

Computer-Guided Orbital Reconstruction to Improve Outcomes

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ABSTRACT

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Objectives (1) To describe repair of complex orbital fractures using computer planning with preoperative virtual reconstruction, mirror image overlay, endoscopy, and surgical navigation. (2) To test the hypothesis that this technique improves outcomes in complex orbital fractures.

Methods A series of 113 consecutive severe orbital fracture cases was analyzed, 56 of which were performed with mirror image overlay guidance, and 57 of which were repaired without. Data were collected on patient characteristics, fracture severity, diplopia and globe position outcomes, complications, and need for revision surgery.

Results The mirror image overlay group showed decreased postoperative diplopia in all fracture types ($P = .003$); the effectiveness was maximal for fractures that involved 3 or 4 walls or the posterior one-third of the orbital floor ($P < .001$). The need for revision surgery was greatly reduced in this cohort (4% vs 20%; $P = .03$).

Conclusions The efficacy of mirror image overlay navigation and orbital endoscopy was studied in one of the largest series of complex orbital fractures in the literature. Based on statistically significant improved outcomes in postoperative diplopia and orbital volume, as well as the decreased need for revision surgery, we accept the hypothesis that mirror image overlay guidance improves outcomes in complex orbital reconstruction and recommend its use for complex orbital fracture repair.