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Research Article

MODERN COMPREHENSIVE TREATMENT OF FACIAL INJURIES

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ABSTRACT

The introduction of digital technologies and improvement of reconstruction methods, diagnostics of combined traumas of the maxillofacial region should be aimed at improving the quality of life and aesthetic parameters of patients, reducing traumatization, reconstructing anatomical areas, reducing the duration of the postoperative period.

KEYWORDS

Maxillofacial surgery, orbital floor, reconstruction, trauma, face.

INTRODUCTION

Orbital reconstruction is the first and most predictable step in the surgical treatment of orbital fractures. Orbital reconstruction is *keyhole* surgery performed in an enclosed space. The technology-supported workflow, called computer-assisted surgery (CAS), has become the standard for complex orbital trauma surgery in many hospitals. CAS technology has become the catalyst for the implementation of personalized medicine in orbital reconstruction. The complete workflow consists of diagnosis, planning, surgery, and

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evaluation. Advanced diagnostics and virtual surgical planning are methods used in the preoperative phase to optimally prepare for surgery and adapt treatment to the patient. Further personalization of treatment is possible if the reconstruction is performed using an implant that is customized for the patient, and several design options are available to adapt the implant to the individual needs. During surgery, visual assessment is used to evaluate the resulting position of the implant. Surgical navigation, intraoperative imaging, and special PSI design options can improve feedback in the CAS workflow. Assessment of surgical outcome can be done both qualitatively and quantitatively. The concepts of CAS and personalized medicine are intertwined throughout the workflow. A combination of methods can be used to achieve the most optimal clinical outcome.

The position of the globe after trauma may be displaced, for example, with inward displacement (enophthalmos) or downward displacement (hypoglobus). The soft tissues of the orbit may also be affected by trauma. The structural integrity and functionality of the connective tissue or extraocular muscles may be compromised, resulting in impaired eye movement and double vision (diplopia). The location and type of impact, combined with the amount of energy delivered to the bony structures of the orbit and the soft tissues of the orbit, cause a heterogeneous clinical picture.

There is an ongoing debate about the indications for surgical reconstruction, and systematic reviews have failed to provide evidence-based recommendations. Some advocate a radical approach to prevent clinical symptoms, others opt for a more conservative approach with delayed surgery if clinical symptoms develop. The indication for reconstruction in most cases remains a subjective decision, depending on the surgeon and the characteristics of the patient. Surgical treatment of orbital fractures focuses on repositioning the contents of the orbit and globe and restoring structural support to restore ocular function. Orbital reconstruction is the first and most predictable step in the surgical treatment of orbital fractures.

Titanium mesh implants have now become the preferred biomaterial for surgical orbital reconstruction. Titanium implants can be divided into flat implants, pre-formed implants, and patient-specific implants (PSIs). Flat implants are shaped and trimmed by hand by the surgeon. A generic or custom (mirror) orbital model can assist in the shaping process. Prefabricated implants have a predetermined shape based on the mid orbital model . Patient Specific Implants (PSIs) are designed individually for the patient and are subsequently manufactured using additive manufacturing.

The complex soft tissue architecture and proximity to vital structures create surgical challenges in orbital reconstruction. Orbital reconstruction is a keyhole surgery performed in a limited space. This contributes to limited visualization, which is further enhanced by the protruding fat. The margin for error is small: an improperly placed implant can have significant implications for the clinical outcome and quality of life of the patient, and the literature considers this to be grounds for revision surgery. Medical technology has been incorporated into the clinical workflow of orbital reconstructions to reduce the risk of incorrect positioning of the implant .

This technologically supported workflow, called computer-assisted surgery (CAS), has become the standard for complex orbital trauma surgery in many hospitals. The introduction of CAS has also allowed personalization of treatment: treatment planning is tailored to the capabilities and needs of the patient, and intraoperative management is adjusted to anatomical capabilities. The main goal of this article is to provide a comprehensive overview of the CAS workflow for orbital reconstruction, with an in-depth description of the methods built into the workflow and a particular focus on personalizing treatment with patient-specific implant design.

The workflow of post-traumatic orbital reconstruction

The normal workflow of post-traumatic orbital reconstruction and the possible CAS methods are shown in

Figure 1. The individual steps are described in detail in the following paragraphs.

Diagnosis

A thorough clinical and radiographic evaluation of the patient is necessary to determine the optimal treatment. The clinical evaluation should at least assess the magnitude of ocular displacement and the degree of double vision. The Hertel exophthalmometer is the simplest instrument to quantify the relative ventrodorsal position of the globe. Despite known limitations such as asymmetry of the lateral edges of the orbit, soft tissue compression, and lack of uniform technique, it is currently the gold standard.

Computed tomography (CT) is the method of choice for radiographic evaluation because of its superior visualization of bony structures. The size and extent of the fracture can be assessed or measured in the coronal, sagittal, or axial plane. Given that the bone is thin in some areas, a maximum slice thickness of 1.0 mm is essential for

evaluation. In individual cases, evaluation of soft tissue changes may become important. It has been reported that shape changes in the inferior rectus muscle affect delayed or postoperative enophthalmos and may influence treatment decisions. In addition, orbital soft tissue herniation may be an indication for surgical reconstruction. Magnetic resonance imaging (MRI) provides better soft tissue contrast than CT and is more sensitive to detect extraocular muscle or periorbital fat entrapment . However, MRI is not part of the standard imaging protocol for orbital trauma . This may change in the future, given that all subsequent stages of

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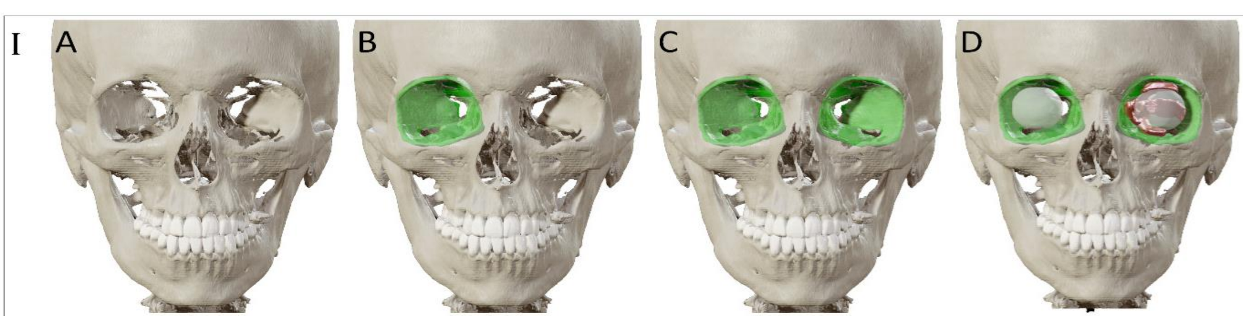
treatment benefit from optimized information gathering at the diagnostic stage.

Advanced diagnostics

Extended diagnostics seeks to maximize the information extracted from the available image data. For this purpose, CT scans are imported into a virtual surgical planning software. The CT scan is divided into voxels (three-dimensional pixels), each with a gray value corresponding to the absorption of X-rays in a given volume. These voxels can be segmented (grouped) based on the type of tissue or anatomical structure to which they belong. Anatomical structures of interest in orbital trauma are the orbit, the orbital cavity, and possibly the surrounding bony structures, such as the zygomatic complex. The segmentation is visualized as supra-.

in a multiplanar view and as a 3D model. Additional information can be gathered Through quantification (e.g., volume measurement) or manipulation (e.g., mirror image)

Segmented anatomy. The unaffected contralateral orbit and orbital cavity in unilateral fractures can serve as a reference for the affected orbit, giving an idea of the extent of the fracture and the displacement of the orbital walls or the surrounding bony structures. The volume of the affected orbit can be compared with the volume of the unaffected healthy side to determine the relative change in volume, because it has been proven that the orbits are very symmetrical. These volume changes can be incorporated into the treatment plan. Information can also be extracted from several sets of images. Image Image fusion allows multiple datasets of the same modality to be aligned over time or sets of images from different modalities. Image sets can be simultaneously visualized and evaluated after image fusion. The segmentation process can also be based on information from several merged modalities.



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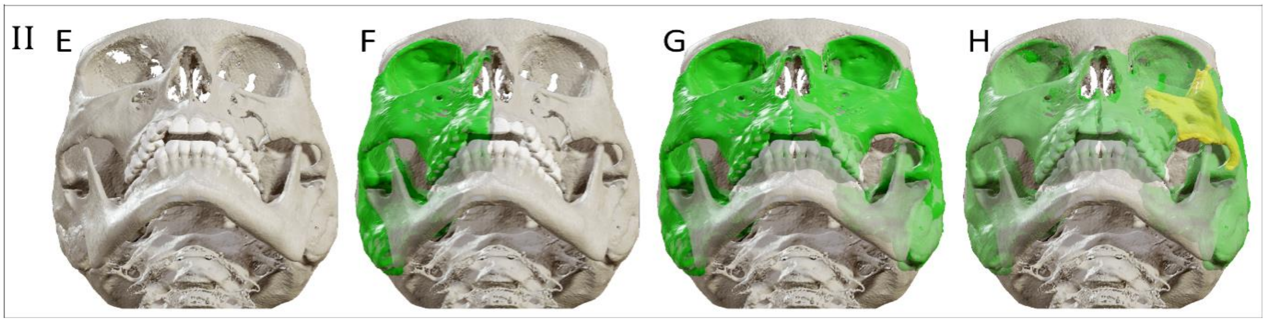
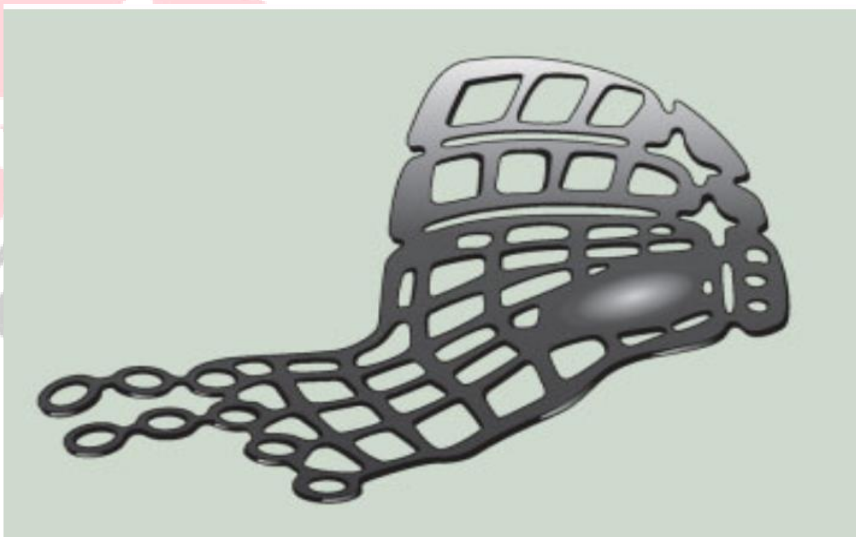


Figure 2: Extended diagnosis for two cases. I: Single orbital reconstruction (A-D). (A) Visualization of a three-dimensional model of the bone surface. (B) Segmentation of the unaffected orbit. (C) Mirroring of the segmented orbit on the affected, contralateral side. (D) Visualization of additional structures such as the globe and ocular muscles. II Fracture of the zygomatic (F) Segmentation of the unaffected side. (G) Mirroring of the segmentation on the affected, contralateral side. (H) Visualization of displacement of the zygomatic complex.



Design of a preformed titanium orbital implant. Size modifications can easily be performed by reducing the intersection bars.

Intraoperative image fusion of the preoperative (blue outline) and intraoperative data set (orange) in coronal view. In addition, the preoperative planning (segmentation and mirroring) and the intra- operative acquired was merged. The white arrow represents the real implant position comparing with the virtual planning one in red.

Virtual surgical planning (VSP) is a simulation of a real surgery based on imaging data. It is based on information gathered from previous treatment steps.

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The exact content of virtual surgical planning depends on the type of implant. If a flat mesh plate is used, virtual models of the mirror orbit and the affected orbit can be exported and printed on a 3D printer to serve as custom template(s) for bending when shaping the flat mesh.

When the finished implant is placed, a stereolithographic model (STL) of the finished implant is imported into the planning environment to perform a virtual reconstruction of the affected orbit. The potential for implant placement is assessed and its optimal position is simulated to accurately reconstruct the pre-injured anatomy. Thus, the potential for VSP in the pre-formed implant environment is highly dependent on the willingness of implant manufacturers to provide STL files of their pre-formed implants. In modern planning software, the implant can be automatically aligned to another virtual model, such as a mirrored orbit. Manual correction may be necessary to prevent bone interference and provide coverage of the orbital defect with adequate support of the implant on the dorsal protrusion and the possibility of fixation on the infraorbital rim.

The implant can be virtually trimmed to simulate a medial or posterior implant cut. The surgery can be simulated several times in virtual surgical planning, with different implant types and sizes . This allows you to compare pre-prepared implant options and make an informed decision before surgery. The number of attempts during virtual planning is unlimited without consequences for the patient, unlike attempts during actual surgery. Determining the optimal position in virtual planning provides the surgeon with intraoperative feedback, which can reduce surgical time and the amount of intra-orbital manipulation during surgery.

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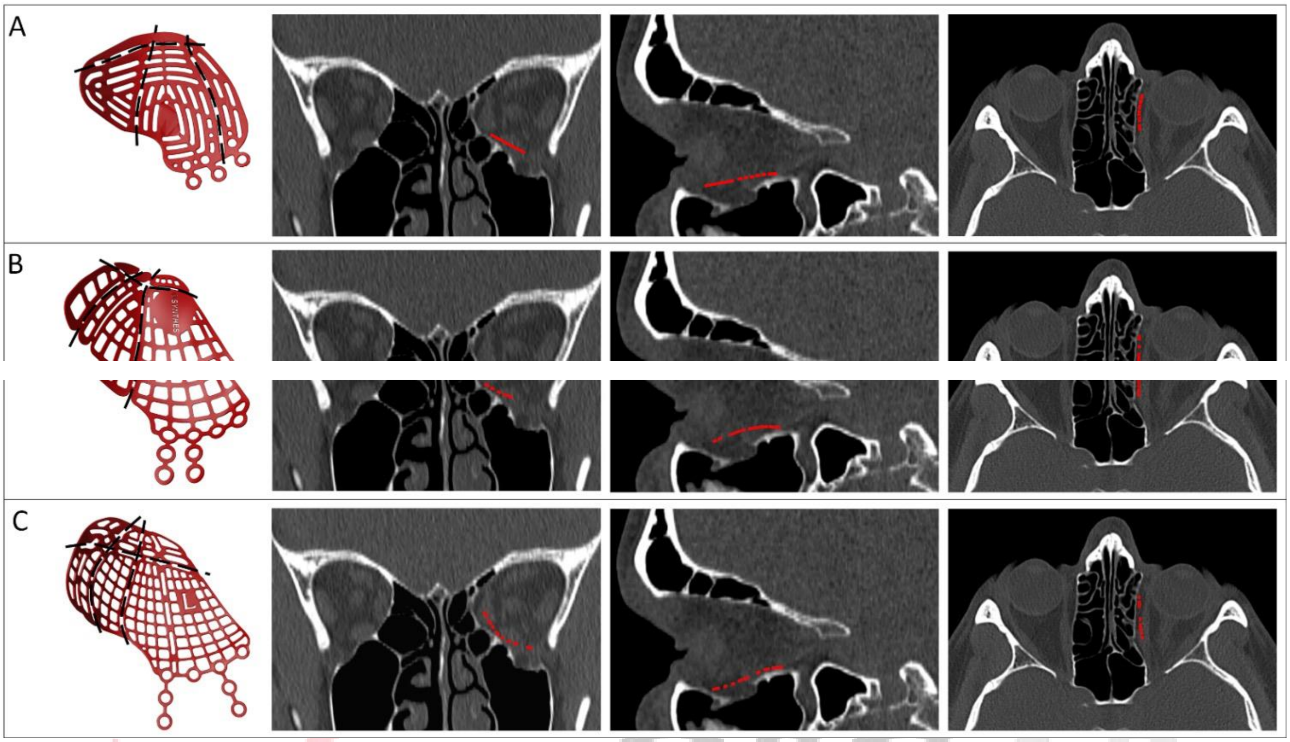

Figure 3: Virtual placement of various pre-formed implants for a single orbital fracture.

Three-dimensional models of the KLS Martin (A), Synthes (B) and Stryker (C) pre-formed implants are visualized with potential incision lines (black lines) in the first column. Implants are virtually positioned (red outline) and the fit is evaluated on the coronal, sagittal, and axial slices.

Adequate support (on the posterior prominence, on the medial wall, and on the infraorbital rim) and no interference with the bone.

Patient-specific implant design

Orbital reconstruction with PSI is the final step in individualizing orbital reconstruction. The PSI is virtually modeled from scratch using information from the (advanced) diagnostic stage and exported virtual models. A prototype of the implant is created in special design software. The prototype is imported into virtual surgical planning and its fit is evaluated. The prototype position is not adjusted in virtual surgical planning to improve the fit, but the prototype design is adjusted and the new prototype is re-imported. Although the PSI design is not fixed in the protocols, various design variants have been described in the literature. An overview of the variants is given in Table 1. This overview is not exhaustive, and new design variants regularly appear in the literature. Structural considerations can be categorized according to their intended effect: stability, ease of positioning, accuracy

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of implant placement, or relief of clinical symptoms. The size and shape of the implant depend on the extent of the defect. The defect must be covered by the implant, and its shape should reflect the intended reconstruction of the affected orbital walls. Reliance on existing bone structures is taken into account to ensure stability of the reconstruction. Similar to pre-formed implants, support is most often at three points in the orbit. Fixation is recommended to ensure the stability of the PSI. Possible screw positions can be evaluated in virtual planning, considering the patient's anatomy and local bone quality. Implant thickness and the presence of an atraumatic cord around the edge are factors that affect both implant stability and ease of positioning during surgery. Thanks to the rigidity of additively manufactured titanium, the implant thickness of 0.3 mm combined with the atraumatic cord provides a good balance between rigidity and ease of positioning.

The accuracy of positioning of the implant can be controlled by extending over the unaffected bone supports. Extension of the implant over the bony structures creates a secure fixation. Extension of the infraorbital rim limits rotation and translation in the anteroposterior direction. Additional flaps may be placed on the posterior lateral wall to prevent unwanted movement of the implant. The screw positions from the fixation material of the previous reconstruction can be reused in the secondary reconstruction to provide guidance and thus increase the accuracy of the implant positioning . Another design option is the inclusion of navigation markers and vectors that can improve the interpretation of feedback from the intraoperative navigation system.

The last category, clinical symptoms, is related to the correction of globe displacement.

overcorrection to counteract fat atrophy and anticipated iatrogenic soft tissue loss.

The amount of overcorrection can be subjectively determined at the time of surgery, by introducing Orbital volume is corrected to reduce globe displacement, but the volume can be after the equator of the bulbus . On the other hand, hypoglobus are additional struts, or it can be fully integrated into the PSI structure, the posterior portion of which is the result of caudal displacement of the infraorbital rim. The anterior elevation, corresponding to the equator of the bulbus . On the other hand, the hypoglobe is the result of a caudal downward displacement of the orbital rim, which can facilitate the hypoglobe.

Displacement of the infraorbital rim. The anterior elevation corresponding to the amount of (Figure 4). The PSI grid can be developed using a variety of techniques: the use of a large downward displacement of the orbital rim can facilitate the hypoglobe (Figure 4). A horizontal grid pattern for maximum drainage, or a more porous arrangement of PSIs can be developed using a variety of techniques: the use of a large horizontal pattern for The multitude of design and hand-design options results in a wide range of

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maximizing drainage, or a more porous arrangement. The many possible forms of PSI Design options and manual design result in a wide range of possible PSI shapes

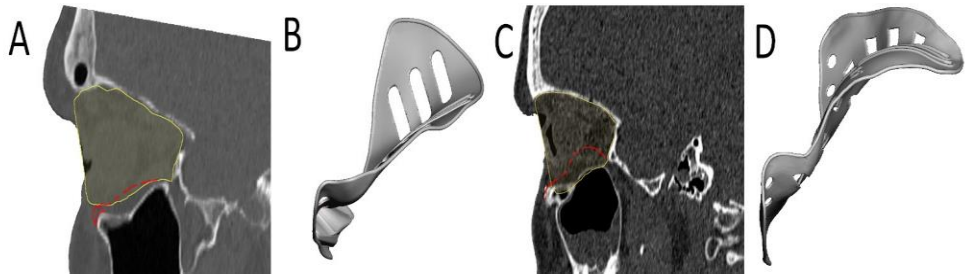

Figure 4: Examples of two patient-specific implant designs with overcorrection (red outline) in mirrored orbital volume (yellow outline).

The first patient-specific implant is designed with an anterior elevation on the infraorbital rim to compensate for globe position asymmetry (A,B). The second patient-specific implant is designed with a large overcorrection to reconstruct the anophthalmic eye socket (C,D).

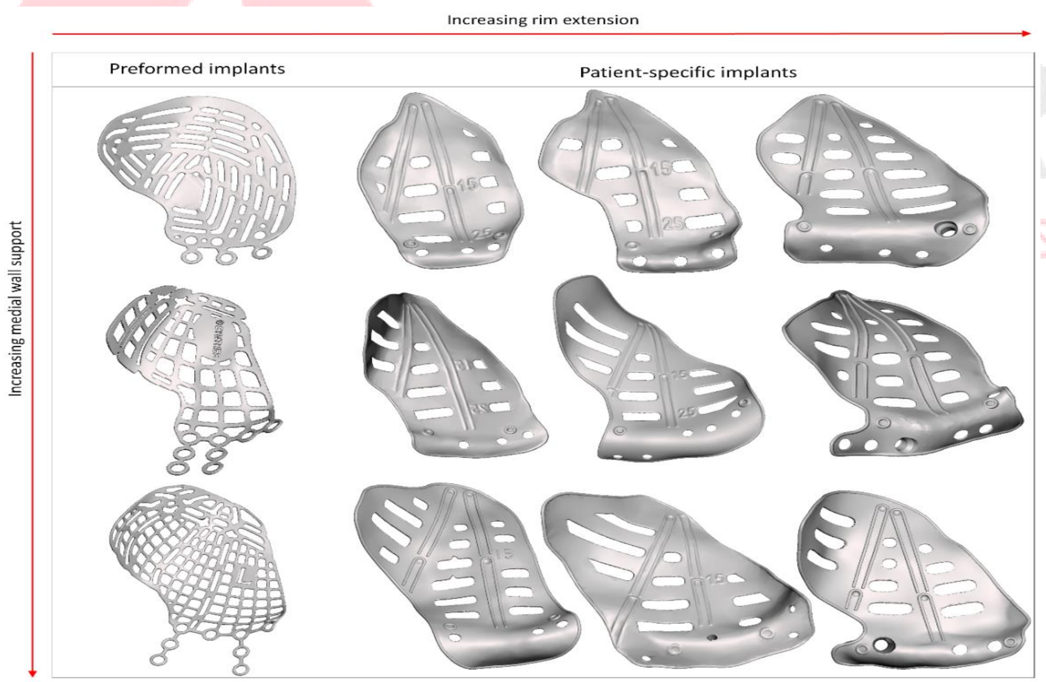

Figure 5. Shows the different shapes of available prefabricated implants and patient-specific implants

There is a wide variety of shapes of patient-specific implants. From left to right the rim extension increases. From top to bottom medial wall support increases

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The PSI design can be adapted to facilitate reconstruction of multi-walled defects, for example, by using multiple PSIs (Figure 6). This allows a reconstruction that covers the entire defect, while limiting the size of the PSI and, in turn, the required incision [46,55]. Depending on the connection used, it also provides an opportunity to create artificial support and relative feedback. In cases with concomitant fractures of the surrounding bony structures, orbital reconstruction with PSI alone is not sufficient. In addition to orbital reconstruction, repositioning of the surrounding bone may be necessary. Additional design options are available to provide PSI feedback on the subsequent steps of reconstruction in these more complex cases. Examples include incorporating the desired position of the zygomatic complex into the PSI design to facilitate proper repositioning

Figure 6. Patient-specific implant design for multivessel cases. (A) The ridges on the orbital floor implant provide relative feedback for positioning the lateral wall implant. (B) Matrix-matrix connection to connect the medial wall implant and the orbital floor. (C) The orbital floor implant with medial wall extension is connected to the lateral wall implant dorsally with ridges and anteroposteriorly with a jigsaw joint. (D) Quadruple wall reconstruction with hook-and-loop connection for additional support of the orbital floor implant.

Intraoperative feedback

During surgery, the surgeon strives to position the implant as close as possible to the ideal position that was established in the HSP. The presence of the VSP provides intraoperative feedback, which improves the outcome of the reconstruction [35]. There are additional types of feedback that help with accurate positioning of the implant (summarized in Table 2). Design options related to implant positioning provide static feedback through a unique and convincing PSI fit (Figure 7). In secondary cases, reuse of screw positions from the primary reconstruction will also help to find the planned position.

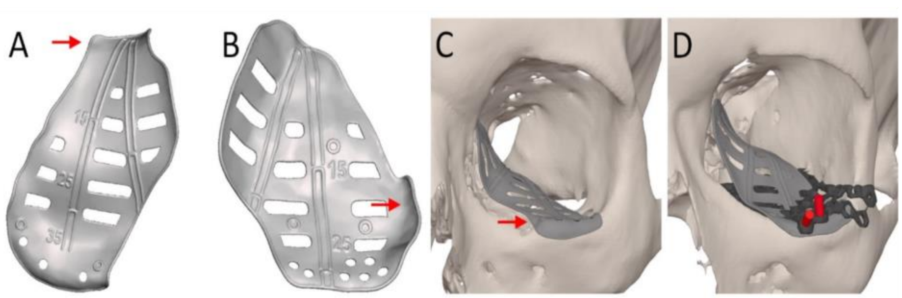

Figure 7: Illustration of the different feedback methods.). Markers and vectors are visualized in (A) and (B). The convincing match of the patient-specific implant design is indicated by red arrows (A-C)

Segmentation of the screw holes of the previous reconstruction is shown in red (D) and the previous implant is shown in dark gray.

Surgical navigation can be used to provide dynamic feedback of the implant position. During registration for surgical navigation, the patient's position in the operating room is linked to preoperative imaging data in virtual surgical planning. There are several methods of registration: soft-tissue registration, bone-fixed fiducials, and surgical splints. Splint registration methods used to require repeated radiographs with a fiducial splint in place, but combining intraoral scanning data during the in-depth diagnostic phase allows a registration splint to be fabricated without additional radiological imaging [59]. The splint is designed taking into account the individual features of the patient's dentition and contains fiducials that can be specified virtually in the planning software and physically in the operating room.

After registration, the position of the navigation pointer in the patient is visualized in the virtual surgical planning on the screen of the navigation system.

Once registered, the position of the navigation pointer in the patient is visualized in the virtual surgical planning on the navigation system screen. This provides the surgeon with feedback on the position of the pointer, representing the position of the specified location (a specific point on the implant surface). The quality and interpretability of the feedback can be improved with navigation markers embedded in the design [39,52].

The markers are indicated in the EP as navigational landmarks and are used in the operating room as a reference point. If the surgeon places a pointer in the navigational marker on the implant, visual and quantitative feedback about the position of the pointer in relation to the landmark is provided.

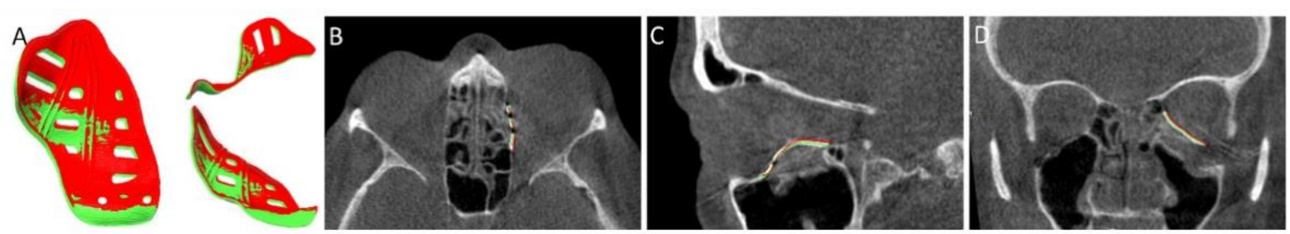

Figure 8: Illustration of the evaluation. (A) Three-dimensional model of the planned patient-specific implant (red) and the realized patient-specific implant (green) from different perspectives.

(B-D) Axial, sagittal, and coronal views of the postoperative CT scan with the planned contour of the patient-specific implant highlighted in red.

An optimally positioned orbital implant is no guarantee for a perfect clinical result. Restoration of the globe position can be achieved relatively well with PSI, even

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in secondary reconstructions [22]. The treatment of diplopia is more difficult because it involves mechanical eye movement, combined visual perception and processing in the visual cortex. Visual processing can (partially) adapt over time. On discharge, the patient is informed that double vision will be present for the first 10-14 days, possibly longer.

Ocular mobility can be improved by training the extraocular muscles to prevent scarring and anticipate fibrosis [61]. Instructions are given to mobilize the eye as much as possible: monocular orthoptical exercises six times a day for 6-12 weeks to prevent adhesions and to stimulate the reduction of orbital soft tissue edema, especially for the extraocular muscles. This protocol has a positive effect on clinical improvement in both primary and secondary cases.

Several larger comparative studies have demonstrated a positive effect of (components of) CAS on the accuracy of volumetric reconstruction [62], clinical outcomes [36], and the need for revision surgery [63]. In practice, a combination of several CAS components is often used. This leads to heterogeneity of surgical approaches, which makes it difficult to compare results between studies. Differences in indications, patient and fracture characteristics, and implant materials used further complicate the comparison [64]. Determining the effect of individual CAS techniques on patient outcomes is difficult because of the overlap between the techniques in the groups studied. Individual effects of CAS techniques have been evaluated in a one-to-one comparison on a series of cadavers [65]. Despite the limitations of the cadaveric model and the inability to estimate clinical outcome parameters, a positive effect of virtual planning, intraoperative imaging, and surgical navigation on reconstruction accuracy was found.

The best solution to achieve an optimal result [78] and in the future can be accurately adapted to the individual patient, provided the above knowledge gaps are filled. Cost, turnaround time, and logistical requirements are disadvantages of using PSI. Pricing.

can vary depending on geography, but typically the process costs between 1,500 and 6,000 euros. Making the implant takes about 3-5 business days; this amount does not include sterilization or the time required for virtual surgery planning and design. Korn et al. described the average communication time between the surgeon and the PSI technician during virtual surgical planning, which was nearly nine days for isolated wall fractures and 16 days for multi-wall fractures [82]. Adjustments to the original design proposed by the technician were required in nearly three-quarters of cases, but implants placed by technicians trained by the company required fewer adjustments. Improved communication and understanding are believed to be the reasons for the increased efficiency. Complete in-house planning and design by a dedicated technician on site can improve planning efficiency and ultimately significantly reduce preparation time (assuming the surgeon and

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technician are experienced and have collaborated on previous cases). In-house design is supposed to reduce costs because the commercial partners rely only on production. These advantages of in-house design may be why surgeons using in-house planning feel less of the disadvantages of using PSI .

Although this paper focuses on posttraumatic orbital reconstruction, other orbital-related applications of PSI have also been described. In cheekbone reconstruction after trauma, ablative surgery or congenital deformity, PSI has been found to accurately restore anatomy without the need for additional bone grafts. In secondary posttraumatic reconstruction of the orbit and zygomatic bone, PSIs allow for a one-stage surgical procedure in which the order of operations is reversed: if the orbit is operated on first, the functional result of orbital reconstruction does not depend on repositioning of the zygomatic complex [54]. PSIs can also be used to create an artificial rim and orbital floor to support the globe after maxillectomy [84,85]. The most extensive orbital reconstructions using PSI have been described after resection of a spheno-orbital meningioma or neurofibroma . In these cases, reconstruction of all four orbital walls with multiple PSIs allowed predictable reconstruction of the internal orbital structure under the same surgical conditions as the resection. The design of PSI in the aforementioned cases may differ significantly from that of posttraumatic reconstruction of single orbital fractures. Nevertheless, the point of using PSI is the same: freedom of design to adapt PSI to the patient's anatomy and a predictable and accurate end result.

REFERENCES

1. Холмурадов, Ж. Р., Холиков, А. А., & Фаттаева, Д. Р. (2022). МЕТОДЫ ОБСЛЕДОВАНИЯ
2. БОЛЬНЫХ С ФЛЕГМОНАМИ ЧЕЛЮСТНО-ЛИЦЕВОЙ ОБЛАСТИ. Central Asian
3. Research Journal for Interdisciplinary Studies (CARJIS), 2(12), 97-101.
4. 2 . Фаттаева, Д. Р., Ризаев, Ж. А., Рахимова, Д. А., & Холиков, А. А. (2021). CLINICAL
5. PICTURE OF SINUSITIS IN PATIENTS AFTER COVID-19 WITH CHRONIC
6. OBSTRUCTIVE PULMONARY DISEASE. УЗБЕКСКИЙ МЕДИЦИНСКИЙ
7. ЖУРНАЛ, 2(2).
8. Fattaeva, D. R., Rizaev, J. A., & Rakhimova, D. A. (2021). Efficiency of Different Modes of Therapy for Higher Sinus after COVID-19 in Chronic Obstructive Pulmonary Disease. Annals of
9. the Romanian Society for Cell Biology, 6378-6383.
10. Холиков, А., Юлдашев, А., Фаттаева, Д., & Олимжонов, К. (2020). ПЕРЕЛОМ ЧЕЛЮСТИ
11. ДИАГНОСТИКА И ЛЕЧЕНИЕ. Stomatologiya, (2 (79)), 88-93.
12. Fattayeva, D. R. (2021). ADVANTAGES OF EARLY DETECTION AND TREATMENT OF

American Journal Of Biomedical Science & Pharmaceutical Innovation
(ISSN – 2771-2753)
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Crossref doi Google Scholar WorldCat MENDELEY
Publisher: Oscar Publishing Services

13. ODONTOGENIC HEMORRHOIDS IN PREVENTING COVID-19
14. COMPLICATIONS. British Medical Journal, 1(1.2).
15. Холиков, А., Юлдашев, А., Фаттаева, Д., Олимжанов, К., & Худойкулов, А. (2020). Анализ современной эпидемиологической картины переломов нижней челюсти. Журнал вестник врача, 1(4), 103-108.
16. V.V. Shamov, A.A. Kholikov, D.R.Fattayeva (2022).
17. Improvement of treatment methods of combined traumas of maxillofacial region. Periodica journal.
18. (4).
19. Hoffmann J, Cornelius CP, Groten M, Pröbster L, Pfannenberg C, Schwenzer N. Orbital reconstruction with individually copy- milled ceramic implants. Plast Reconstr Surg 1998;101(3): 604–612
20. Burm JS, Chung CH, Oh SJ. Pure orbital blowout fracture: new concepts and importance of medial orbital blowout fracture. Plast Reconstr Surg 1999;103(7):1839–1849
21. Nolasco FP, Mathog RH. Medial orbital wall fractures: classification and clinical profile. Otolaryngol Head Neck Surg 1995;112(4): 549–556