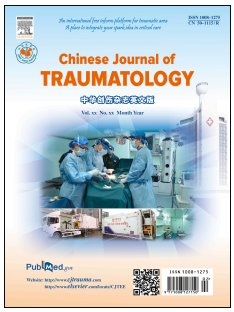
Accepted Manuscript



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PII: S1008-1275(16)30155-9

DOI: 10.1016/j.cjtee.2016.11.002

Reference: CJTEE 190

To appear in: *Chinese Journal of Traumatology*

Received Date: 30 September 2016

Revised Date: 29 November 2016

Please cite this article as: Herford AS, Miller M, Lauritano F, Cervino G, Signorino F, Maiorana C, The use of virtual surgical planning and navigation in the treatment of orbital trauma, *Chinese Journal of Traumatology* (2017), doi: 10.1016/j.cjtee.2016.11.002.

Case report

Received: 30 September 2016

Revised: 29 November 2016

Accepted: 20 Accepted 2016

The use of virtual surgical planning and navigation in the treatment of orbital trauma

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Abstract: Virtual surgical planning (VSP) has recently been introduced in craniomaxillofacial surgery with the goal of improving efficiency and precision for complex surgical operations. Among many indications, VSP can also be applied for the treatment of congenital and acquired craniofacial defects, including orbital fractures. VSP permits the surgeon to visualize the complex anatomy of craniofacial region, showing the relationship between bone and neurovascular structures. It can be used to design and print using three-dimensional (3D) printing technology and customized surgical models. Additionally, intraoperative navigation may be useful as an aid in performing the surgery. Navigation is useful for both the surgical dissection as well as to confirm the placement of the implant. Navigation has been found to be especially useful for orbit and sinus surgery. The present paper reports a case describing the use of VSP and computerized navigation for the reconstruction of a large orbital floor defect with a custom implant.

Keywords: neuronavigation, orbital trauma, orbital implants, virtual surgical planning

Introduction

Reconstruction of the skull and facial regions represents a challenge for the maxillofacial surgeon due to the complex anatomy, the variety of techniques and materials, and the esthetical and psychological implications of the area. Recent innovations such as computer-assisted surgical planning and intraoperative navigation could potentially improve the efficacy, precision, and predictability of the surgical treatment. Multi-planar computed tomography (CT) scans, associated with 3D reconstruction software, show in detail the individual anatomical variability and help the surgeon to identify a specific bone area to