions.[7] The three main concerns regarding robotic technology included lack of surgeon experience with robotic surgery, robot malfunction causing harm, and increased cost. Only half of respondents accurately understood the actual role of robotic surgery.

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Does the use of robotic technology provide superior clinical outcomes? Intraoperative use of technology may improve the accuracy of implant placement. However, it has not yet translated into improved early reported functional outcomes.[8]

The existing literature comparing robotic THA and conventional THA is scarce and low-quality.[9] There are evidence to support increased accuracy and reproducibility of THA component placement with robotic THA. However, this has not been shown to reduce postoperative dislocation and revision rates. Based on the available evidence, functional outcomes are comparable between techniques, and robotic THA appears to be associated with longer operative times.

Robotic THA leads to highly accurate implant placement and significantly reduced limb length discrepancies. However, in a systematic review and meta-analysis, the authors did not recommend robot-assisted techniques for routine THAs due to lack of adequate long-term follow-up data, prolonged operation times, and no significant differences in the rate of complications and implant survivorship compared to conventional THAs.[10]

A bibliometric analysis of all published primary research demonstrates robotic THA has not yet reached the point of scholarly acceptance. Scholarly acceptance of robotic THA as an orthopedic surgical technique has yet to be reached. Probably, robotic THA would remain in the experimental phase due to the rapid development of new technology in this field.[11]

The familiarity of the new-generation surgeons with technology and the increasing data flow to machine learning systems are indications that the share of these systems in the planning and

implementation of the treatment would increase in the long term.[12]

In conclusion, the public's unawareness of the doubtful outcome superiority associated with robotic-assisted orthopedic surgery may contribute to misinformed decisions in some patients. This makes robotic-assisted technology appears to be a powerful marketing tool. For a better evaluation of the utility of robotic THA, additional well-designed, prospective, controlled studies with long-term follow up would be helpful.

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