KLS martin GROUP

IPS Implants®

TMJ Prosthesis

www.klsmartin.com

Oral and maxillo-facial 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.

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IPS® – Individual Patient Solutions

IPS Implants®
TMJ Prosthesis

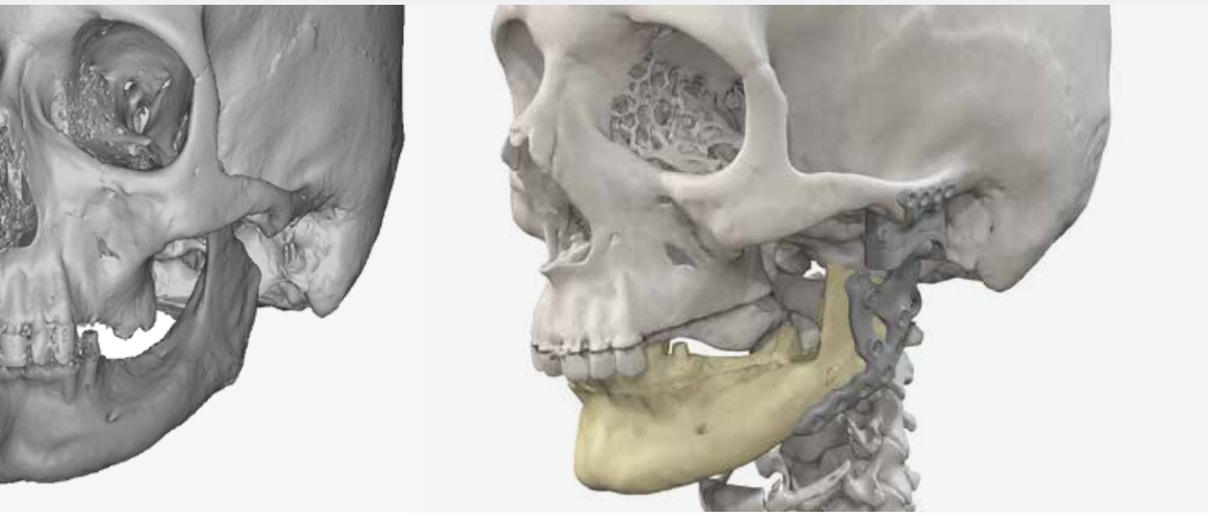
Innovative Solutions x Established Workflow

The temporomandibular joint is a unique joint in the human body due to the complexity of its geometry, function, the structures involved and the influences acting on it. It can be seen as a double joint in which the lower Articulatio Discomandibularis and the upper Articulatio Discotemporalis are working together as a union. These can be used separately or together to perform the various movements: opening/closing the mouth, moving sideways, advancing and retracting the lower jaw.

The temporomandibular joint is also susceptible to functional disorders and diseases due to its complexity. The majority of TMJ disorders in patients who complain of functional restrictions or pain can be treated using conservative and minimally invasive treatment methods. However, due to various causes, the temporomandibular joint can also be destroyed to such an extent that treatment is no longer possible without partial or complete replacement of the temporomandibular joint.

If the progression of the disease leads to a loss of the basic constitution of the joint structures, a surgical replacement is usually the only option, whereby the resection of diseased temporomandibular joint components and their artificial replacement with alloplastic prostheses is seen as a last chance.

Feature, Function and Benefit



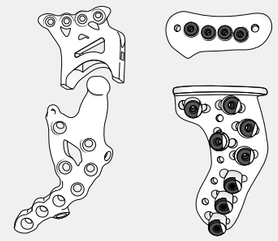
IPS® is ideal for solutions customized to the patient by a simple and efficient process – from planning to the functional implant.

We supply IPS Gate®, a platform that guides surgeons and users reliably and efficiently through the process of inquiring about, planning, and completing custom-made products. The intuitive concept offers the user maximum mobility, flexibility, and functionality. With the HTTPS standard IPS Gate® ensures encrypted data transmission, which is additionally certified by the TÜV Süd seal.

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 can be implemented in surgery with unprecedented precision.

The resulting advantages for patients are reduced complication rates, improved esthetic and functional results, reduced surgical time and faster rehabilitation.

IPS Implants® – TMJ Prosthesis

	Features and functions	Benefits
Planning process	■ Simple and efficient interaction with the user via the IPS Gate®	■ Maximum mobility, flexibility and functionality
	■ Planning, fabrication, shipping from a single source	■ Complete service with the requirement for coordinating multiple services eliminated
	■ Various planning options with obligatory check by FEM simulation with IPS inSilico® x VIT	■ High degree of safety in planning the post-operative result
	■ Planning time: 30 working days after case approval	■ Save time with efficient case processing
Planning aids	■ Enables transfer of virtual planning to the OR	■ Maximum safety with accurate determination of plate position and screw holes
	■ Integrated steel sleeves	■ No need for additional drill guides
	■ Made of polyamid or additive manufactured titanium alloy	■ Variability in planning options and high biocompatibility
Prosthesis	■ Innovative, modern and anatomically inspired design	■ Allows for more post-operative jaw movements
	■ Latest production technologies such as additive manufacturing	■ Additive manufacturing technology provides complete freedom of design for implants
	■ Manufactured as standard from high-strength titanium alloy Ti6Al4V (condyle) in combination with UHMWPE (fossa)	■ Proven materials combined in a new way: leads to fewer foreign body reactions, ideal gliding properties and high stability of the implant
	■ Prosthesis based on the individual CT scan of the patient, already checked for perfect fit ex-works	■ Best possible three-dimensional precision fit
	■ Prosthesis can optionally be fixed with locking or non-locking screws	■ Maximum flexibility and stability
	■ Optionally with hooks on both components	■ Allows for suture fixation
	■ Prosthesis components are coming pre-sterilized	■ Reducing risk of infection

Step by Step to Optimal Fixation

Fields of use

Reconstruction is indicated for patients with severe temporomandibular disorders (TMD), which may be associated with functional limitations of the masticatory system, restricted jaw opening or pain in the temporo-mandibular joint.

Surgical Technique

Virtual planning

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

The IPS® engineer prepares the case plan based on the information and the requests of the user. An integrated chat function and web meetings are available for direct communication between the IPS® engineer and user.

Note:
More detailed information on how to prepare patient data for virtual planning can be found in our brochure "IPS Implants® Scan Protocol TMJ Prosthesis".

The resection lines are defined first. Then planning aids such as drill and marking guides as well as implant replicas and of course the prosthesis components are generated. The type, diameter and length of the osteosynthesis screws are defined.

The prosthesis components are additionally tested via FEM analysis with our IPS inSilico® tool before they are manufactured.

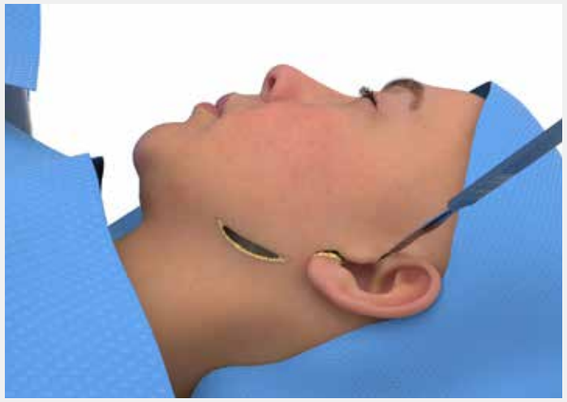
At the end the user approves the design for production.

Preparation of the implant

Following approval, the custom-made products are manufactured and shipped.

Then surgery can be initiated.

Note:
The custom-made prosthesis components are delivered sterile. The planning aids however are non-sterile. Before use, they must be removed from their packaging and subjected to a suitable cleaning, disinfection and sterilization procedure.



Incision

The ramus is exposed using a submandibular approach.

The condylar head and the fossa are accessed via a preauricular incision.

Optionally, the occlusion can be stabilized using intramaxillary fixation.

Preparation of the mandible via drill and marking guides

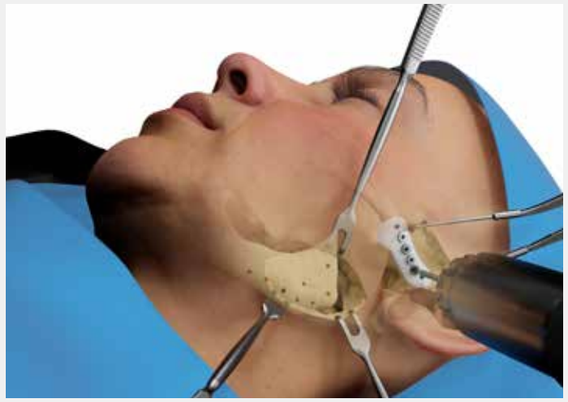
After preparation of the mandible, the drill and marking guides, which also predefine the cutting angle, are fixed to the mandible with 2.0 mm (alternatively 1.5 or 2.3 mm) osteosynthesis screws. The small holes in the drill and marking guides serve to fix the guide to the mandible.

The resection lines are marked.

The screw holes for the implant are pilot-drilled through the large holes in the drill and marking guide. Steel guides are fitted into the holes, through which targeted drilling can be performed without additional drill guides.

Resection of the condylar area

The drill and marking guide is removed and the resection performed along the marked line.

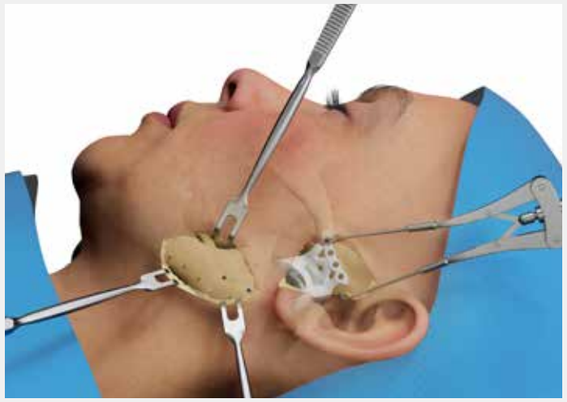


Preparation of the fossa

After resection of the condyle, respectively the ascending ramus, the fossa is prepared.

Similar to the condyle segment, a drilling and/or marking guide with osteosynthesis screws 1.5 mm (alternatively 2.0 mm) is fixated to the zygoma arch.

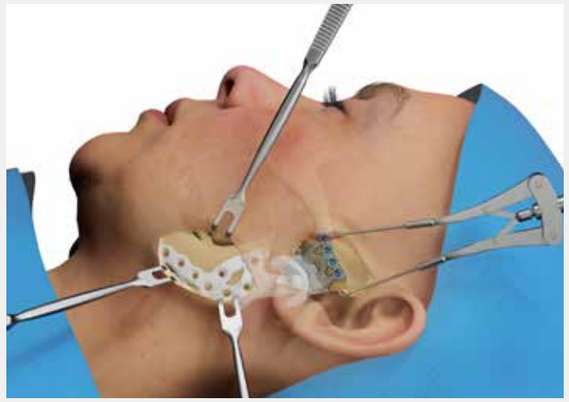
After the drilling the marking guides are removed from both the condylar and fossa segments.



Examination of the implant positions via planning aids

To check the positioning beforehand additional custom-made planning aids made of polyamide are used.

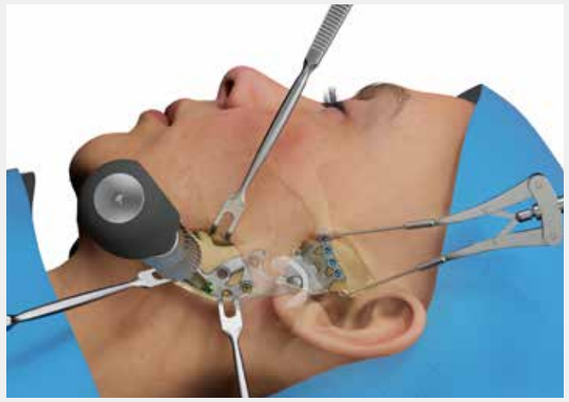
When the soft tissue is sufficiently prepared and the planning aids fit into the position the sterile prosthesis components can be opened.

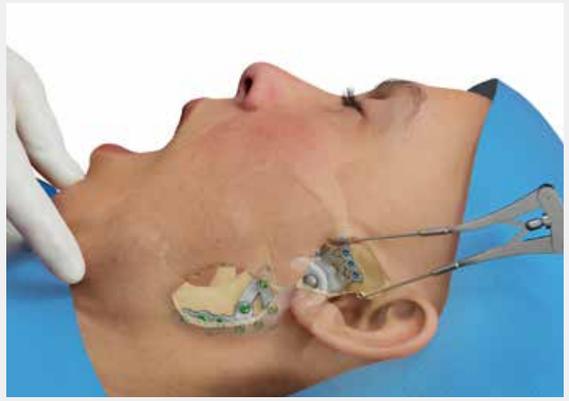


Final fixation of the prosthesis components

After the drilling the marking guides are removed from both the condylar and fossa segments. Finally, the fossa component is fixed to the temporal bone (os temporale) or zygoma arch using the pre-drilled screw holes.

Following the fossa, the condylar segment is then fixated via the pre-drilled screw holes onto the mandible.





Merging of the fossa and condyle components

In order to enable movement both components are now brought together. The condyle head is inserted above the plate into the sliding surface of the fossa component.

The mouth opening, function and range of motion of the artificial joint are checked manually by the clinician.

Optional suture hooks on both implants can be used for connecting the prosthesis.

If necessary, an additional fat graft is performed for better healing. If intermaxillary fixation has been used, this is now released.

Wound closure

Finally, the wound is sutured.

Uni- or bilateral total joint replacement by a prosthesis

Orthognathic planning including a total joint replacement

Mandibular reconstruction including a total joint replacement

Optionally with graft planning included
- Fibula
- Scapula
- Iliac crest

Osteosynthesis Accessories

In addition to the IPS® implant and the included drill and marking guides, the following osteosynthesis accessories in sterile condition are required for the surgical treatment:

- 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
- 2.0 mm osteosynthesis screws (alternatively 1.5 or 2.3 mm screws) for fixing the drill and marking guide with suitable twist drill and screwdriver

The IPS® Product Range

IPS CaseDesigner®

The IPS CaseDesigner® makes virtual 3D surgical planning easier and faster than ever before. With this flexible software tool, orthognathic procedures can be efficiently and reliably planned and simulated, and then applied to treatment in the operation in a customized manner.

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 products. With the HTTPS standard IPS Gate® guarantees encrypted data transmission, which is additionally certified by the TÜV Süd seal.

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