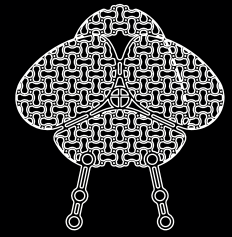
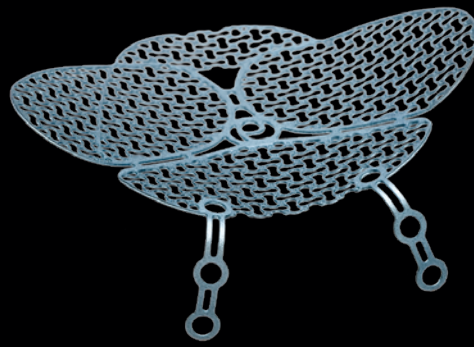


CASE STUDY



Fixation of a Zygoma (Tripod) Fracture with Medartis MODUS Midface and Orbital Floor Plates

The Surgeon

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Prof. Neff is an OMFS surgeon with two decades of experience in complex facial trauma. He is editor of a comprehensive textbook on OMFS, authoring the chapter on facial traumatology, and German guideline coordinator for midfacial fractures.

The Case



Patient Profile

A 24-year-old male patient was presented to our department of OMFS via the emergency ward. There was no relevant prior medical or medication history. He suffered a toboggan accident colliding with the head of another sledge driver. The patient showed swelling of the right-hand periorbital region without diplopia and a minor hypesthesia of the right-hand cheek area. At the emergency ward a 3D CT scan was taken, showing a zygomatic tripod fracture on the right-hand side (lateral midfacial fracture, ICD 10 code S02.4). The coronal CT scan showed an extended orbital floor involvement. An ophthalmological control was without relevant pathological findings.



Figure 1



Figure 2



Figure 3



Figure 4



Preoperative Imaging Analysis

The CT scans showed a pronounced impression fracture of the zygoma with fragmentation of the infraorbital rim and a multifragmented impression fracture of the facial antral wall on the right side. In addition, the coronal CT scans exhibited an orbital floor fracture $\gg 2 \text{ cm}^2$ with depression of the orbital floor and involvement of the border area to the medial orbital wall including the dorsomedial ledge, i.e., establishing an absolute indication for surgical repair.



Surgical Treatment

Five days after trauma the patient was operated in a supine position. After exposure of the zygomatico-frontal suture (also fragmented) via a lateral blepharoplasty approach for visual and palpational control, a closed repositioning was performed using a Stromeyer hook via a transcutaneous buccal stab incision. The frontozygomatic suture including some butterfly fragments was then preliminarily fixed via screws rather loosely fitted for fragment approximation by a MODUS 6-hole plate, thickness 0.6 mm, to allow for some 3D-position control during the further procedure. Next, the sphenozygomatic suture was visualized intraorbitally via the lateral orbital approach and was fixed with a MODUS 4-hole plate under endoscopic control. Next, a transconjunctival approach was performed for osteosynthesis of the infraorbital rim fragments with a MODUS 6-hole plate, thickness 0.6 mm. This also was done in a preliminary way, i.e. not all screws were tightened yet for fixation. A small bony intermediary fragment was realigned and a second plate inserted for additional stabilization. Then, in order to secure a precise three-dimensional position of the zygoma, a transoral approach was used to expose the zygomatico-alveolar crest and the paranasal pillar, which were anatomically aligned using a MODUS L-plate and a 4-hole plate, both of 1 mm thickness. With the zygoma now repositioned in a controlled three-dimensional position, the lateral orbital, infraorbital and zygomatico-alveolar plate fixations were finally tightened including a paranasal 4-hole plate. Only after this, the orbital floor and medial orbital wall was reconstructed, using a MODUS OPS plate (Orbital Plating System), thickness 0.35 mm, which was prebent using an averaged anatomical scaffold and fixed by a self-drilling screw. The facial antral defect zone was reconstructed using a 0.15 mm PDS sheet also fixed by a single self-drilling screw.

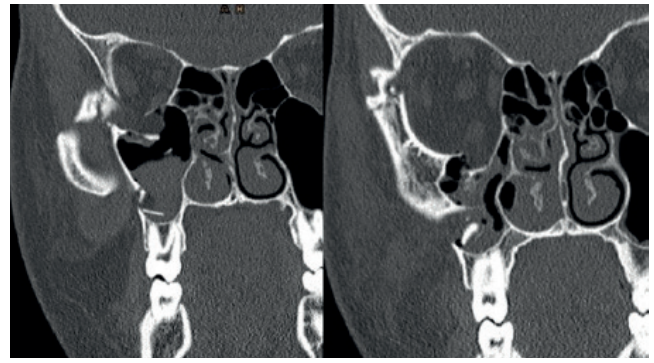


Figure 5

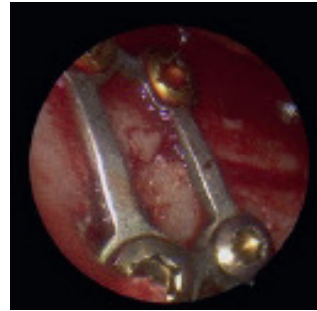


Figure 6

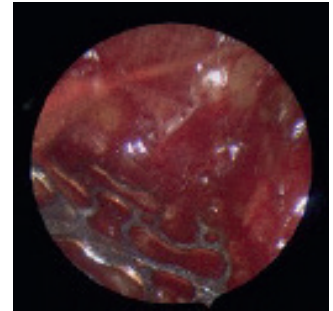


Figure 7



Figure 8



Figure 9



Figure 10



Figure 11



Intraoperative Findings

The MODUS orbital floor plate could be well aligned to the posterior orbital ledge. The MODUS miniaturized plates with thicker profile allowed for a sufficient stabilization of the buttress fractures (lateral orbital rim (0.6 mm) and zygomatico-alveolar crest (1.0 mm)), including an efficient fixation of the infraorbital rim small fragments, thickness 0.6 mm. Four months postoperatively, all fractures had healed correctly. At the time of removal of the osteosynthesis material, the facial antral wall defect zone showed a subtotal but progressive ossification.

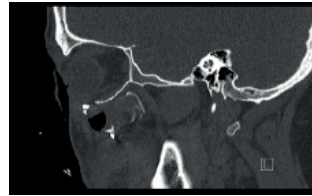


Figure 12

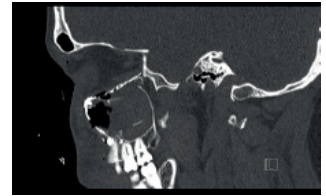


Figure 13



Figure 14



Figure 15



Postoperative Treatment

Postoperatively, the patient exhibited some double vision due to swelling, which quickly resolved within 2–3 weeks. During follow-up, the patient reported a slight dysesthesia in the cheek area (pins and needles on palpation), which, however, was progressively receding. When scheduled for removal of osteosynthesis material 4 months post trauma, he exhibited neither facial asymmetry, nor enophthalmos or double vision, the lateral blepharoplasty access scar was inconspicuous. After removal of the osteosynthesis material, the patient was last seen for follow-up at demission.



Figure 16



Conclusion

Open reduction and systematic internal fixation of a zygoma fracture with fragmentation and involvement of the orbital floor and posterior dorsal bulge area using an orbital mesh, intraoperatively prebent on an averaged scaffold, provides good anatomical and clinical results.



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