



IPS Implants®

TMJ Prosthesis

Scan protocol



IPS® – Individual Patient Solutions

IPS Implants® TMJ Prosthesis

Scan protocol



Basic information

This scan record describes how patient data has to be prepared for the virtual planning of TMJ reconstruction surgery so that a TMJ prosthesis (a member of our IPS Implants® product family) can be manufactured.

The following data sets are required for the virtual planning of IPS Implants® TMJ Prosthesis interventions:

- Scan of the patient skull
- Dental scans of the maxilla and mandible in STL or DICOM format
- Optionally: scan of the planned final occlusion in STL or DICOM format, alternatively: simulation of a virtually planned occlusion by IPS® Design Team

Should you have any queries, please do not hesitate to contact our **hotline +49 7463 838-222**.

Important:

Planning results are only ever as up to date as the clinical data records!
If the anatomical situation should change after scanning, the precision fit of the products can no longer be guaranteed.

Scan of the patient skull

- Patient scans have to be up-to-date and precise (< 10 months).
- The spatial resolution (size of the voxels) should be a maximum of **1.25 mm** for DVT scanners.
- The slice thickness of CT scans should be between **0.5 - 1.25 mm**.
- The slice increment must be \leq slice thickness.
- The axial layers are required.
- Movements of the patient during the actual scanning have to be avoided coercively.
- The patient orientation (right, left, anterior, posterior, superior, inferior) should be recorded in the scan and be correct.
- Classic computed tomography (CT) scans are preferred for implant planning.
- In the case of medical CT scans **no gantry tilt is allowed (gantry tilt 0°)**.
- Make sure that there is no (foreign) radiopaque material in the patient's mouth during the scanning.
- The complete dento-maxillofacial complex including all areas of interest in the anterior cranio-maxillofacial volume has to be scanned. The scan should include the mandibular fossa and should range below the mandible.
- The use of bandages, chin rests or similar to constrain the patient should be avoided, otherwise the soft tissue will be deformed.
- Save the entire scan (incl. all sub-files) as a DICOM file.
- It should be ensured that the patient details in the scan match those in IPS Gate® (name and date of birth).

(CB)CT-based workflow for dental casts

When taking the bite impression make sure that

- the patient bites down deep enough into the impression material
- the material covers all the desired areas for the impression.

When the patient is wearing braces, make sure the impression material also covers the brackets at least up until the archwire. Please avoid covering the braces or brackets with wax.



Dental casts of the planned final occlusion

Dental casts separated

Scan of the planned final occlusion

- Fixate the lower and upper cast into the correct occlusion.
 - Tip: Sticking wax to the sides of both casts will fixate the occlusion without causing artifacts in the scan result.
- Place a firm sponge in the scanner (approx. 10 mm thick).
- Place the fixated casts on the sponge in the scanner. Make sure that the occlusal plane is as horizontal as possible.
- Performing the scan:
 - Voxel size: **0.20 mm**
 - Position the casts in the scanner in a similar orientation as in the patient scan.
 - In the case of a medical CT the casts might have to be positioned vertically. Ensure that the impression does not touch the CT table (e.g. by a sponge or similar).

Remove the casts, but **leave the lower sponge in place in the scanner**. This is important to make sure the dental cast scan and the occlusion scan are registered at the same position within the scanner.

Important:

The applied requirements for the dental casts and scanning the patient's skull are identical. Please make sure that the number of the **scan of the planned final occlusion** and the **scan of the dental casts is the same**. Make sure to perform the occlusion scan and the scan of the dental cast with the same scanner and the same scan protocol. Otherwise, case planning cannot be performed.

Make sure to scan the same upper and lower cast to create both the surgery model and the occlusion model.

Scan of the dental casts

- Place the lower cast on the sponge that was left in the scanner after making the occlusion scan, the teeth facing upwards. Make sure the orientation of the dental cast scan is identical to the orientation of the occlusion scan.
- Place another firm sponge (between 2 mm and 10 mm, preferably 5 mm thick) on top of the lower cast. This will ensure a clear distinction between the two casts in the scanned files, without the gap being too big.
- Put the upper cast on top of the sponge, teeth facing downwards.
- Make sure that upper and lower casts are positioned as if they were in a correct occlusion, but separated by the sponge.
- Performing the scan:
 - Voxel size: **0.20 mm**
 - Position the casts in the scanner in a similar orientation as in the patient scan.
 - In the case of a medical CT the casts might have to be positioned vertically. Ensure that the impression does not touch the CT table (e.g. by a sponge or similar).

Virtual segmental surgery

If orthognathic surgery is virtually planned with a **split maxilla**, identical duplicates of the casts will be required. One of the two duplicates is then used for scanning the casts in the planned final occlusion and the other is used for scanning the casts at a distance apart.

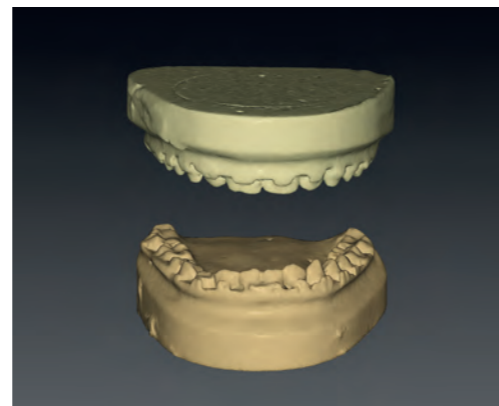
STL-based workflow for dental casts

As an alternative to (CB)CT-scanning the dental cast models, the virtual planning software supports to a limited extent a workflow based on surface-scanned dental cast models (STL files).

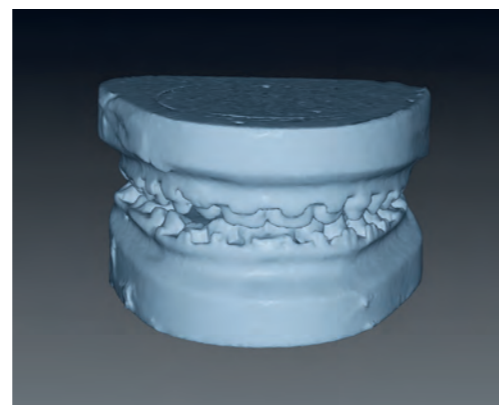
Procedure

These STL files can be obtained by an intraoral scanner or by a dental lab scanner. However, in this STL-based workflow, you need to take into account the following:

- For the dental cast scan, separate STL files for the upper and lower dental models need to be provided. It has to be ensured up front, however, that these models are virtually positioned as they would need to be placed in the case of a CBCT scan.
- The planned final occlusion has to be scanned as one surface model.
- When working with STL files, make sure to preprocess the files in order to close the surface model and turn it into a 'watertight' model before using them in the virtual planning software.
- KLS Martin advises you never to combine STL files and DICOM files in a single patient case.



Scans of the surface models from the dental casts



Scan of the surface model from the planned final occlusion

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 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.



KLS Martin Group

KLS Martin Australia Pty Ltd.

Sydney · Australia
Tel. +61 2 9439 5316
australia@klsmartin.com

KLS Martin do Brasil Ltda.

São Paulo · Brazil
Tel. +55 11 3554 2299
brazil@klsmartin.com

KLS Martin Medical (Shanghai) International Trading Co., Ltd

Shanghai · China
Tel. +86 21 5820 6251
info@klsmartin.com

KLS Martin India Pvt Ltd.

Chennai · India
Tel. +91 44 66 442 300
india@klsmartin.com

KLS Martin Italia S.r.l.

Milan · Italy
Tel. +39 039 605 67 31
info@klsmartin.com

KLS Martin Japan K.K.

Tokyo · Japan
Tel. +81 3 3814 1431
info@klsmartin.com

KLS Martin SE Asia Sdn. Bhd.

Penang · Malaysia
Tel. +604 261 7060
malaysia@klsmartin.com

KLS Martin de México, S.A. de C.V.

Mexico City · Mexico
Tel. +52 55 7572 0944
mexico@klsmartin.com

KLS Martin Nederland B.V.

Huizen · Netherlands
Tel. +31 35 523 45 38
infonl@klsmartin.com

KLS Martin SE & Co. KG

Moscow · Russia
Tel. +7 499 792 76 19
russia@klsmartin.com

KLS Martin Taiwan Ltd.

Taipei · Taiwan
Tel. +886 2 2325 3169
taiwan@klsmartin.com

KLS Martin SE & Co. KG

Dubai · United Arab Emirates
Tel. +971 4 454 16 55
middleeast@klsmartin.com

KLS Martin UK Ltd.

Reading · United Kingdom
Tel. +44 118 467 1500
info.uk@klsmartin.com

KLS Martin LP

Jacksonville · Florida, USA
Tel. +1 904 641 77 46
usa@klsmartin.com

KLS Martin SE Asia Sdn. Bhd.

Hanoi · Vietnam
Tel. +49 7461 706-0
vietnam@klsmartin.com

KLS Martin SE & Co. KG

A company of the KLS Martin Group

KLS Martin Platz 1 · 78532 Tuttlingen · Germany
PO Box 60 · 78501 Tuttlingen · Germany
Tel. +49 7461 706-0 · Fax +49 7461 706-193
info@klsmartin.com · www.klsmartin.com