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Impact of Microscope, Loupes, and Video Displays on Microsurgeons' risk for Musculoskeletal Injuries

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ABSTRACT

Microsurgery is commonly performed with operating microscopes or loupes to repair traumatic injuries, damage from cancer surgery, etc.; however, the prolonged, awkward, and constrained postures from using these equipment puts microsurgeons at risk for musculoskeletal pain and injuries. An alternative heads-up displays may improve surgeons' ergonomics by allowing microsurgeons to perform the procedure in a more comfortable and ergonomic position. The study compares the effect of microscope, loupes and video displays on postures during microsurgical targeting task. This study incorporated three steps to contrast displays. Firstly, 12 participants wearing six reflective markers completed a surgery simulation using all three displays, and their sagittal planes were video recorded. Secondly, randomly selected frames were captured and coordinates calculated in Matlab. Lastly, angles of interests obtained were compared to suggest the optimal display that demand least stressful postures. The final results indicated that video displays would bring microsurgeons relatively comfort and freedom of postures. Future improvement on ergonomics in microsurgeons can be implemented through design of equipment, tasks and work environments.

Keywords

Postures, ergonomics, displays, microsurgery.