

Introduction

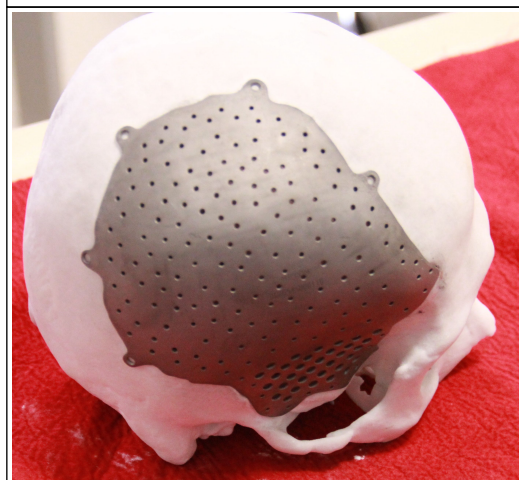
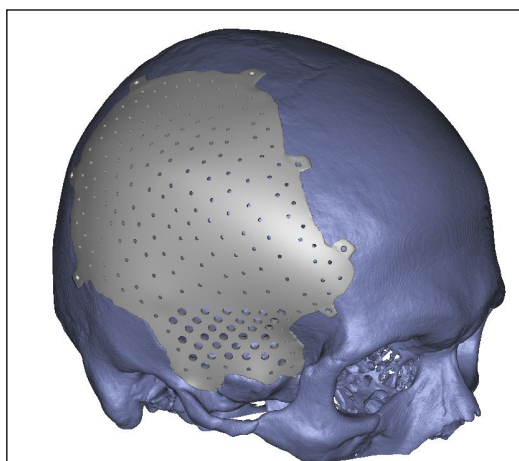
Large cranium defects after severe head injuries are important surgical problems for the neurosurgeons. Closure of these defects using synthetic materials sometimes causes cosmetic disturbances. Computer-based custom made titanium implants were developed in order to facilitate the surgery and to obtain better cosmetic outcomes. In this presentation, we will try to share our clinical experience on the closure of cranium defects using preoperatively custom-made titanium implants.

Methods

Cranioplasty operation using custom-made titanium implants was performed in 25 patients over a 3-year period. The cause of large cranium defect was trauma in 21 patients and tumor resection in 4 patients. Preoperative computed tomography (CT) scan with very thin slices was obtained and these slices were transferred to the computer in order to create a titanium implant. The implants were designed virtually using computer programs and the products were manufactured using 3D printers. The patients underwent surgery and implants were inserted on the cranium defects and secured with mini-screws. Patients were followed-up by CT scans.

Results

Postoperative CT scans confirmed appropriate cosmetic reconstruction. No intraoperative or postoperative complication has been occurred. None of the patients underwent revision surgery for infection or cosmetic problems.



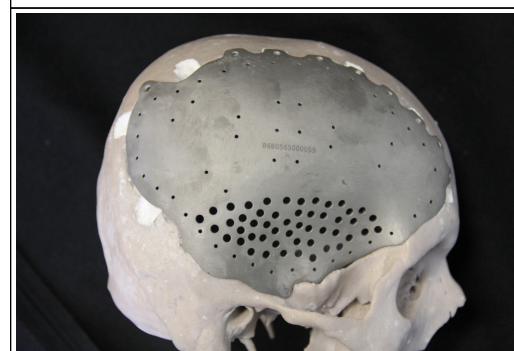
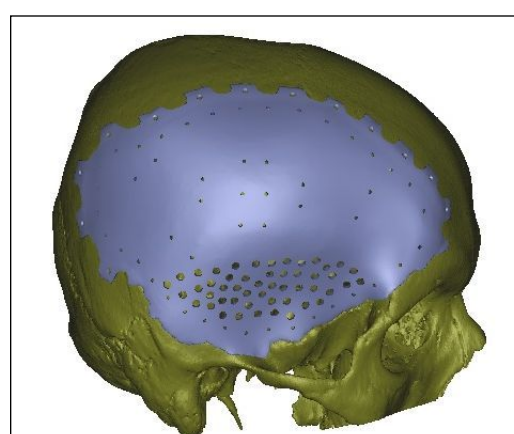
Conclusions

Computer-based modelling and production of titanium implant is highly promising method for the closure of large cranium defects. Better functional and cosmetic results could be obtained by this technique with close collaboration with biomedical engineers.

Learning Objectives

Computer-based technology is important in neurosurgery.

Multidisciplinary approach to close the large cranial defects using computer technology provides excellent clinical outcome.



References

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