Precise Implantation Using Zygomatic Implants with Le Fort I Osteotomy

– A Modern Solution Integrating Treatment Planning and Surgical Execution

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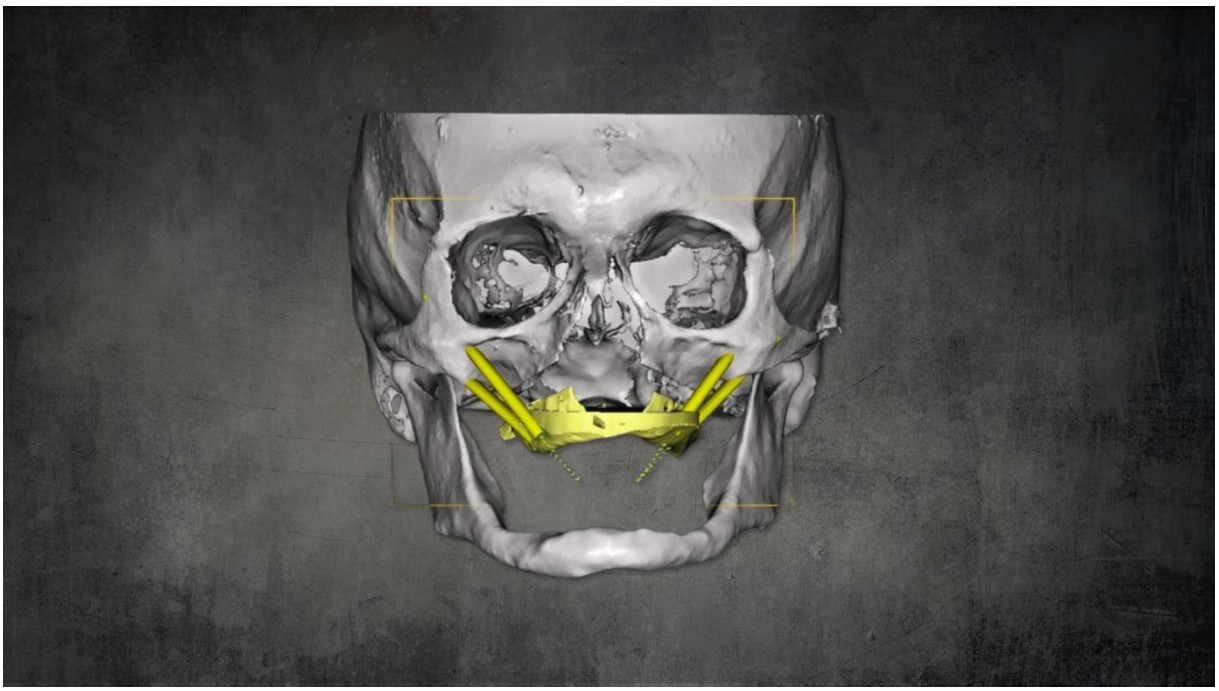

DDS-Pro empowers implantologists with advanced digital tools to optimize zygomatic implant placement, enhance surgical precision, and improve patient outcomes. By integrating cutting-edge navigation technology with 3D planning, DDS-Pro streamlines treatment workflows, reduces complications, and ensures predictable results in complex cases.

Dr Paweł Aleksandrowicz

Digital implantology has achieved a breakthrough with innovative technologies enabling precise planning and navigation in complex procedures. DDS-Pro, advanced software by Polorto, allows for fast and accurate preparation of diagnostic models and navigation templates for zygomatic implant placement and Le Fort I osteotomy. This innovation is revolutionizing the approach to treating patients with advanced bone resorption, ensuring greater precision, safety, and predictable outcomes.

Fig. 1: Surgical treatment planning: determining the True Vertical Line (All images: Paweł Aleksandrowicz)

The method of simultaneous zygomatic implantation combined with the Le Fort I procedure is a critical tool in treating patients with severe maxillary bone loss. Just as orthognathic surgery has become standard in orthodontic treatment, prosthetic rehabilitation of edentulous patients has faced similar challenges for years. Most edentulous patients present with a skeletal class III relationship, where zygomatic implantation often becomes the best—if not the only—solution. This approach provides patients with a chance to regain functionality and aesthetics.

Positioning zygomatic implants in the zygomatic bone sometimes results in a prosthetic bridge that does not perfectly match the patient's natural anatomy. Consequently, a gap often emerges that must be masked with pink porcelain or acrylic. From both an aesthetic and functional standpoint, this represents a significant challenge affecting patient comfort. To avoid this issue, surgical planning using DDS-Pro and DSD software is essential.

Many specialists perform such procedures "freehand" or reduce the alveolar ridge of the maxilla—an invasive approach that not only compromises the patient but does not consistently yield satisfactory results. Attempting to combine zygomatic implantation and maxillary osteotomy in a single procedure, especially without the proper tools, can lead to errors that compromise prosthetic alignment and patient comfort.

To address these challenges, I have adopted an innovative, patent-pending, navigated procedure for simultaneous zygomatic implantation and Le Fort I osteotomy. This method allows for precise planning and execution of the operation, minimizing typical complications associated with these procedures. Preparation for the surgery includes creating a digital surgical plan and customizing the appropriate navigation toolkit.

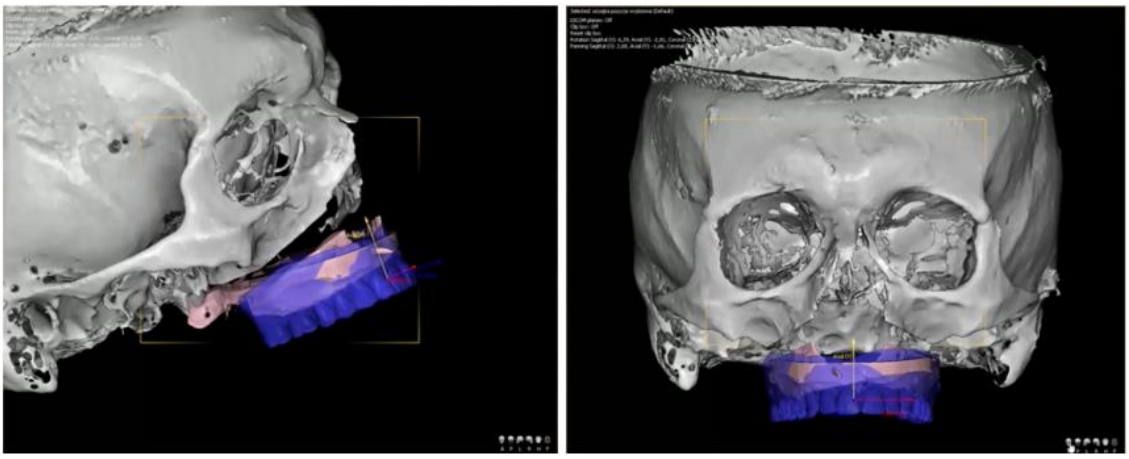

Fig. 2: Digital design of Le Fort I (osteotomy) – precise positioning of the maxillary mucosa scan in relation to the tomography and creation of a digital model that matches the patient's actual anatomy, ensuring that the implants and maxilla will be positioned correctly. (All images: Paweł Aleksandrowicz).

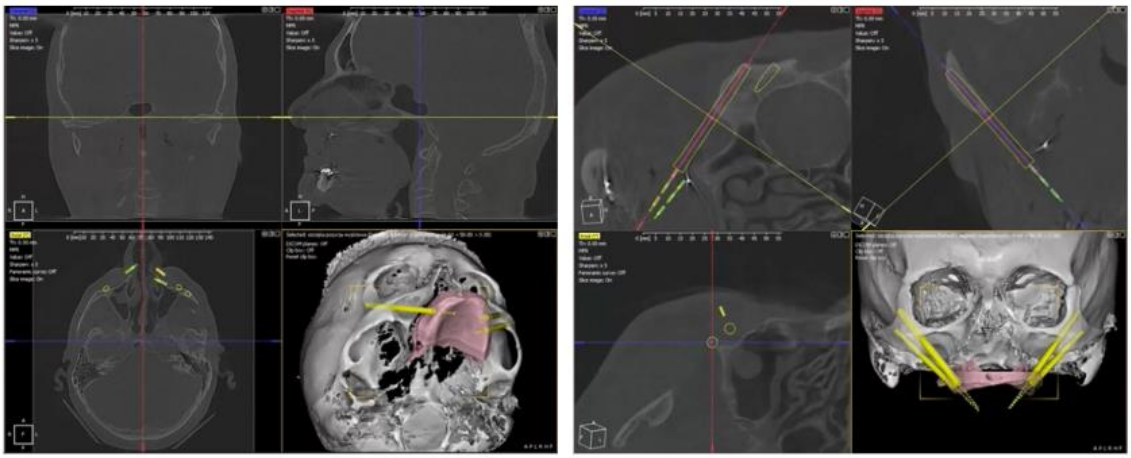

Fig. 3: Digital design of precise preparation of zygomatic implant sites and creation of holes for pins in DDS-Pro (All images: Paweł Aleksandrowicz).

Fig. 4: Digital design of simultaneous zygomatic implantation and Le Fort I procedure in DDS-Pro (All images: Paweł Aleksandrowicz).

A critical resource I use is the DDS-Pro software, which enables the creation of a digital treatment plan and corresponding navigational guides. The software facilitates planning with maximum precision using data from both computed tomography (CT) and intraoral scans. Overlaying these data sources generates an optimal implantation and osteotomy plan, crucial for complex procedures.

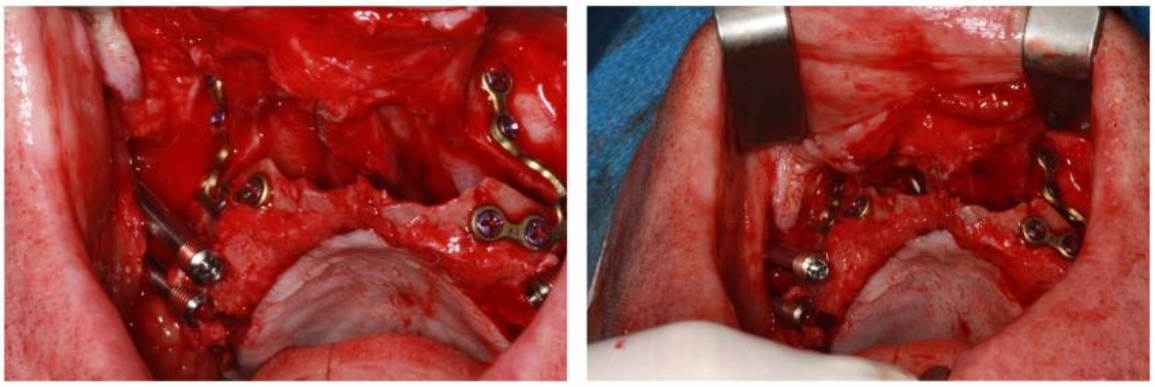

Fig. 5: Intraoperative image of Le Fort I osteotomy (All images: Paweł Aleksandrowicz)

Particularly significant is the additional CT examination with markers, which allows accurate positioning of the mucosal scan relative to the tomography. This enables the creation of a digital model matching the patient's real anatomy, ensuring the correct placement of implants and maxilla. As a result, the procedure becomes more precise and safer.

This approach significantly speeds up preparation and facilitates swift adaptation of the plan to the individual patient.

During the surgery, I utilize two 3D-printed navigation templates. The first is fixed to the maxilla before performing the Le Fort I osteotomy, enabling precise preparation of zygomatic implant sites and pin placement. The second template, used after repositioning the maxilla, ensures accurate implant insertion and proper jaw positioning. This technology delivers unmatched precision, limited only by the quality of diagnostic data.

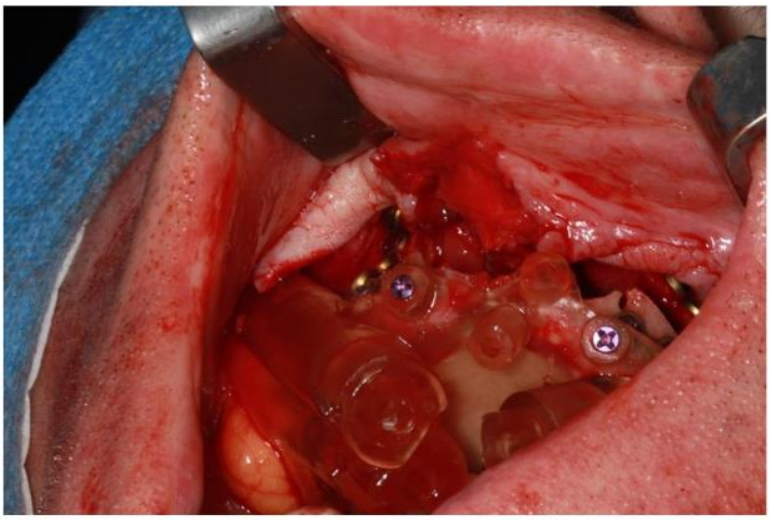

Fig. 6: Intra-oral view of the preparation of the zygomatic implant sites and the creation of holes for pins (All images: Paweł Aleksandrowicz).

The entire procedure—from surgical planning to guide production and execution—is performed using DDS-Pro software, certified for medical use.

Recently, I performed such a procedure on a 69-year-old patient who had suffered from edentulism and advanced maxillary bone loss for many years. We conducted simultaneous zygomatic implantation and Le Fort I osteotomy, planned entirely with DDS-Pro. This enabled precise implant placement and proper maxillary repositioning. The procedure, which lasted approximately two hours under general anesthesia, proceeded seamlessly. The navigational tools performed exactly as planned on the computer screen, ensuring a stress-free operation for the surgeon.

Postoperatively, the patient reported feeling comfortable with minimal pain—a testament not only to modern technology but also to my experience using advanced navigation tools. A few days after the surgery, the patient resumed normal activities, and recovery was uneventful.

By utilizing DDS-Pro, I achieved maximum precision, minimized complication risks, and enhanced treatment outcomes. The patient expressed great satisfaction, noting that the results exceeded their expectations. They now smile confidently, freed from previous insecurities.

In my practice, I use these technologies to provide patients with medical and aesthetic solutions at the highest level. These innovations enable precise, repeatable procedures while enhancing patient comfort during recovery.

Additionally, I am using DDP AI software, which allows me to quickly generate a digital diagnostic model post-scan, with access to critical anatomical data. This tool creates precise 3D occlusal models in .stl, .ply, and .obj formats, facilitating comprehensive treatment planning—from the initial positioning of teeth to the final crown-to-root setup.

PLANNING NAVIGATED ZYGOMATIC IMPLANTATION WITH SIMULTANEOUS LEFORT PROCEDURE EFFECTIVE USE OF DIGITAL TECHNIQUES – PRACTICAL TIME, OPERATOR INVOLVEMENT, AND COSTS

CASE DATA PREPARATION FOR SURGICAL DESIGN (BEGINS WITH MERGING TOMOGRAPHY DATA AND INTRAORAL SCANS THEN SPECIFIC OBJECTS ARE CREATED

INPUT DATA	WORKING TIME/SOFTWARE	LICENSE FEE	WHO CAN PERFORM THE TASK
• Scanner (stl, obj, ply) • Tomography of the prosthesis with markers (DICOM) • Patient tomography with prosthesis	45 min "DDS-Pro"	included in the software license	Technician/Assistant/Clinician

📍 This process is typically conducted live by the operator 💰 Outsourcing may incur additional costs

SURGICAL PLANNING

INPUT DATA	WORKING TIME/SOFTWARE	LICENSE FEE	WHO CAN PERFORM THE TASK
DDS-Pro study This stage requires final approval by the clinician.	15-30 min "DDS-Pro"	0 EUR	Clinician with the support of a technician or assistant - remotely

NAVIGATION TEMPLATE DESIGN

INPUT DATA	WORKING TIME/SOFTWARE	LICENSE FEE	WHO CAN PERFORM THE TASK
DDS-Pro study with the surgical plan This stage also requires final clinician approval.	30-90min/ "DDS-Pro"	0 EUR	Technician/Assistant/Clinician

TEMPLATE CONVERSION (EXPORT) TO STL FOR 3D PRINTING

INPUT DATA	WORKING TIME/SOFTWARE	LICENSE FEE	WHO CAN PERFORM THE TASK
DDS-Pro study with the templates For projects requiring more than two templates, the license fee may increase.	5min/ "DDS-Pro"	2 x 23,5 EUR	Technician/Assistant/Clinician

SUMMARY OF TIME AND COSTS FOR SURGICAL PLANNING AND NAVIGATION TEMPLATE SET

OUTPUT DATA	WORKING TIME/SOFTWARE	LICENSE FEE	WHO CAN PERFORM THE TASK
DICOM and .stl	85 - 165 min of design work	Total cost 47,0 EUR	Technician/Assistant/Clinician

➡ Proceed to printing phase production 💰 Local printing costs will depend on labor and resources required for template

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