METICULY

Personalized medical solutions for better lives

CRANIO-MAXILLOFACIAL PRODUCT CATALOG

METICULY Patient-Specific Titanium Mesh Implant and
METICULY Patient-specific titanium maxillofacial mesh implant


SUPERIOR
METICULY

MEET METICULY

Empowering your practice with personalized titanium implants

PRECISION IN PRACTICE

Creating premium, precise maxillofacial solutions with advanced technologies.

PERSONALIZED CARE

Every implant tailored to patient's anatomy and their unique conditions.

SEAMLESS SUPPORT

Helping you focus more on patient care while we manage your case.


METICULY

METICULY DIFFERENCE

Addressing the Challenges of Patient-Specific Cranial Implants

Post-operative infection remains a significant complication in cranioplasty, impacting patient outcomes and creating a financial burden for hospitals. Studies suggest that the rate of infection ranges from approximately 3.7% to 16.7%,[1-2] depending on various factors including the type of implant material used.

0.6% POST-OPERATIVE INFECTION RATE[3]

According to PMS data analysis of over 800 clinical cases, our biocompatible Ti-6Al-4V demonstrates a significantly low explanation rate of 1.56% and a corresponding infection rate of 0.6%.[3]

Traditional cranioplasty can be complex and time-consuming, particularly in cases with irregularly shaped defects. This complexity can lead to longer operating times, resulting in an increased risk of complications such as blood loss and infection.

REDUCE TIME SPENT IN SURGERY BY 20-60 MINUTES[4-6]

Our patient-specific implants can significantly reduce the time spent during surgery, consequently minimizing the risks associated with long operating hours.

The patient-specific implant manufacturing process has traditionally been associated with lengthy production and delivery times, leading to significant surgical delays in essential procedures and increasing to patient distress.

DELIVERY WITHIN 10 DAYS AFTER CONFIRMATION

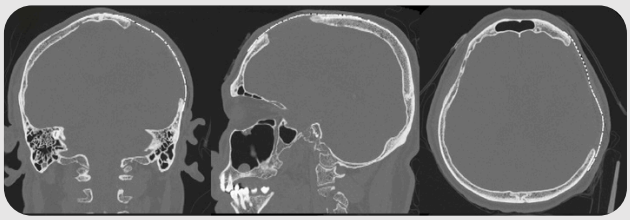
We have redefined the delivery process with real-time communication at every step, establishing a new benchmark for precision and efficiency uniquely tailored to each patient's needs.

BIOCOMPATIBLE TITANIUM (Ti-6Al-4V)

Medical-grade titanium is widely regarded for its biocompatibility due to its high compatibility with human tissue. Its high strength makes it suitable for daily activities and ensure long-term durability.

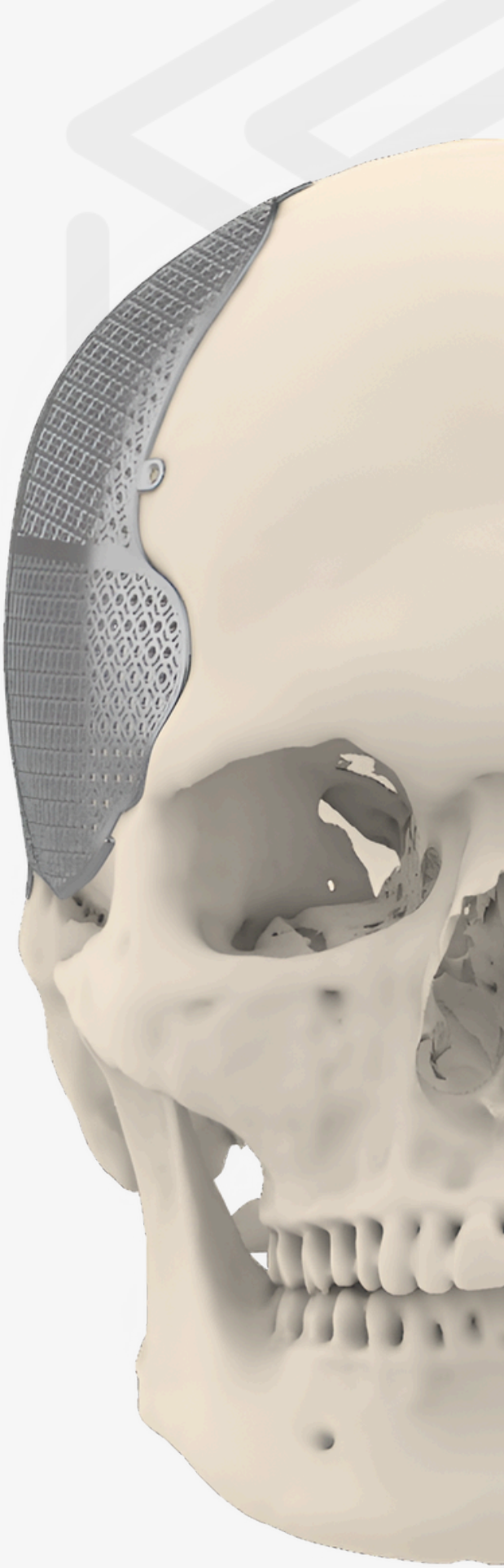
MESH-LIKE STRUCTURE

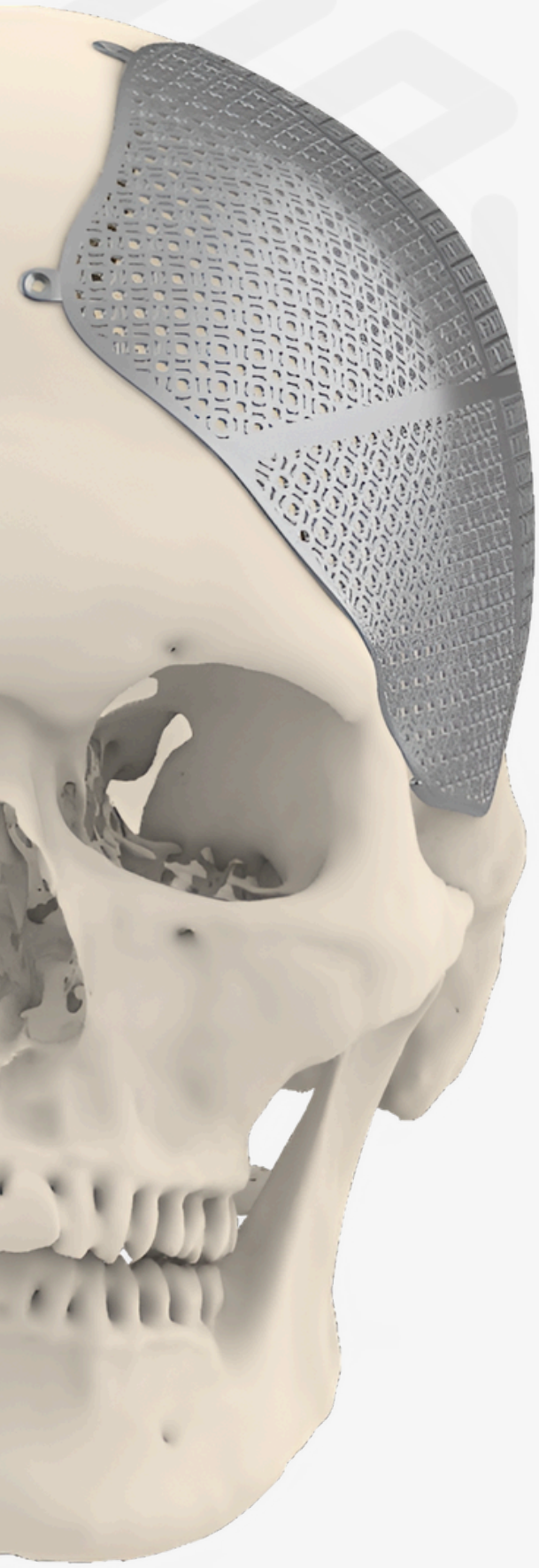
Minimize implant weight and X-ray artifacts during imaging, potentially aiding CSF drainage, while maintaining a natural and aesthetic appearance.



PERSONALIZED CONTOUR

Implant are designed to match patient's specific anatomy and conditions to ensure a precise, clinical and aesthetic outcome.



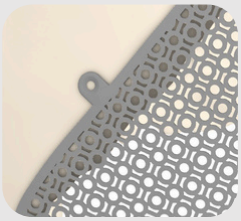


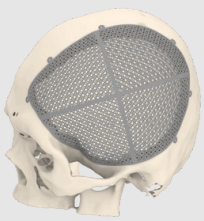
INTEGRATED FIXATION POINTS

Feature low-profile non-locking screw fixtures for securing the implant to the skull, minimizing the need for additional fixation plates and ensuring a smoother surface along the perimeter of the defect. The fixation points are universally compatible with standard neuro micro-screws.

LOW PROFILE ONLAY IMPLANT DESIGN

Designed with a 0.5 mm mesh-like thickness that overlaps with surrounding bone defects, this design ensures an optimal anatomical fit, reduces stress concentration, and enhance both aesthetic outcome and durability.





POSITIONING GUIDE

Incorporate anatomical landmarks on the implant, accompanied by a bone model as a positioning guide. These features assist surgeons in precisely placing and securing them, thereby streamlining the surgical process.


METICULY

METICULY DIFFERENCE

Addressing the Challenges of Patient-Specific Maxillofacial Implants

Improper implant placement in maxillofacial surgery can lead to complications such as diplopia, enophthalmos, and unsatisfactory aesthetic outcomes. These complications may require surgical revisions, ultimately hindering the patient's overall recovery.[7-8]

0.92% POST-OPERATIVE DIPLOPIA[7]

According to PMS data analysis of over 216 clinical cases, our patient-specific implants demonstrate a significantly low complication rate of 2.31%, with diplopia at only 0.92%,[7] notably lower than the average postoperative diplopia rate of 4.9-17% reported in orbital fracture studies.[9-10]

Traumas to the maxillofacial region can greatly impact a patient's physical and psychological well-being.[11] Due to the complex anatomy and limited intra-operative visibility in this area, traditional techniques such as intra-operative bending can be time-consuming, requiring manual adjustments to shape and trim the implant to fit the contours of the fracture accurately.[12-13]

4.38 OF 5 PRODUCT SATISFACTION[7]

Our patient-specific implants have consistently achieved high satisfaction rating from first-time users, particularly for the quality of the implant, ease of use during surgery, and customizable features tailored to meet each patient's unique needs.[7]

The patient-specific implant manufacturing process has traditionally been associated with lengthy production and delivery times, leading to significant surgical delays in essential procedures and adding to patient distress.

DELIVERY WITHIN 10 DAYS AFTER CONFIRMATION

We have redefined the delivery process with real-time communication at every step, establishing a new benchmark for precision and efficiency uniquely tailored to each patient's needs.

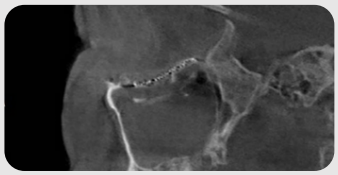
BIOCOMPATIBLE TITANIUM (Ti-6Al-4V)

Medical-grade titanium is widely regarded for its biocompatibility due to its high compatibility with human tissue. Its high strength makes it suitable for daily activities and ensure long-term durability.

MESH-LIKE STRUCTURE AND ULTRA-THIN PROFILE

Made possible by advancements in 3D printing, the implant features a mesh-like structure and a thickness of just 0.5 mm, significantly minimizing the weight of the implant and x-ray artifacts during imaging. This design not only preserves a natural aesthetic outcome, but also ensures long-term retention of the implant's shape.

Post-operative X-ray imaging of mid-facial implant[14]



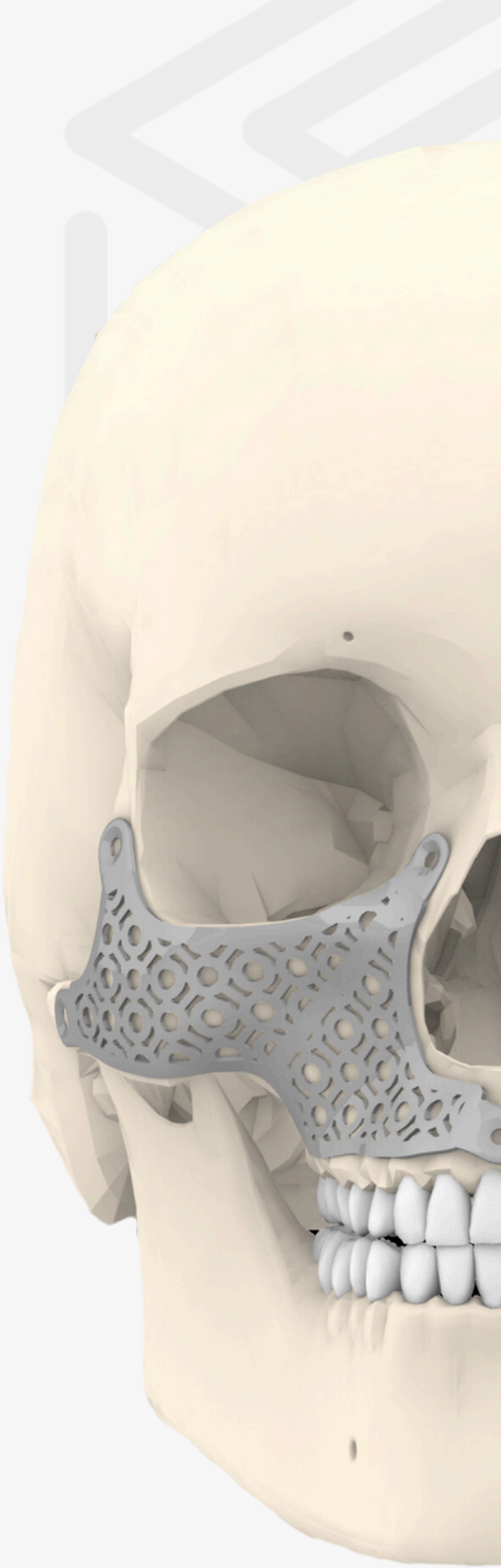
Post-operative CBCT scan of orbital implant[15]

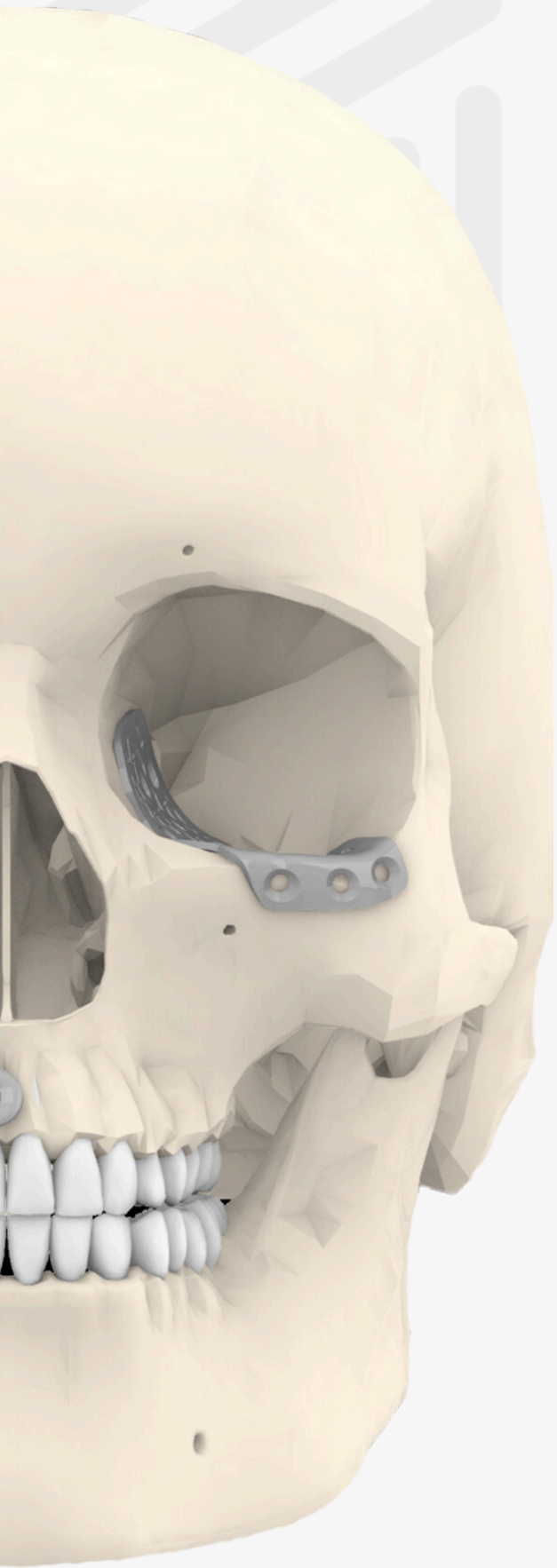
CUSTOMIZED DESIGN FOR FACIAL AESTHETIC

Each implant is custom-designed using advanced technologies that incorporate preoperative planning to ensure the final outcome aligns with the patient's unique anatomy and specific needs. This approach ensures a precise fit, optimized aesthetics, and contour, ultimately enhancing both confidence and quality of life.

Pre-operative[14]

Post-operative[14]



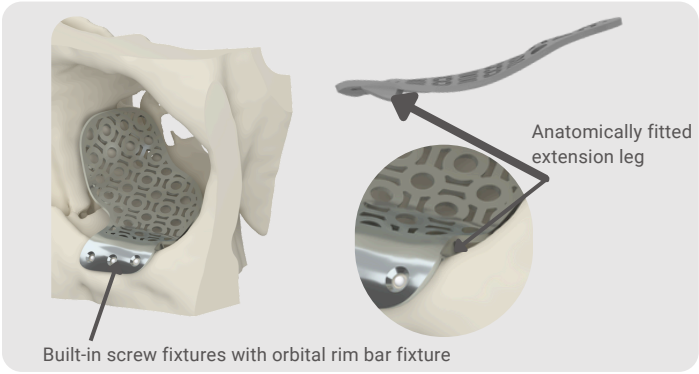


BUILT-IN SCREW FIXTURES

Equipped with low-profile, non-locking screw fixtures that are universally compatible with standard screws, allowing for secure attachment to the facial bone. The orbital rim bar fixture provides a stable and customized anatomical fit. This design minimizes the need for additional fixation plates and creates a smooth perimeter along the defect, enhancing operative efficiency and reducing the requirement for extra instruments.

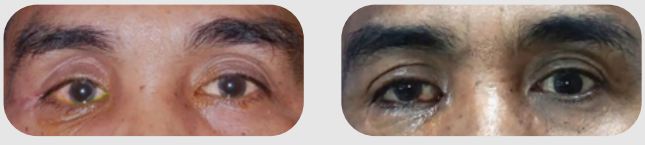
ANATOMICAL FITTED EXTENSION LEG

The anatomically fitted extension leg offers extended support providing an anatomical contour that follows the natural curvature of the cranial or facial bone. The additional fixation option reduces movement and improves the overall stability of the implant.



CUSTOMIZED DESIGN FOR ORBITAL FUNCTION

The patient-specific implant plays a crucial role in functional outcomes and overall well-being. It helps restore essential functions, such as returning the eyeball to its proper position, aiding in the prevention of double vision, and improving visual clarity. With pre-operative planning, each implant is designed to achieve precision while avoiding sensitive areas such as nerves and blood vessels.



Pre-operation [12]

Post-operation [12]

RESULTS MATTER

Where quality meets care

Ensuring patient comfort, aesthetics, and safety is crucial for advancing cranioplasty solutions. The satisfaction and well-being of patients post-operation not only highlight the success of the treatment but also reinforce the safety and reliability. This commitment to patient-centered care promotes trust and confidence within the medical community.

ADVANCED 3D PRINTING

Meticuly leverages the Laser Powder Bed Fusion (L-PBF) technology to create 3D-printed implants. This process utilizes a high-powered laser to melt metal powder particles layer-by-layer, achieving complete fusion. This results in the mechanical strength of patient-specific implants being guaranteed regardless of defect, shape, and size. With L-PBF, Meticuly can precisely shape and contour even the most complex designs down to the micron level, ensuring a perfect fit and optimal functionality.

STREAMLINED OPERATING PROCEDURES

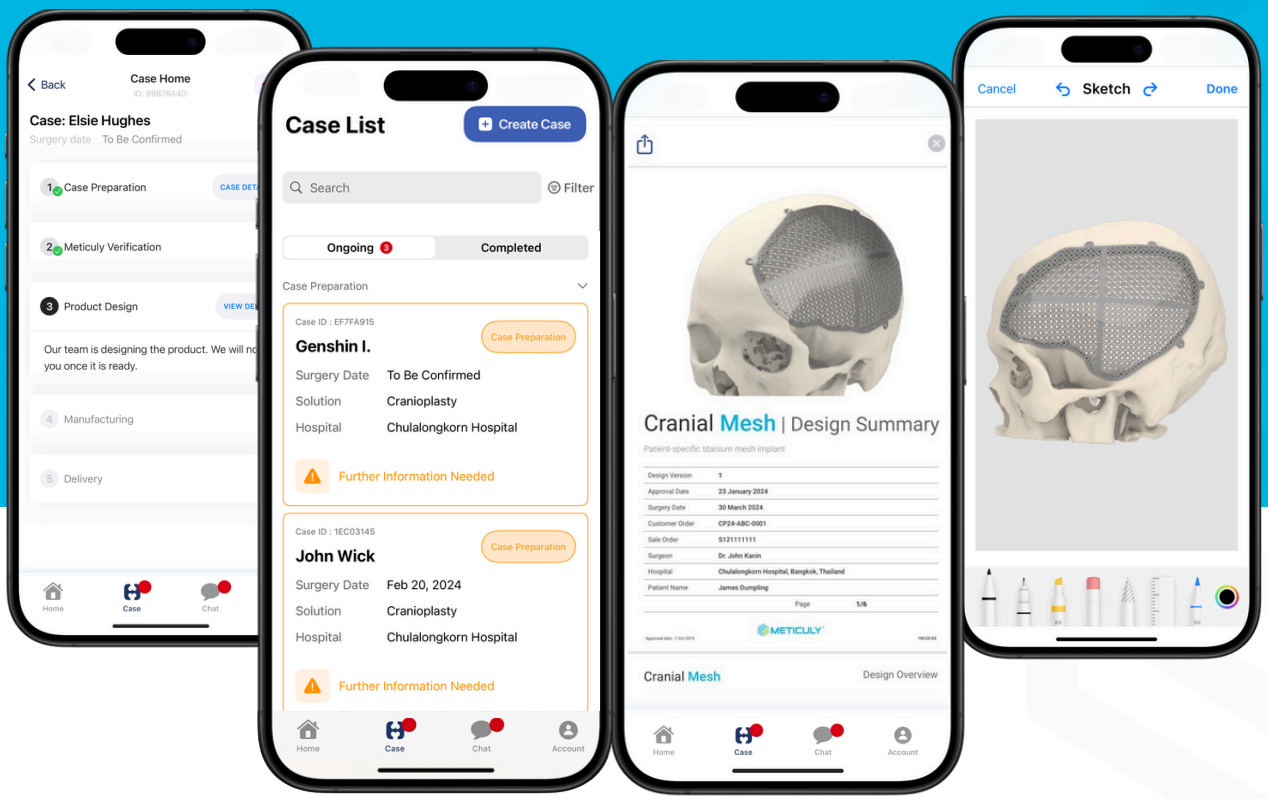
Our implants streamline surgeries by eliminating the need for time-consuming intraoperative bending required with traditional methods, reducing operation time by 2-3 hours and minimizing blood loss. This approach makes surgeries more efficient and straightforward.[5,14]

CONFIDENT AESTHETIC RESULTS

Our designs feature a uniform contour with customizable options, restoring a natural appearance and boosting patient confidence.[3,5-6] Surgeons have rated the implants highly, with first-time users giving an average satisfaction score of 4.81 out of 5 for cranioplasty cases and 4.53 out of 5 for maxillofacial procedures. Both functional and aesthetic results, particularly the symmetry of the zygomaticomaxillary complexes, have been praised, setting a new benchmark for ease of use, patient outcomes, and timely implant delivery.[1,7,14]

IMPROVE QUALITY OF LIFE

Our unique mesh-like structure supports effective healing, ensuring durability and comfort throughout the recovery phase.[5,14]



RELIABLE REAL-TIME MANAGEMENT

Customized support

Utilizing a proprietary advanced technology, we have streamlined the design process to provide rapid responses, offering a better user experience for ordering patient-specific implants.

1 REQUEST

CASE SUBMISSION

We have simplified the process for you. It only takes 5 minutes to upload patient CT scans and submit your case through our centralized platform.

2 REVIEW

DESIGN & MANUFACTURING

Accessible communication is key. Our engineering expertise ensures precise product design and manufacturing tailored to your needs.

3 RECEIVE

REAL-TIME TRACKING

Accuracy and speed are vital. Feel confident with real-time case tracker. Allowing you to monitor real time case status and anticipate the delivery of the implant.

METICULY'S QUALIFICATIONS

Credentials & Support

Ensuring the best outcome for each patient's path to wellness and supporting surgeons in achieving enhanced success.

ABOUT METICULY

Serve as a cutting-edge provider of personalized bone implants

METICULY is a global medical device manufacturer specializing in customized 3D-printed titanium implants. We utilize advanced technologies in the design process to ensure precision and quality in every product. Notably, our 3D-printed patient-specific titanium mesh implant received U.S. Food and Drug Administration (FDA) 510(k) clearance in December 2021, and the patient-specific titanium maxillofacial mesh implant received the 510 (k) clearance in April 2024, marking a significant milestone. Elevating beyond traditional methods, we are setting a new benchmark for surgical excellence. Meticuly's technology empowers surgeons to overcome limitations and embrace a future where each patient receives tailored solutions based on their unique anatomy.

www.meticuly.com

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4. Kim, J. K., et al. (2018). Cranioplasty using autologous bone versus porous polyethylene versus custom-made titanium mesh: a retrospective review of 108 patients. J Korean Neurosurg Soc., 61(6), 737.
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8. Lozada, K., Kadakia, S., Abraham, M. T., & Ducic, Y. (2017). Complications of midface fractures. Facial plastic surgery, 33(06), 557-561.
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14. Akaranuchat, N., & Yodrabum, N. (2020). The Innovation of Customized 3D Cutting Guide and Customized 3D Titanium Mesh Plate for Maxillectomy and Maxillary Defect Reconstruction in Thailand: Case Report. Journal of the Medical Association of Thailand, 103.
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PATIENT-SPECIFIC TITANIUM MESH IMPLANT

Specification & product model

THICKNESS OF PLATE

0.5 mm

PLACEMENT

Cover patient's bone

NUMBER & LOCATION OF FIXTURES

Fully customizable

TYPE OF FIXATION

Non-locking screw

POSITIONING GUIDE

Bone model

CT REQUIREMENT

Refer to 'Cranium' CT protocol

CODE	PRODUCT DESCRIPTION	SIZE	MAJOR LENGTH (mm)
CP-301	Meticuly Patient-Specific Titanium Mesh Implant S Non-Sterile	S	<50
CP-302	Meticuly Patient-Specific Titanium Mesh Implant M Non-Sterile	M	50-100
CP-303	Meticuly Patient-Specific Titanium Mesh Implant L Non-Sterile	L	100-150
CP-304	Meticuly Patient-Specific Titanium Mesh Implant XL Non-Sterile	XL	>150
CP-321	Meticuly Patient-Specific Titanium Mesh Implant with orbital region S Non-sterile	S	<50
CP-322	Meticuly Patient-Specific Titanium Mesh Implant with orbital region M Non-sterile	M	50-100
CP-323	Meticuly Patient-Specific Titanium Mesh Implant with orbital region L Non-sterile	L	100-150
CP-324	Meticuly Patient-Specific Titanium Mesh Implant with orbital region XL Non-sterile	XL	>150

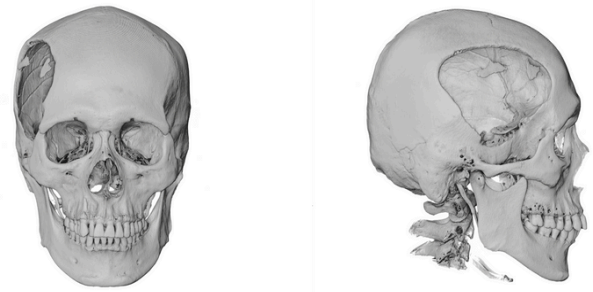
PATIENT-SPECIFIC TITANIUM MESH IMPLANT

CT Scan Protocol | Cranium

The patient-specific titanium mesh implant is designed using the CT scan of the patient. Good scan data is crucial to the design and manufacture of a high-quality implant. Please carefully review and follow the instructions before proceeding with the CT scan protocol.

Region of Interest

- For cranial defects, the scan area should include the entire skull.
- The Field of View (FOV) should extend from the cranium to the mandible bone, including skin and soft tissue.



Scanning Parameters

Sliced Thickness:	Less than 1.0 mm
Voxel Size:	Less than 1.0 mm
Image Type:	Bone Window - Non-Contrast
Export File:	DICOM and Uncompressed Standard
Feed per Rotation:	Less than 1.0 mm
Pitch:	1 or Less
Reconstructed Slice Increment:	Less than 1.0 mm
Reconstruction Algorithm:	Bones/ Details
Gantry Tilt Angle:	Not allowed for Medical CT scan (Gantry Tilt 0˚)

Scanning Instruction

- Helical (spiral) scanning mode is preferred for CT image acquisition
- Scan must be less than 3 months old. (Less than 1 month old for tumor case)
- Capture the complete cranio-maxillofacial region including mandible with condyle, orbital floor, maxilla, zygoma, nose, chin, and cranium bone.
- Align the patient in a way that prevents as many artifacts as possible and do not deform the soft tissue.
- No patient movement. If the patient moves during the scan, it must be repeated.
- All slices must have the same field of view, reconstruction center, and table height.
- Scan with the same slice spacing, less than or equal to the slice thickness.
- Minimize the artifacts caused by metallic dental restorations or orthodontic brackets by aligning the patient's occlusal plane as much as possible with the axial slices.
- Images scanned with no gantry tilt and no oblique reconstruction (i.e. use only primary axial images). No reformatting into coronal or sagittal planes.

Data Transfer

- Provide the complete data set of raw/original DICOM images to the surgeon or Meticuly representatives
- Could be transferred by physical or digital devices
- Data will be anonymized by Meticuly on receipt of the data, after cross-check with prescription of the surgeon to ensure the images of the right patient are provided.

PATIENT-SPECIFIC TITANIUM MAXILLOFACIAL MESH IMPLANT

Specification & product model

THICKNESS OF PLATE

0.5 mm

AVAILABLE SCREW DIAMETER

Customizable range 1.5-2.0 mm

NUMBER & LOCATION OF FIXTURES

Fully customizable (≥ 3 holes)

TYPE OF FIXATION

Non-locking screw

PLACEMENT

Cover patient's bone

CT REQUIREMENT

Refer to 'Maxillofacial' CT protocol

CODE	PRODUCT DESCRIPTION	SIZE	RECONSTRUCTION AREA
MF-211	Patient-specific titanium maxillofacial mesh implant: Orbital Mesh Non-Sterilization	Normal	Orbital floor and wall reconstruction
MF-212	Patient-specific titanium maxillofacial mesh implant: Orbital Mesh S Non-Sterilization	S	Orbital floor reconstruction
MF-311	Patient-specific titanium maxillofacial mesh implant: Facial Mesh S Non-Sterilization	S	Maxilla or zygomatic reconstruction
MF-312	Patient-specific titanium maxillofacial mesh implant: Facial Mesh M Non-Sterilization	M	Maxilla and zygomatic reconstruction or Maxilla and orbital reconstruction or Zygomatic and orbital reconstruction
MF-313	Patient-specific titanium maxillofacial mesh implant: Facial Mesh L Non-Sterilization	L	Maxilla, zygomatic, and orbital reconstruction or Zygomatic, orbital, and frontal reconstruction
MF-314	Patient-specific titanium maxillofacial mesh implant: Facial Mesh XL Non-Sterilization	XL	Maxilla, zygomatic, orbital, frontal, and cranial reconstruction

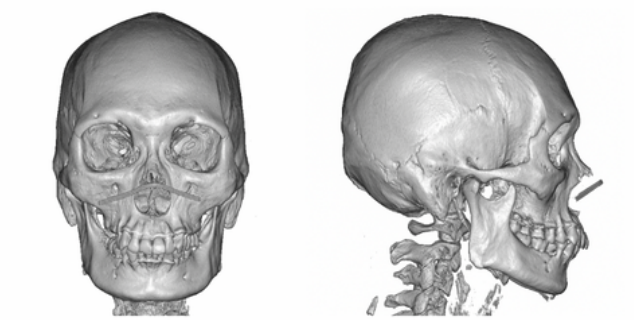
PATIENT-SPECIFIC TITANIUM MAXILLOFACIAL MESH IMPLANT

CT Scan Protocol | Maxillofacial

Meticuly Patient-specific medical solutions are designed using the CT scan of the patient. Good scan data is crucial to the design and manufacture of a high-quality implant. Deviations from this protocol may result in an unusable scan and delay of surgery.Please carefully review and follow the instructions before proceeding with the CT scan protocol and contact the Meticuly team for further clarification.

Region of Interest

- For cranio-maxillofiacl defects, the scan area should include the entire skull.
- The Field of View (FOV) should extend from the cranium to the mandible bone, including skin and soft tissue.



Scanning Parameters

Sliced Thickness:	Less than 0.625 mm
Voxel Size:	0.3-0.5 mm
Image Type:	Bone Window - Non-Contrast
Export File:	DICOM and Uncompressed Standard
Pitch:	1 or Less
Reconstructed Slice Increment:	Less than Sliced Thickness
Reconstruction Algorithm:	Bones/ Details
Gantry Tilt Angle:	Not allowed for Medical CT scan (Gantry Tilt 0˚)

Scanning Instruction

- Helical (spiral) scanning mode is preferred for CT image acquisition
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