

# Journal of Cranio- Maxillofacial Surgery

OFFICIAL PUBLICATION OF THE EUROPEAN ASSOCIATION  
FOR CRANIO-MAXILLOFACIAL SURGERY



XVth Congress of the European Association for  
Cranio-Maxillofacial Surgery  
3-7 September 2002  
Münster, Germany

CHURCHILL LIVINGSTONE 

**Material and methods:** The preoperative registration of common registration markers and the markerless laser scan technology is performed in 20 patients. The precision of both simultaneously applied technologies is compared.

**Results:** The periorbital region remains stable and does not shift and allows for an automatically surface registration of more than 20,000 laser scanned registration points.

The studies show that the laser scan correlation without registration markers works as precisely as (or even better than) the common correlation via registration markers.

**Conclusions:** A first scout CT and a second CT with applied registration markers is no longer necessary for computer-assisted surgery of the head. The new markerless intraoperative laser scan correlation of data sets enables every plain computed tomography to be used for computer-assisted surgical manipulations. Thus the decision whether a computer-assisted approach is utilised or not does not require a second marker-CT - and the radiation load of patients can be reduced.

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### RECONSTRUCTION OF A LARGE POST-TRAUMATIC CRANIAL DEFECT WITH A COMPUTER GENERATED CUSTOM-MADE TITANIUM PLATE

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**Aims:** The reconstruction of large and complex cranial deficits is still a difficult task. The possibility of a computerised reconstruction of a customised titanium plate from the patient's Helical CT is one of the most efficient methods of correcting a large and irregular cranio-facial deficits after severe traumas.

**Method:** We treated a 58 y.o. man with a large residual left fronto-temporo-parietal cranial defect secondary to a serious caved-in trauma with loss of the bone flap. Six months after the trauma, the patient had serious functional and aesthetic-psychological residues. The data off the CT were used to generate a three-dimensional model and a customized titanium plate was manufactured (Cranio Construct, Bochum, Germany). The plate was positioned after the dura was freed from fibrous adhesions, and anchored to the temporal muscle on one side and the arachnoid on the other. The plate was fixed to the surrounding cranial edges with nine titanium microscrews. The patient was discharged the second post-op day; the post-op CT showed good positioning of the plate with absence of fluid collection underneath.

**Results:** Two months after the reconstruction the patient was well and the results were good both objectively and subjectively, with recovery of cranial integrity and symmetry.

**Conclusions:** We believe that in large and irregular defects optimal reconstruction is obtained only by customized plates, which also reduce surgical time. In line with the literature, we believe that in adults there is no cranial growth, and that titanium is the best material given its resistance, ductility and biocompatibility.