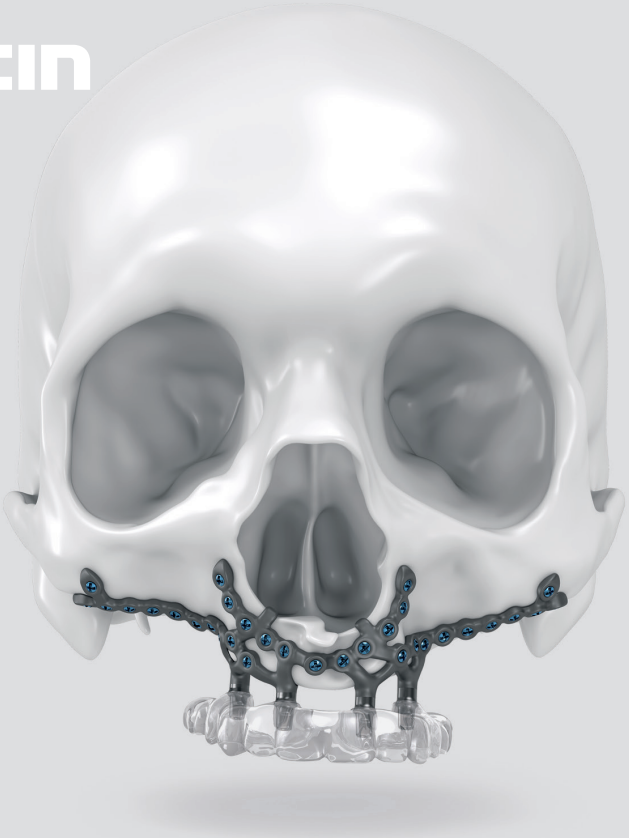
KLS martin GROUP



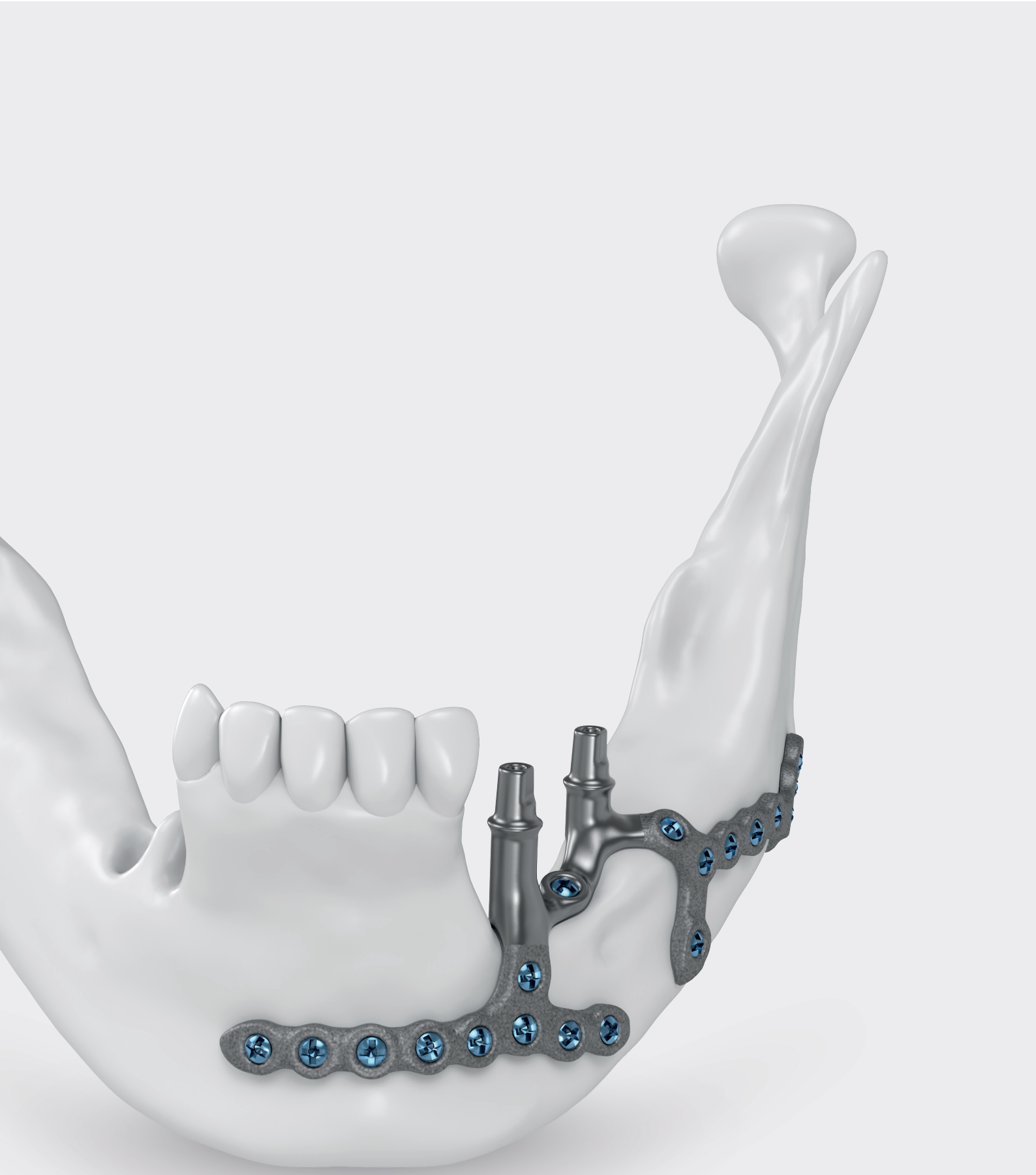
# IPS Implants®

## Preprosthetic

www.klsmartin.com

Oral and maxillofacial surgery is our passion! Its further development, together with our customers, is our ambition. Every day we work on developing innovative products and services which meet the highest demands on quality, and which contribute to the wellbeing of the patient.

# Table of Contents



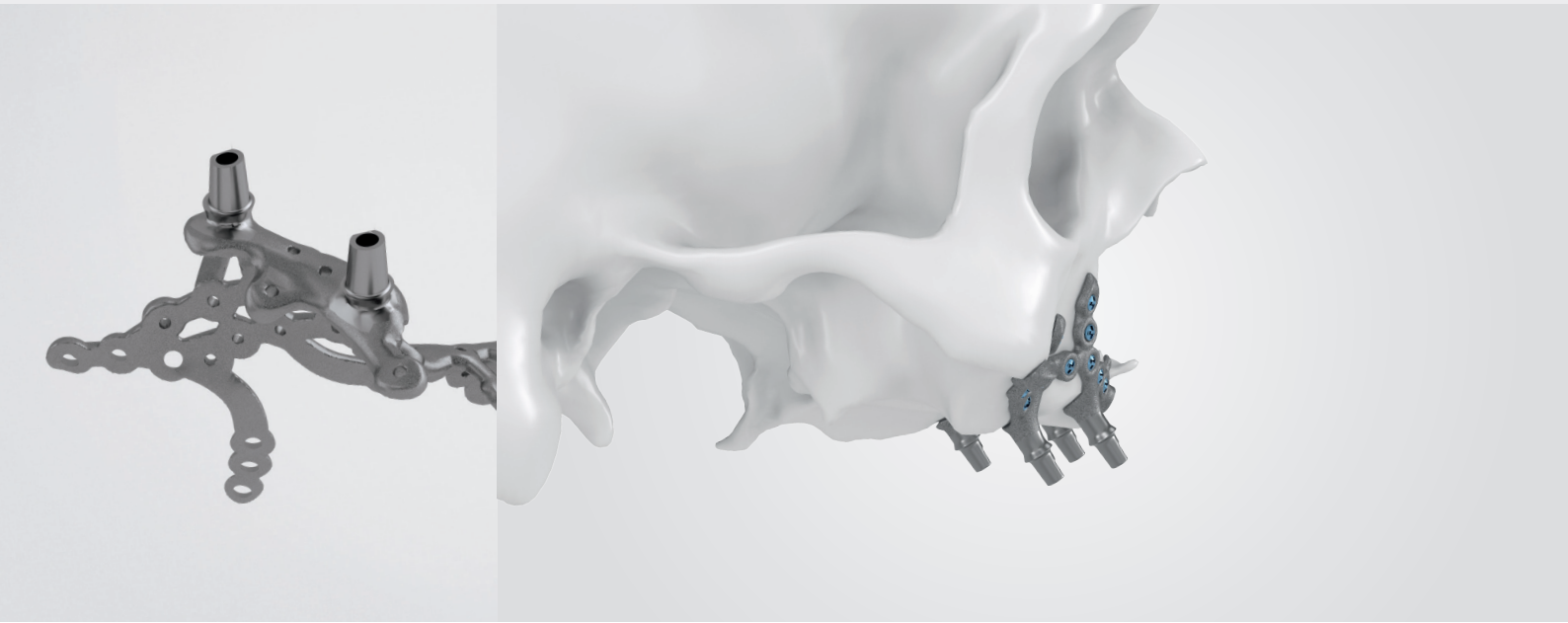
# **IPS** Implants® Preprosthetic
# One Patient. One Solution.

The conventional dental implantology is a well-established possibility for dental rehabilitation if the individual bone and soft tissue are sufficient.

But conventional methods are limited in case of larger tissue loss or replacement. Right here the new possibilities of IPS Implants® Preprosthetic are an excellent enlargement to achieve instant functionally stable dental rehabilitation. The shape-free produced implant offers a high stability.

The comparative moderate treatment costs as well as the decreased treatment duration constitute an interesting therapy option for patients with challenging tissue situation.

# Feature, Function and Benefit

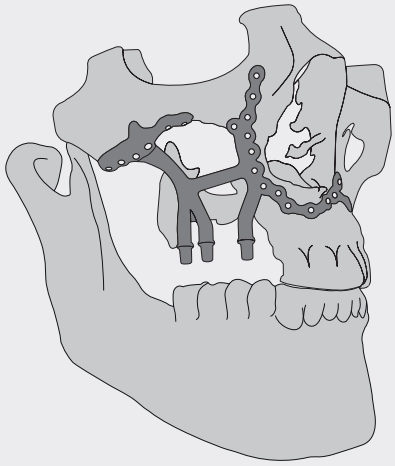
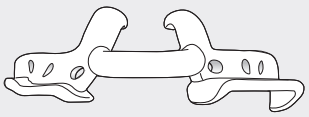
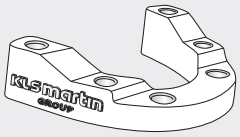
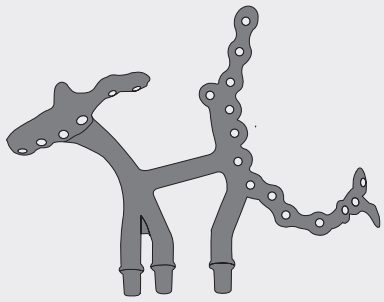


IPS Implants® Preprosthetic convinces by an easy and efficient process for custom-made patient solutions – from the planning up to the functionalized implant as a base for the complete dental rehabilitation.

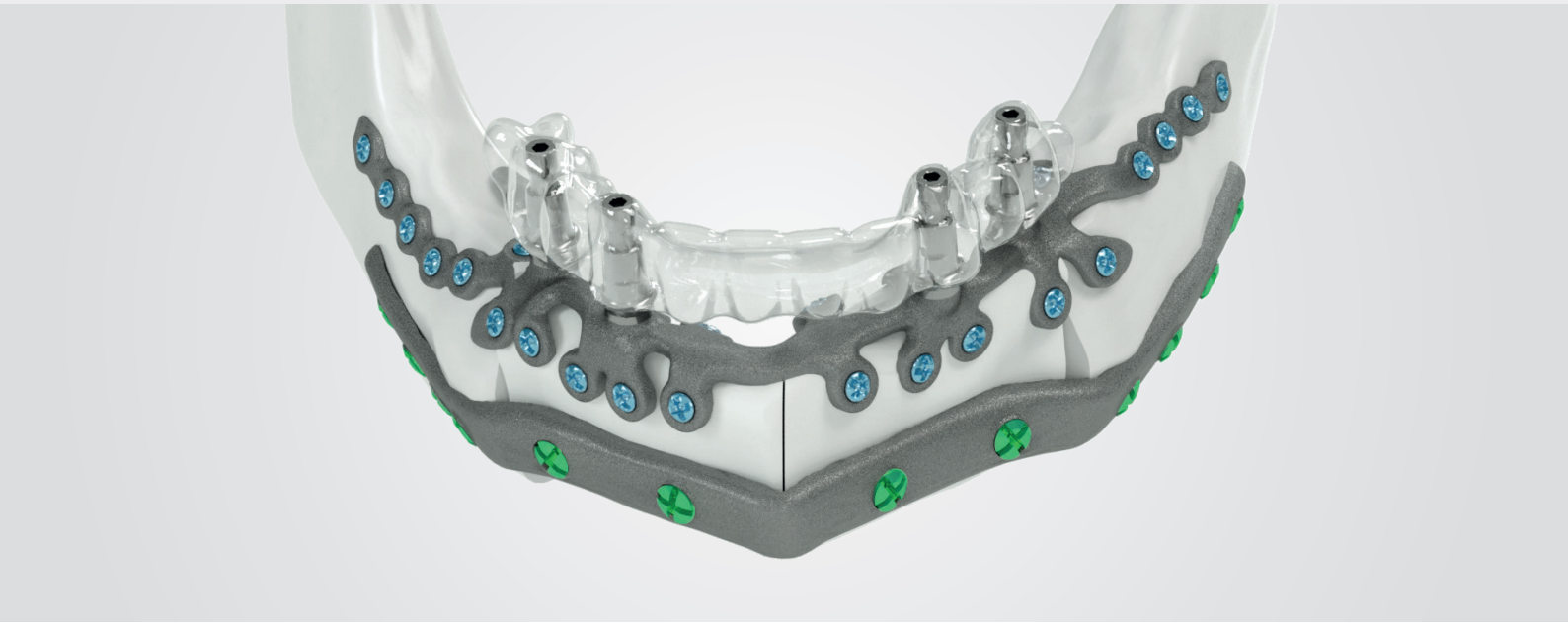
With the IPS Gate®, we provide a platform which guides surgeons and users reliably and efficiently through the process of inquiring about, planning including possible corrections, and completing custom-made products. The intuitive concept offers the user maximum mobility, flexibility, and functionality.

Custom-made implants, planning aids, and anatomical models are made from various materials using state-of-the-art fabrication technologies. Thanks to computer-based planning and functionalized custom-made implants, preoperative planning with individual clinical findings can be implemented in surgery with unprecedented precision.

# IPS Implants® Preprosthetic

| | Features and Functions | Benefits |
|---|---|---|
| **Planning process**  | ■ Efficient interaction with the user via IPS Gate® | ■ Maximum mobility, flexibility, and functionality |
| | ■ Planning, production, shipping, and local support from a single source | ■ Complete service with the requirement for coordinating multiple services eliminated |
| | ■ Range of options for planning<br>- Targeted predetermination of the screw holes and the osteosynthesis screws to be used (Ø 1.5 mm and Ø 2.0 mm)<br>- Preventive elements (e.g., tapered metal structures)<br>- Epithetic solutions or custom-made reconstructive implants can be combined with IPS Implants® Preprosthetic | ■ High degree of safety in planning<br>■ Optimized “one-fit-only” design<br>■ Holistic treatment concept |
| **Marking and positioning guides (optional)**    | ■ Enables transfer of virtual planning to the OR | ■ Maximum safety through accurate determination of the implant position |
| | ■ Marking guide: marking the osteotomy line | ■ Leveling of the alveolar ridge |
| | ■ Positioning guide: guidance for two-piece implant solutions over two quadrants | ■ Precise positioning |
| **Implant**  | ■ The latest production technologies such as form-free additive manufacturing | ■ High degree of freedom in the individual shaping of the framework structure and the pillars, even for difficult bone and soft tissue conditions |
| | ■ Functionalized design | ■ Clear implant positioning |
| | ■ Implant based on the individual patient data, already checked for perfect fit during manufacture | ■ Best possible three-dimensional precision-fit<br>■ No trimming or bending required, meaning no sharp edges |
| | ■ STL file is made available via the IPS Gate® if required | ■ Compatibility with intra-operative navigation |

# Feature, Function and Benefit

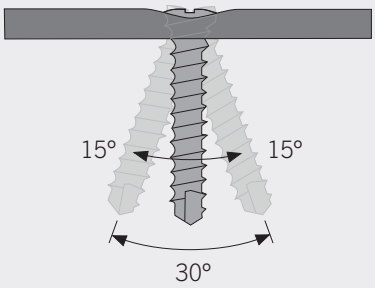
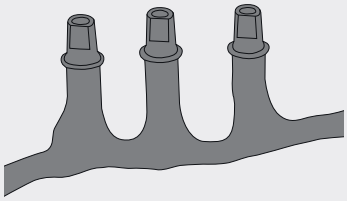
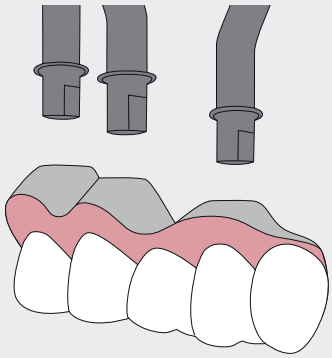


After successful application of IPS Implants® Mandible Reconstruction, a treatment with IPS Implants® Preprosthetic is possible as a second step.

The resulting advantages of IPS Implants® Preprosthetic for the patient are a decreased strain by a reduction of surgical interventions compared to alternative treatments as well as a reduction of the rehabilitation and total treatment duration.

It is pleasant that this new technique, developed in cooperation with the Hannover Medical School, a fast functionally stable chewing capacity and so an immediate aesthetic and functional outcome is achieved.

# IPS Implants® Preprosthetic

| | Feature | Benefits |
|---|---|---|
|  | ■ Option for multivectorial placement of standard or angularly stable osteosynthesis screws on the plate | ■ Highest individuality and stability<br>■ Primary functionally stable bony fixation |
| **Implant pillars**<br>  | ■ Fixation remote from the point where the pillar penetrates the soft tissue<br>■ Polished pillar surface<br>■ Abutments integrated into the pillars reduce the interfaces | ■ Rare inflammation of the mucosa at the pillar has no direct effect on fixation<br>■ Simplified oral hygiene<br>■ Seamless connection without additional cavities or micromovements between pillar and abutment |
| **Prosthetics**<br>  | ■ We will provide you with the STL file for the temporary denture<br>■ Accessories (screwdriver and screws) for intraoperative fixation of the temporary denture are part of the restoration package | ■ You, as the user, continue to create the (temporary) denture with the trusted partner of your choice<br>■ Immediate postoperative esthetic result<br>■ Rapid postoperative chewing resilience<br>■ Quality assurance (parallelism of the pillars)<br>■ Efficient case and surgery workflow |
| **Restoration**<br>  | ■ A unilateral restoration with IPS Implants® Preprosthetic can be implemented in four to six weeks | ■ Time-saving and efficient patient treatment<br>■ Significant savings in overall costs |

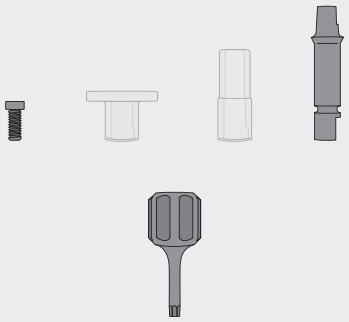
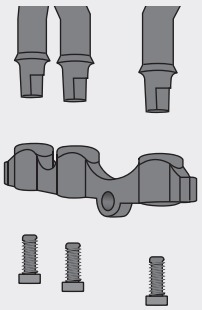
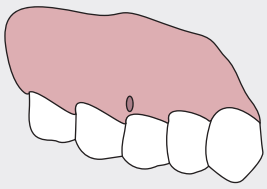
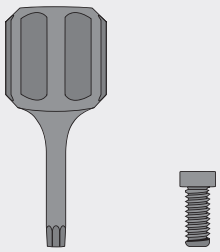
# Feature, Function and Benefit

Our holistic treatment concept supports the patient's continuing postoperative care. The process is comparable to the procedure for standard dental implants. Postoperative treatment can therefore be performed by the patient's attending dentist at all times.

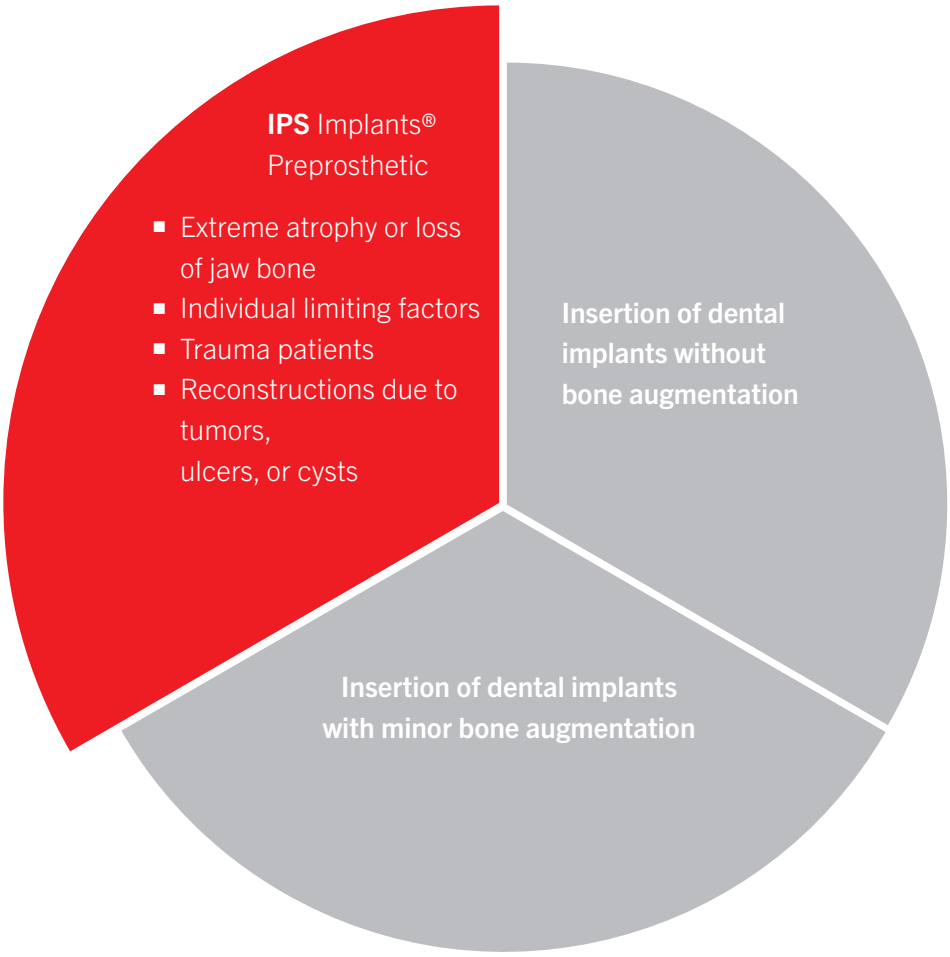
Prosthetic accessories are available for the final prosthetic restoration. With the help of these products, the final denture will still be fabricated by your trusted local partner. This provides for efficient case processing.

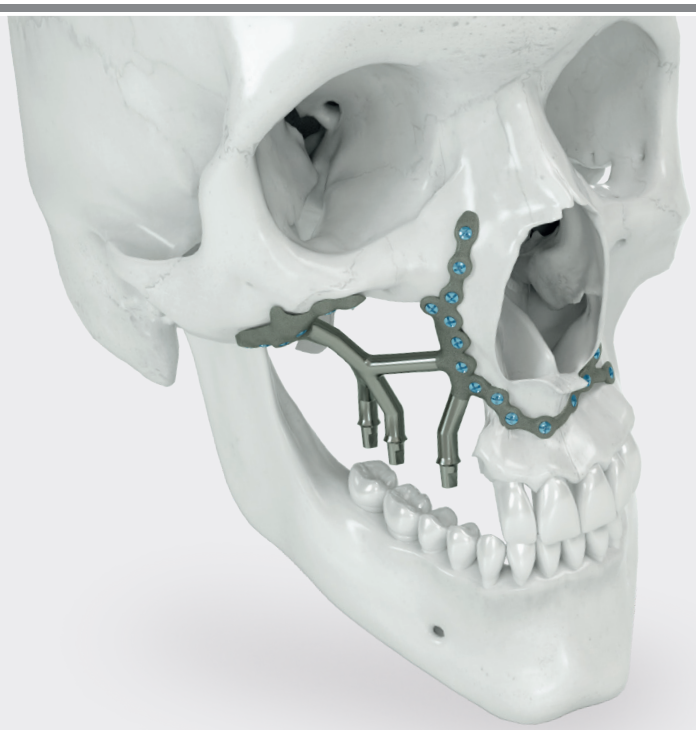
A bar-supported fixed denture is recommended for the final prosthetic restoration. This ensures optimum oral hygiene for your patient.

# **IPS** Implants® Preprosthetic – Prosthetics

| Postoperative prosthetics | Feature | Benefits |
|---|---|---|
|  | ■ Prosthetic accessories for the final prosthetic restoration are available individually | ■ Creation of the bar and final denture by your trusted local partner with the aid of the prosthetic accessories |
|  | ■ Bar as the basis for the final denture | ■ Fabrication by your trusted local partner<br>■ Simplified oral hygiene thanks to a denture that can be removed using the snap-in connection, also for the patient<br>■ Optimal planning conditions for the prosthodontist<br>■ Reduced time needed until the final denture is available |
|  | ■ The final denture can be planned digitally or classically with plaster models as an alternative | ■ Holistic concept |
|  | ■ Screwdriver and prosthetic screw are available individually | ■ Modular accessories<br>■ Supplement for the prosthodontist set<br>■ For initial insertion and replacing with the final prosthetic restoration |

# Step by Step to Optimal Fixation





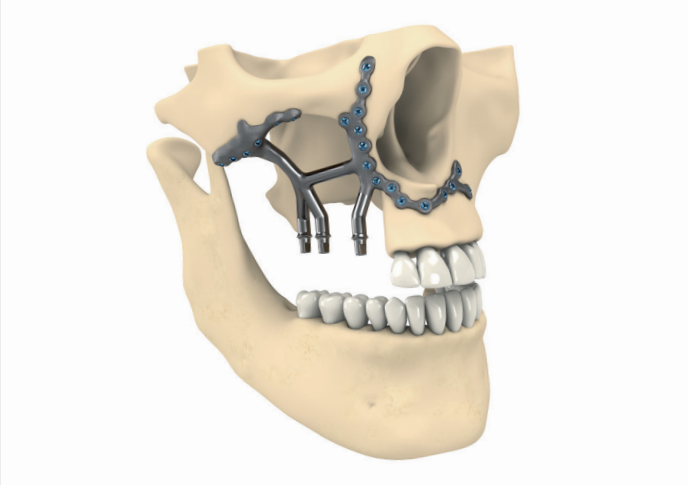
## Surgical Technique



## Postoperative Treatment







**Virtual planning**

To create the case, the patient data and case-related information are uploaded to the IPS Gate® web-based platform.

Based on your information and the patient's requirements, the IPS® developer prepares the case planning. An integrated chat function and web meetings are available for direct communication between you and the IPS® developer.

The number and position of the pillars are determined based on the clinical specifications and requirements. If applicable, the healthy anatomical region is mirrored. A custom-made optimized implant is then generated.

At the end you approve the design for production.

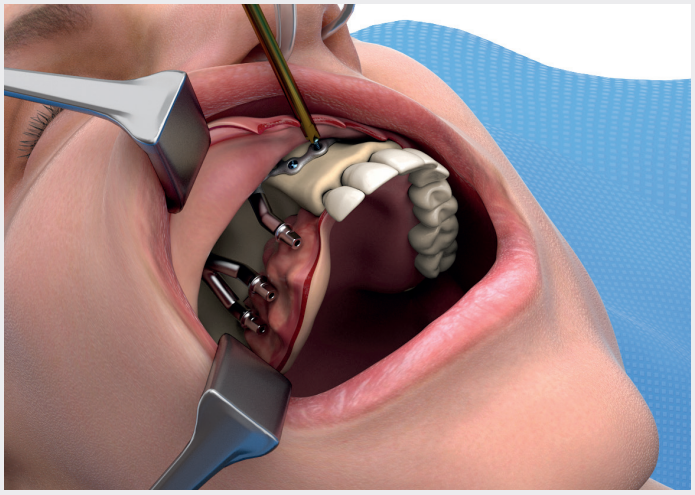
**Preoperative presentation**

Initial situation after removal of a benign tumor and soft tissue reconstruction using a latissimus dorsi flap.

**Preparation for implantation**

The surgical site in the right midface is opened intraorally. Remote fixation is all the more important as there is no maxilla on the right.

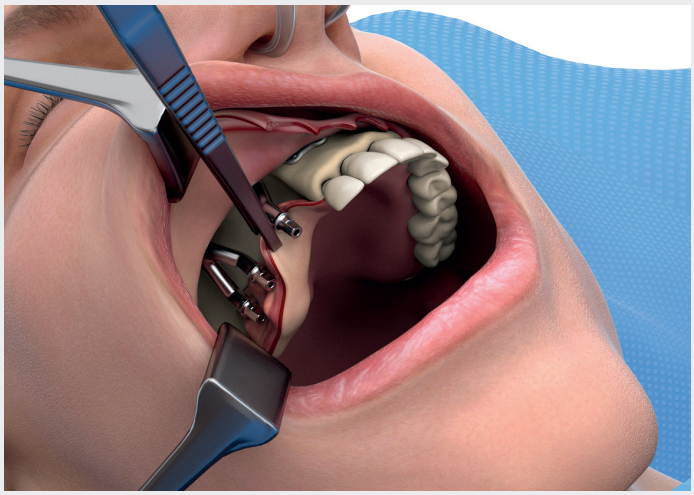
The soft tissue is exposed at the previously defined bony structures.



**Fixation of the implant**

The implant is inserted into the surgical site and fits precisely and accurately thanks to the custom-made design.

Depending on the planning, the IPS® framework base is screwed in with standard (Ø 1.5 mm or Ø 2.0 mm) and/or angularly-stable (Ø 2.0 mm) osteosynthesis screws for functionally stable and multivectorial fixation. Emergency screws (Ø 1.8 mm or Ø 2.3 mm) can also be used for softer bone structures.



**Creation of the pillar emergences**

The pillar emergences are created through the wound closure along the pillars or the incision line.

**Soft tissue situation**

The rotation-stable abutments of the pillars must not be covered by soft tissue after wound closure.

**Fixation of the temporary denture**

The temporary denture was created preoperatively with your trusted local partner and our STL file. The temporary denture is now fixed to the IPS Implants® Preprosthetic on each pillar. The supplied prosthetic screws and the corresponding screwdriver are used for this purpose.

Care must be taken to ensure a sufficiently large distance between the soft tissue and the denture, otherwise undesirable pressure may be exerted on the soft tissue postoperatively as a result of tissue swelling.

Upon request, the temporary denture can be created with or without occlusal contact.

**Prosthetic accessories**

The prosthetic accessories are available for fabrication of the final prosthetic restoration by your trusted local partner.

*Important note:*
*The prosthetic accessories can be configured individually and ordered singly.*

Screwdriver
(part of the treatment package)

Prosthetic screw
(part of the treatment package)

Prosthetic accessories

**Commencing with the final prosthetic restoration**

The intraoral scans for the final prosthetic restoration are prepared on site by the treating dentist as soon as postoperative tissue swelling has subsided.

The following steps are comparable to the procedure for standard dental implants. Scanbodies are not necessary due to the abutments integrated in the implant pillar. The custom-made implant is available in IPS Gate® as an STL file.

The temporary denture is removed using the screwdriver.

**Creation of the intraoral scan**

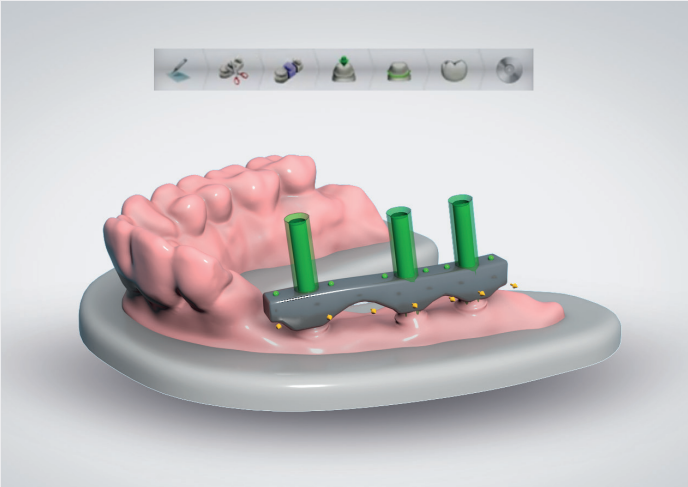
The intraoral scans are then prepared for the digital creation of the prosthetic restoration. Here, the scans of the maxilla and mandible are created separately. The third scan is required to map the bite situation in occlusion. The three scans are then merged digitally.

Finally, the temporary denture is screwed back onto the abutments.

*Important note:*
*When treating a patient with an edentulous maxilla or mandible, an impression and plaster cast (see pages 18 and 19) are required in addition to the intraoral scans.*

Screwdriver

Screwdriver



**Digital designing of the bar solution**

First, the STL file of the implant and the intraoral scan are imported into a standard CAD/CAM software solution for dental technology (see page 24, right column), then superimposed and aligned. The bar solution can then be designed based on the abutments and the soft tissue situation.

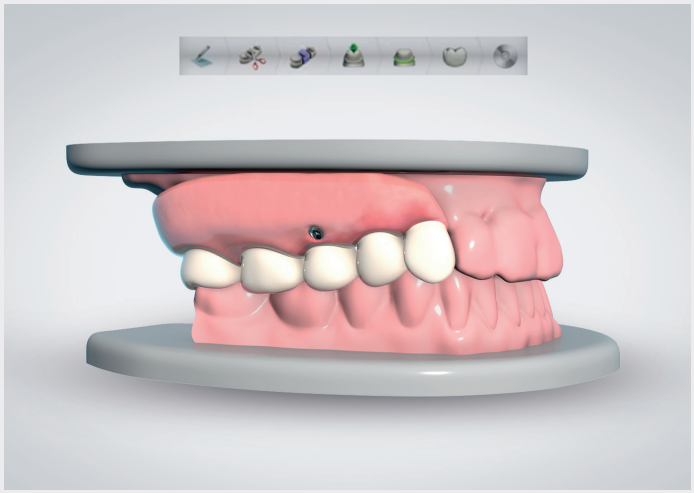
Optional:
Thanks to the digital workflow in the planning and fabrication of IPS Implants® Preprosthetic, the bar can already be fabricated immediately postoperatively during the healing period. For this purpose, the implant is scanned preoperatively with a physical scanner by the user.

This simplifies fabrication of the final denture, which can then be inserted as soon as the swelling has subsided.

**Creation of the bar**

After the bar is designed, it is fabricated mechanically, which includes the holes for the abutments and the locking mechanism.

The final finishing of the bar is performed by grinding and polishing.



**Digital design of the final denture**

The previously prepared digital tooth model with the bar is imported into CAD/CAM software for dental technology. In addition, the scan in occlusion is now also used to optimally align the tooth crowns with each other. Now the denture is designed to match the existing residual dentition and the available soft tissue situation.

**Creation of the final denture**

The final denture is now fabricated. For easy handling, guidance with a matrix (denture) and patrix (bar) is recommended.

The final denture is subsequently fixed to the bar by a locking mechanism.

**Final prosthetic restoration**

The bar serves as a mount for the removable and lockable superstructure (denture). It can now be checked whether the matrix and patrix fit perfectly into each other.

**Insertion of the final prosthetic restoration**

The final prosthetic restoration is inserted at another visit of the patient to the treating physician.

First, the temporary denture is removed using the screwdriver. The bar is placed on the abutments and fixed either with the existing or with new prosthetic screws and the screwdriver.

The final denture is then slid onto the bar and locked in place.

*Note: The bar and the denture are not part of our product portfolio.*

Screwdriver

Prosthetic screw

**Commencing with the final prosthetic restoration**

The impression for the final prosthetic restoration is taken on site by the treating dentist as soon as postoperative tissue swelling has subsided.

The following steps are comparable to the procedure for standard dental implants. Among other things, the prosthetic products are now used.

The temporary denture is removed using the screwdriver. One impression cap each is placed onto the end of each of the integrated abutment.

**Closed impression taking**

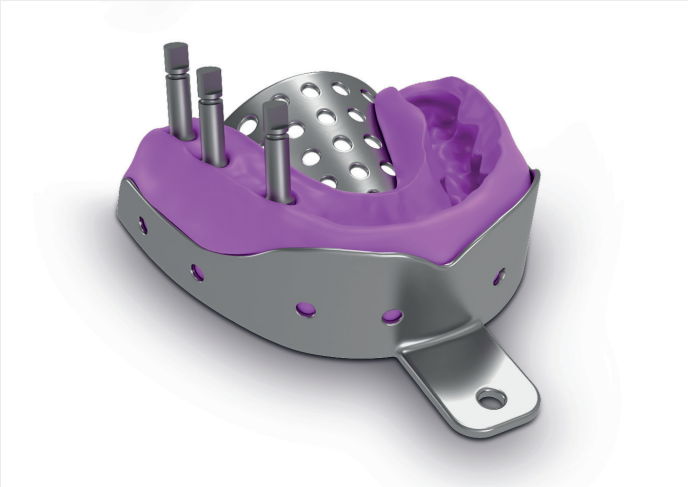
Using a closed impression tray and impression material, an impression of the intraoral situation is taken with any residual dentition. Due to the T-shaped design of the impression caps, these remain in the impression material when the tray is removed. Subsequent curing of the material keeps the caps in their position.

The temporary denture is then screwed back onto the abutments.

Screwdriver

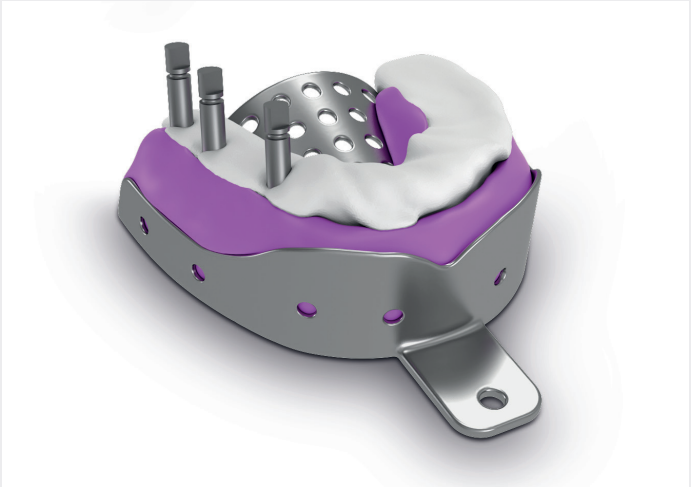
Impression cap

Screwdriver



**Inserting the analog pillars**

The impression material represents a negative model of the intraoral situation. An implant analog is inserted loosely in each impression cap. The two ends of the implant analog are an exact copy of the abutment at the end of the implant analog.



**Casting the impression material**

The negative model (impression material) is now transferred to the exact copy of the intraoral situation, the positive model (plaster model). For this purpose, the impression material and the implant analogs are cast with plaster.

Implant analog

**Finished plaster model**

After the plaster model has dried and cured, it can be separated from the impression material. During this process, the impression pillars remain fixed in the plaster. Now the exact copy of the intraoral situation is available as a plaster model.

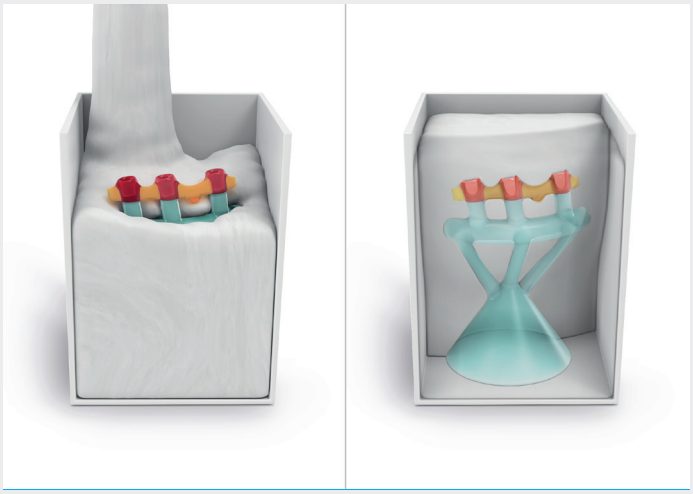
One burnout cap each is placed on the end of each implant analog.

**Creation of the wax-up**

The wax-up of polymer (Pattern Resin) is created around the caps. Connected to this are the subsequent wax casting channels.

The wax-up, including the caps, can now be lifted off the implant analog in the plaster model.

Burnout cap



**Creation of the cast mold**

The wax-up is rotated by 180° and placed in a mold. At the bottom of the mold is the subsequent filling funnel and in the middle there is a horizontal reservoir to ensure that sufficient casting metal can run in later.

The mold is filled with heat-resistant plaster, which completely encloses the wax-up. The plaster also runs into the burnout caps from above and thus forms an exact copy of the abutment there.

**Curing and burnout of the casting mold**

The mold is cured in the furnace. During this process, the wax-up and burnout caps are burned out. The construction evaporates in the process, leaving a cavity.

**Casting process**

The still hot casting mold is rotated by 180°. Then the liquid casting metal can be poured into the mold.

**Exposing the bar**

After the cooling process, the plaster mold, the casting channels that are not required, and the filling funnel are removed, which exposes the bar.

**Final bar design**

The cast bar is finished by milling, drilling, grinding and polishing based on the plaster model.

The final bar serves as a mount for the removable and lockable superstructure (denture) which is now created. For easy handling, guidance with a matrix (denture) and patrix (bar) is recommended.

The denture is fixed to the bar by a locking mechanism.

**Insertion of the final prosthetic restoration**

The final prosthetic restoration is inserted at another visit of the patient to the treating physician.

First, the temporary denture is removed using the screwdriver. The bar is placed on the abutments and fixed either with the existing or with new prosthetic screws and the screwdriver.

The final denture is then slid onto the bar and locked in place.

*Note:*
*The bar and the denture are not part of our product portfolio.*

Screwdriver

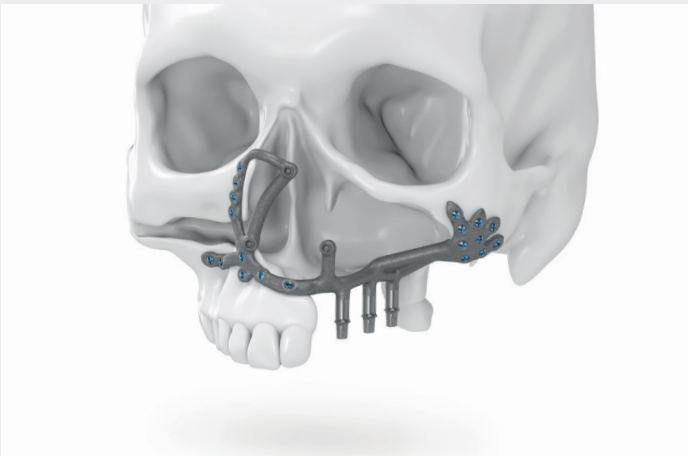
Prosthetic screw

Screwdriver

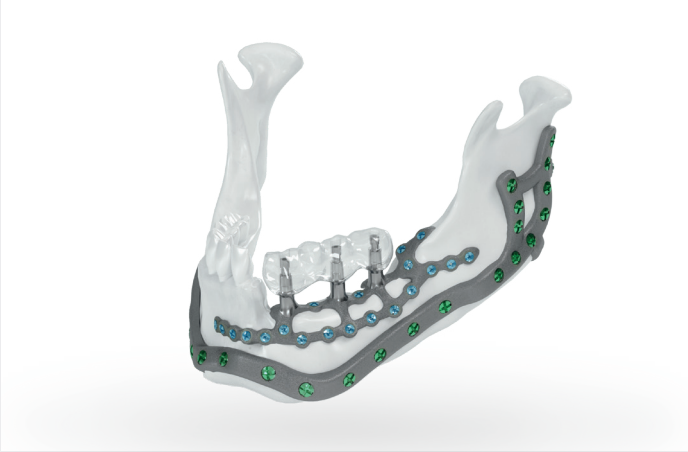
Prosthetic screw

# Case studies
# Restoration in one quadrant

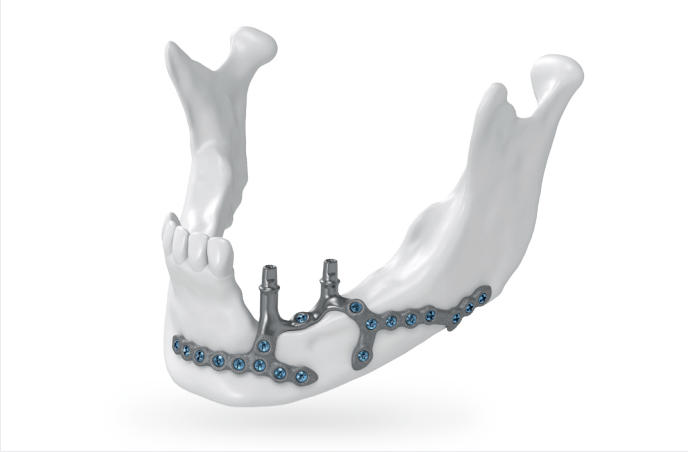
Restoration of the right maxilla after hemi-maxillectomy with IPS Implants® Preprosthetic without bone transplant.



Restoration of the left maxilla with IPS Implants® Preprosthetic including 3 attachment points for a nasal epithesis.

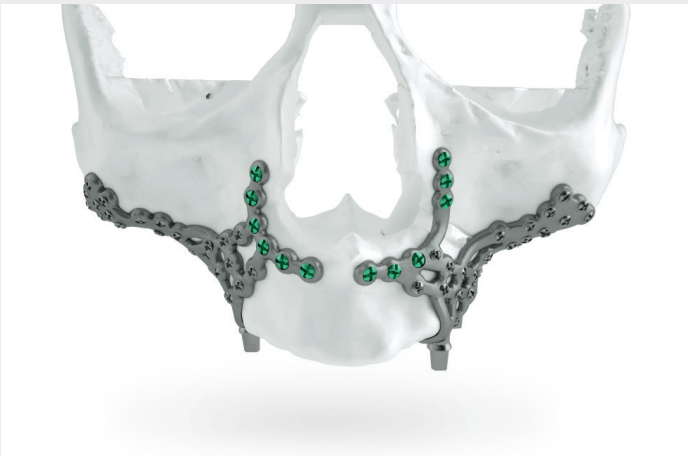


Restoration of the left mandible with IPS Implants® Preprosthetic. As a result of a previous reconstruction, a fibula transplant and an IPS Implants® Mandible Reconstruction are in situ.

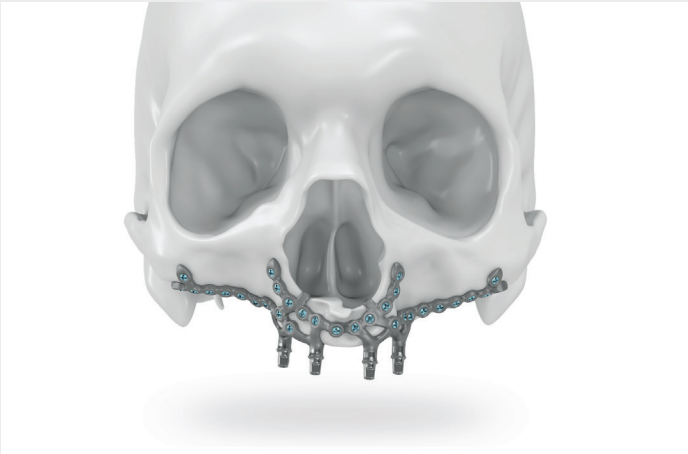


Restoration of the left mandible with IPS Implants® Preprosthetic following tumor surgery.

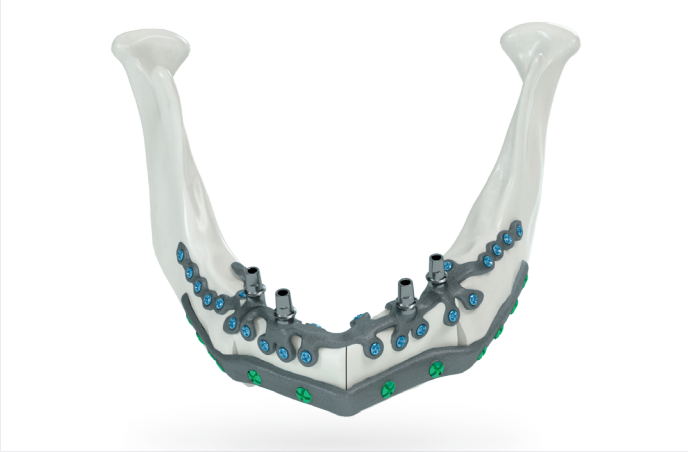
# Case studies
# Restoration in two quadrants



Restoration of an atrophic maxilla with two IPS Implants® Preprosthetic without bone transplant. A positioning guide enables precise insertion and parallelism of the implant pillars.



Restoration of an atrophic maxilla with IPS Implants® Preprosthetic without bone transplant. The one-piece implant in its functionalized and preventive design results in even higher positioning accuracy compared to the two-piece implant over two quadrants.



Restoration of the mandible with IPS Implants® Preprosthetic. As a result of a previous reconstruction, a fibula transplant and an IPS Implants® Mandible Reconstruction are in situ.

# Osteosynthesis and Prosthetic Accessories

For intraoperative restoration, the following accessories are required for IPS Implants® Preprosthetic in sterile condition:

- A sufficient number of KLS Martin osteosynthesis screws in the planned diameters and lengths
- A screwdriver to fit the planned osteosynthesis screws
- A twist drill to fit the planned osteosynthesis screws
- The temporary denture, fabricated by the partner of your choice

For the postoperative restoration, the following prosthetic accessories are required for fabrication and insertion of the final superstructure by the partner of your choice:

- A screwdriver for loosening and attaching the (temporary) denture
- One impression cap, one burnout cap, and one implant analog for each implant analog or the creation of the superstructure
- A screwdriver for creating the superstructure
- One prosthetic screw for each implant pillar for the replacement (optional)

Screwdriver

Prosthetic screw

Implant analog

Burnout cap

Impression cap

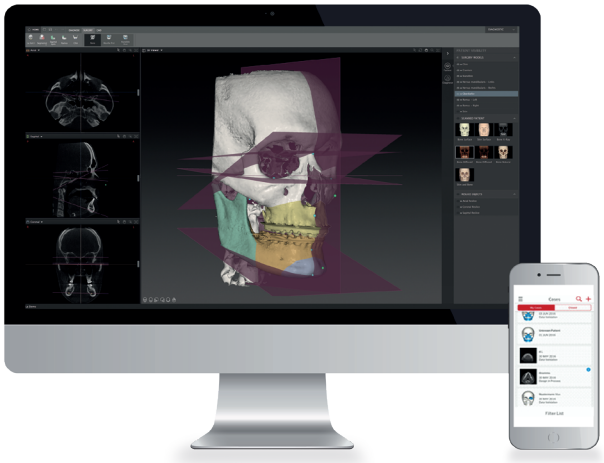
# The IPS® Product Family

**IPS Gate®**

The web-based platform and app guide surgeons and users reliably and efficiently through the process of inquiring about, planning and completing custom-made devices. With the HTTPS standard IPS Gate® guarantees encrypted data transmission, which is additionally certified by the TÜV Süd seal.

**IPS Implants®**

Custom-made devices, planning aids, and anatomical models are made from various materials using state-of-the-art fabrication technologies. Thanks to computer-based planning and functionalized custom-made devices, preoperative planning can be implemented in surgery with unprecedented precision.



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