

## THE MODERN TECHNOLOGY IN RECONSTRUCTIVE NEUROSURGERY

A. Shchemelev, R. Sydorovich, A. Rodzich, e-mail: a.rodzich@mail.ru

*Republican Scientific and Practical Centre of Neurology and Neurosurgery, Minsk, Belarus*

**Aim:** To enhance surgical treatment of patients with complex cranial defects after traumatic injury or after removing lesions of roof and base of the skull using emerging computer simulation and prototyping technologies.

**Materials:** Clinical part of the study included 15 patients suffered traumatic brain injury and requiring complex reconstructive surgery and 7 patients undergoing surgical removal of pathologically affected bone and single-step reconstruction of roof and base of the skull defects. Individual titanium implants created by three-dimensional computer simulation and full-sized laser prototyping techniques were used as a graft.

**Methods:** Study group consisted of 6 (40%) men and 9 (60%) women aged from 14 to 64 years. Patients with large cranial bone lesions reasons for surgical treatment were: functional impairment – 6 (40%); pain syndrome – 5 (32,3%); esthetics considerations – 13 (86,6 %); prevention of possible functional impairment – 3 (20,5%).

**Results:** Results of surgical treatment were estimated using following criteria: correction of anatomical defect, reversal of functional impairment and achievement of good esthetics. Also were taken into consideration feasibility of proposed technique and length of hospital stay of patients. The photos taken before and after surgery allowed estimating the severity of cosmetic defect and improvements in appearance of the patient.

**Conclusions:** Computer simulation and prototyping helps to achieve better esthetic and functional results of surgical treatment, including single-step resection of skull roof and base bone lesions and reconstruction. Proposed technology significantly reduces duration of surgery and risk of surgical infection, enhances esthetic and functional outcomes, which was impossible to achieve using other technologies and materials.

### **References**

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