Navigation-assisted THA Improves the Accuracy of Acetabular Component and Augments Placement, Restoration of Center of Rotation, Leg Length, and Offset in Primary and Revision Hip Arthroplasty

Abstract

Purpose We utilized a new surgical navigation system (visual treatment solution, VTS) to improve the accuracy of acetabular component and augments placement, restoration of center of rotation, leg length, and offset in primary and revision hip arthroplasty.

Methods This was a prospective, multicenter, randomized controlled trial. 124 patients undergoing primary THAs were included. The experimental group underwent VTS-assisted THA, and the control group underwent traditional surgical techniques. The main efficacy evaluation indicators were the proportion of anteversion and inclination angles in the Lewinnek safe zone, and secondary evaluation indicators included operation time, WOMAC score, Harris score, SF-36 score, and hip dislocation rate.

Results The proportion of both anteversion and inclination angles in the safe zone was 93.1% in the experimental group and 50.9% in the control group; the difference was significant ($P < 0.01$). The average operation time was 112.5 min in the experimental group and 92.6 min in the control group; the difference was significant ($P < 0.01$). There were no significant differences in WOMAC score, Harris score or SF-36 score between the experimental and control groups at 3 months after the operation ($P > 0.05$). The dislocation rate was 0% in the experimental group and 1.6% in the control group; the difference was not significant ($P > 0.05$).

Conclusion VTS-assisted primary and revison THA can significantly improve the accuracy of acetabular prosthesis and augments placement,as well as the Restoration of Center of Rotation, Leg Length, and Offset.

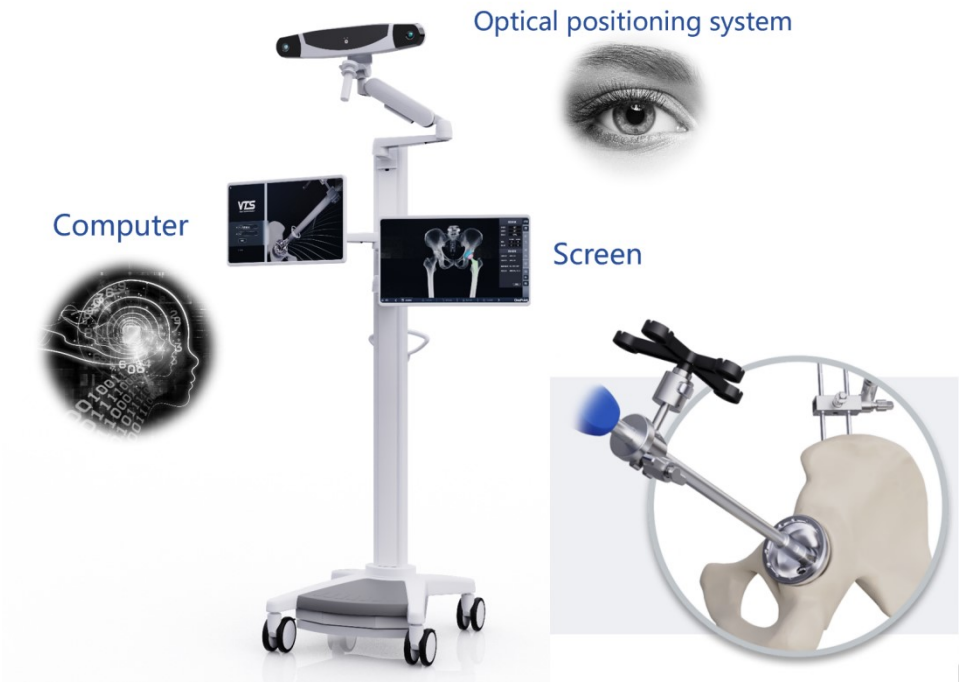

Figure 1. The surgical navigation system for total hip arthroplasty: Visual Treatment Solution (VTS).

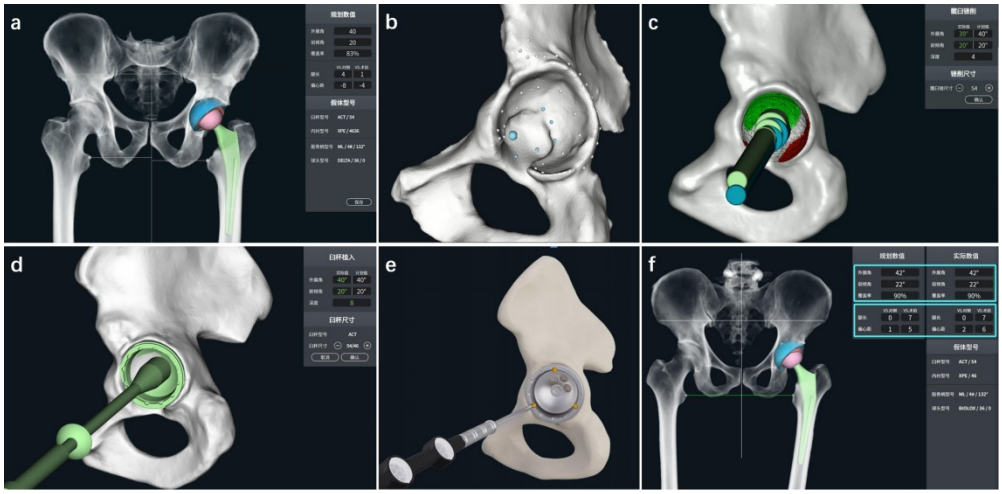

Figure 2. Surgical procedures of VTS-assisted total hip arthroplasty. A. Preoperative planning; B. Acetabulum registration; C. Acetabular reaming; D. Cup implantation; E. Implantation verification; F. Postoperative outcomes