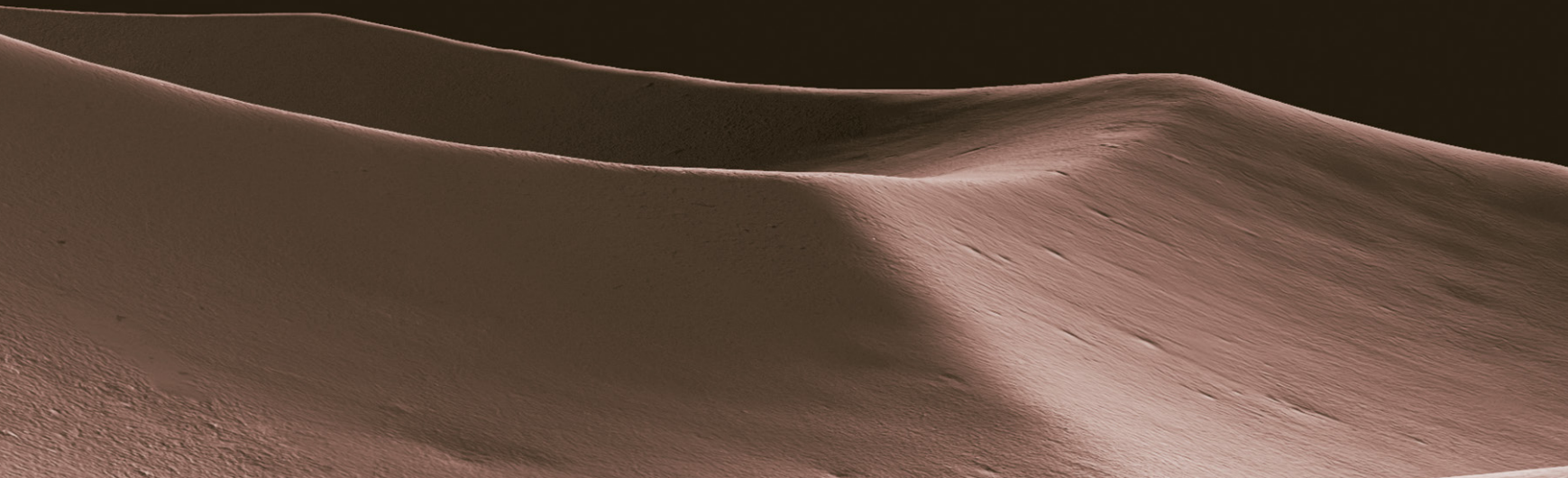
AVINENT CMF

Revolutionizing the medical sector with cranio-maxillofacial solutions

Fully personalized
innovative solutions



At the forefront of personalized medical technology

CV01415 Vers. 3 (05/02/2024)

Innovation and research, **the root of Avinent**

Avinent is a world leader in custom digital solutions, thanks to its commitment to scientific research and technological innovation, which have been its two mainstays throughout more than 40 years of business experience.

Its goal is to build a happier society by improving the quality of life and welfare of people with dental, oral and maxillofacial pathologies.

We will achieve this by expanding our human team, promoting research and exploration into the most advanced technologies to develop, manufacture and market innovative products and services aimed at transforming and improving medical treatments in the oral and maxillofacial sector. This will always be in compliance with the most stringent healthcare standards, respecting our immediate environment and actively collaborating with professionals in the field, to establish strong, long-lasting relationships.

With a **leading Hub** in the medical and dental sector that houses all of the technology we need to develop innovative solutions

The patient's quality of life, **a non-negotiable value**

With research and innovation as its central axes, Avinent CMF is focused on problems in cranio-maxillofacial health.

Avinent CMF aims to fully commit itself to the personalization of medical solutions, the medicine of the future that Avinent wants to make a reality today.

To do this, it offers all its know-how to provide solutions that improve patient quality of life.

From the cutting edge of the digital market, Avinent continues its approach to people's health, seeking to offer a unique and exclusive solution for each patient.

We place the **patient** at the center of the whole process, considering and providing for all their needs and preferences and improving their treatment experience.

1 *A system that guarantees the best results*

Avinent CMF is a line born to offer innovative solutions in multiple areas of the craniomaxillofacial (CMF) field, through the integration of a fully digital and personalized process.

The successful experience of Avinent Implant System in the world of digital odontology, where it is now positioned at the global cutting edge, is the basis for Avinent CMF, with a solid system of new products and tools that guarantee the best results in cranio-maxillofacial restoration.

2 *Personalization to the last detail*

The personalization of solutions and products in the field of medical technology provides the patient with a multitude of advantages, as the product is designed and manufactured in strict accordance with their needs.

3 *At the service of professionals*

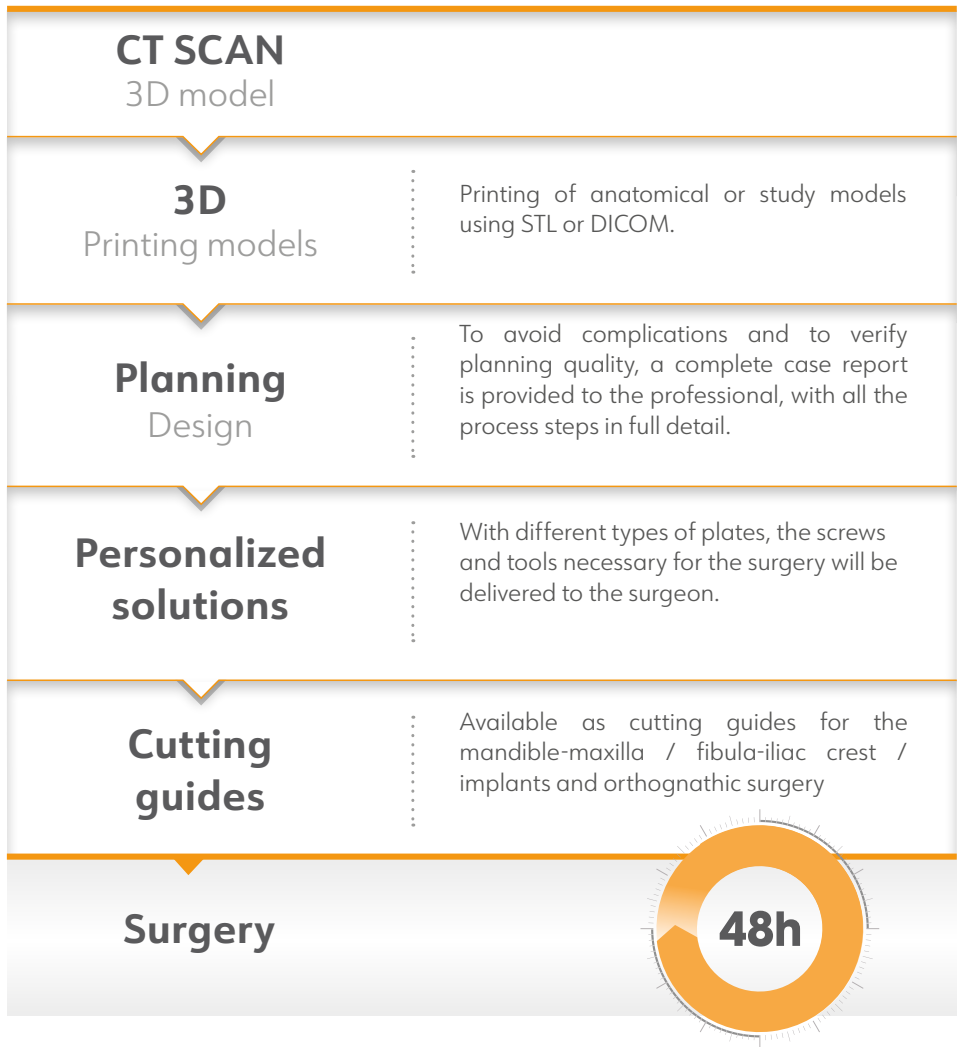
Avinent CMF offers big advantages for professionals. The surgeon has the necessary tools to plan the surgery in advance and check virtually how the whole process is developing in great detail.
This enables us to improve the planning of each case and the surgical practice.

The workflow, **our strong point**

Digital workflow: simple, quick and unique in every case

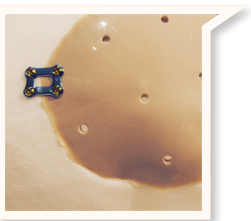
The digital workflow system has been designed to be executed dynamically and safely. This system is developed in constant contact with the doctor and ensures risks to the patient are reduced, thanks to tailored technical support. This reaction time can be as short as just 48 hours.

Based on co-design, this system enables professionals to make detailed plans, receiving the end product with full instructions, to obtain the best results. All of this while maintaining a competitive price.



Varied materials,
a wealth of solutions

Cranio-maxillofacial restorations are very complex and each one is notably different. Therefore, it is very important for clinicians to have products and services with a wide variety of materials and production systems.



MEDICAL GRADE PEEK

Material: Polyether ether ketone

This is a light, biocompatible polymer that is highly resistant to temperature. Its physical characteristics make it comparable to human bone.

RESINS

Material: Acrylic

Acrylic resin is a material with a wide variety of applications, in textures and colors that result in extremely realistic models.

POLYAMIDE 12

Material: Synthetic polymer

Its mechanical properties are magnificent. It is a biocompatible polymer that is stable, rigid and resistant to temperature.

GRADE 23 TITANIUM

Material: Pure titanium

This is a biocompatible alloy with many advantages in specific cases where mechanical function is important. Good adaptation to complex shapes thanks to manufacture technology such as milling and sintering make it a versatile material.

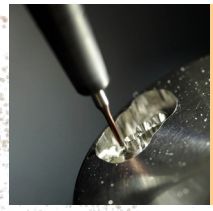
Production processes,
our knowledge is evident in the result

In addition to additive manufacturing technology with different materials and methods, the incorporation of new digital equipment, pioneering on a world level, enables Avinent CMF to offer professionals a wide range of possibilities to take on and resolve any situation.

3D PRINTING ZONE

All under control

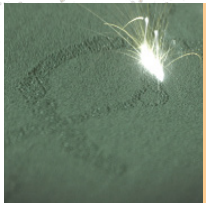
Avinent CMF has an area for 3D printing, the "3D printing zone", fully certified at medical level. It has all the specifications and characteristics that enable us to monitor all the conditions in the productive area.



DRILLING

The safety of years of experience

Through years of research and development, Avinent has become an expert in milling systems. Thus, HSM milling technology makes it possible to obtain custom pieces without modifying the material's structure, which remains homogenous, with no alterations, distortions or tensions in the final result.



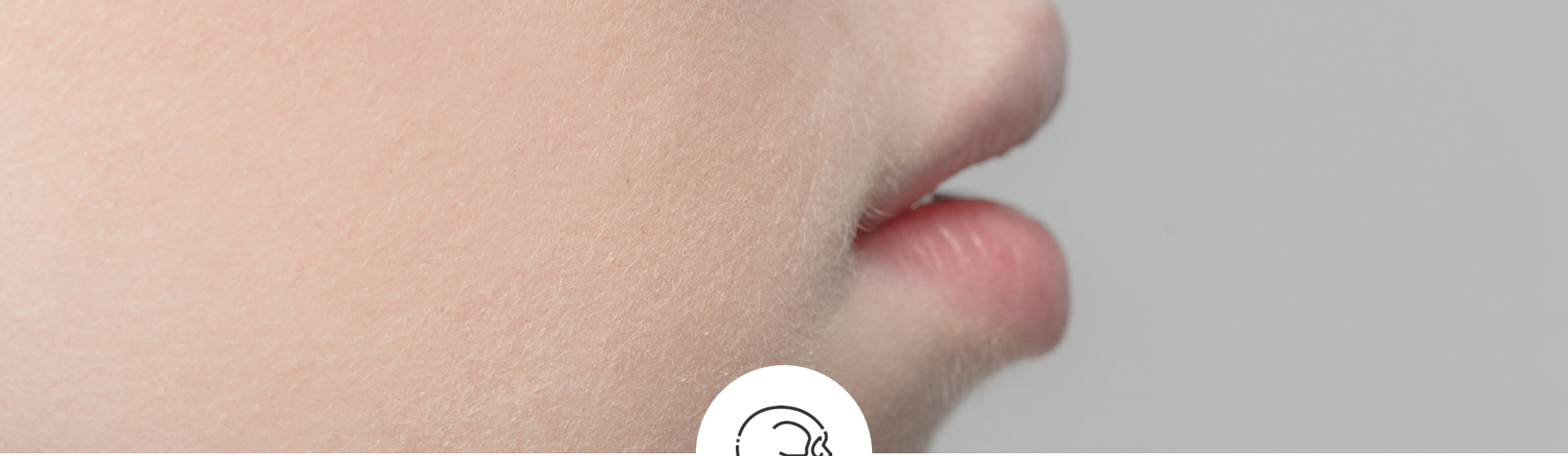
SELECTIVE LASER SINTERING

Pioneers in the 3D printing of titanium

The selective laser melting technology makes it possible to obtain a wide range of properties in a part. Similarly, layered production gives good freedom when designing the manufacture of complex geometries.

CMF PRODUCTS AND SERVICES

A commitment to personalized medical solutions through scientific research and technological innovation, the hallmark of all Avinent CMF products and services

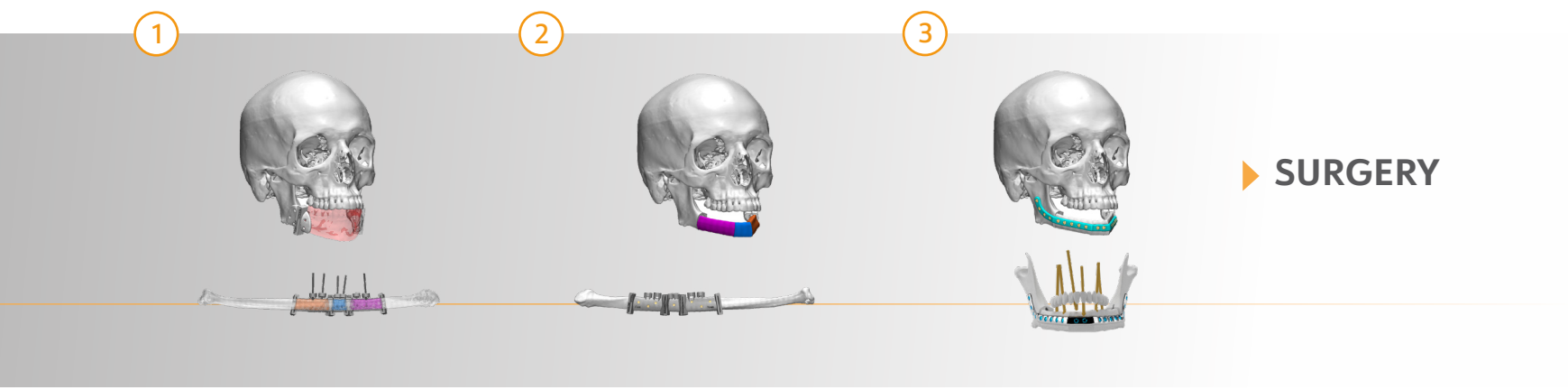


Reconstructive Surgery

Detailed planning for the most complete surgery

Avinent CMF complete reconstructive surgery is available with and without implants, and considers all variables that a restoration may entail. In the case of reconstructive surgery with implants, depending on the case, a dental prosthesis will be designed and then the implants will be designed that will placed directly in the fibula (depending on the prosthesis), and then taken directly to the mandible. In both cases, the procedure will be planned and designed in detail.

What is our **workflow** in reconstructive surgery?



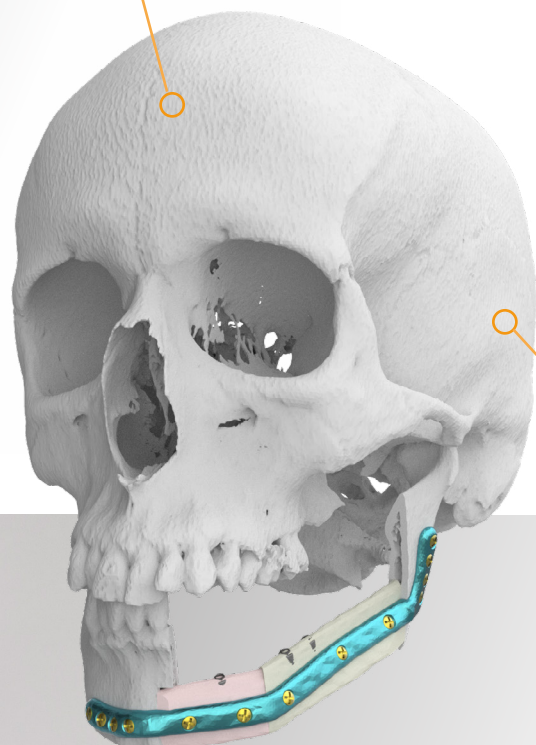
Initial situation | Virtual planning | Personalized plate

At the end of the planning stage, the surgeon receives a detailed report for approval, with all the specifications.

SOLUTIONS

- We provide the option of using **surgical guides** that ensure the perfect planning of the case.
- **Personalized plate**, designed alongside our bioengineering team. Fits the patient's skull perfectly .
- Provision of a **surgical kit** to help carry out the procedure
- **Printed model** to make it possible to practice with a study of the case.
- Avinent is able to supply the **dental implants** needed to carry out the surgery

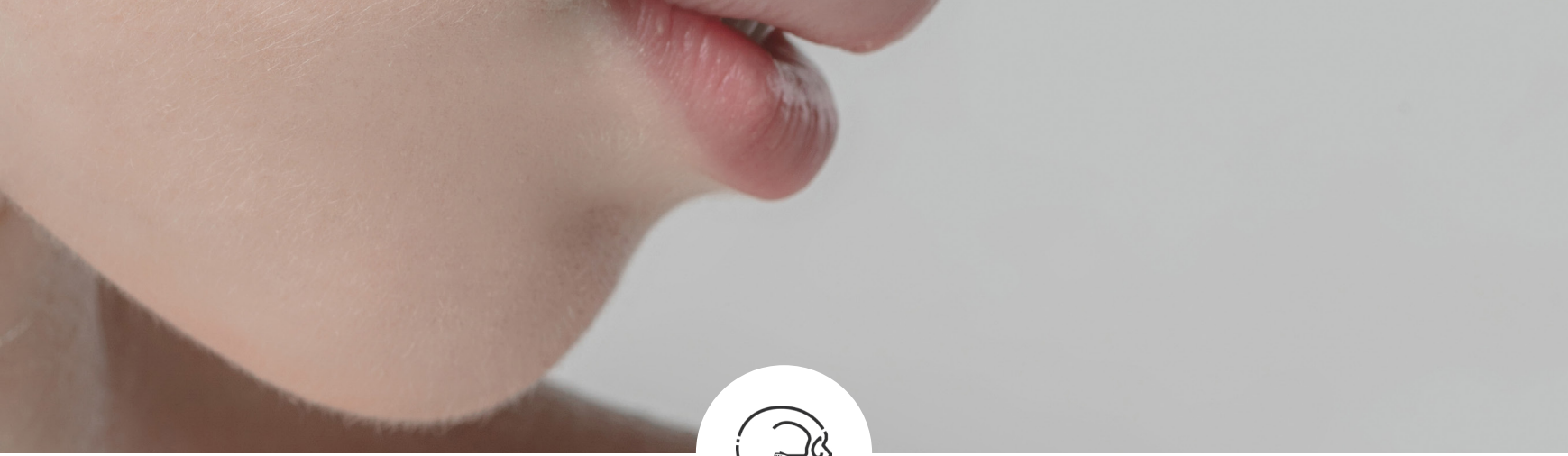
With this surgery the patient recovers significant chewing function and better esthetics than could be obtained with conventional surgery.



DIFFERENTIAL FACTOR

- **Virtual planning**

When reconstructing the patient's anatomy, we recover their chewing function using the dental implant drilling guide in the fibula and improve the esthetic result by combining the restoration with volumes of PEEK that reconstruct the correct anatomy of the patient.



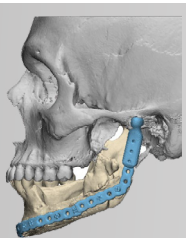
TMJ surgery

Precision, the key to success

Avinent CMF has 3D design and planning software that allows the surgeon to observe movements in advance. In TMJ correction surgery, the prosthesis must fit perfectly to guarantee function for the patient. In the pre-operative stage it is possible to predict actions and minimize risks. TMJ restorations must fit to the millimeter; so printing the model of the plate and testing it in advance in the printed study model greatly help the functional success of the operation.

How is the TMJ surgery designed?

1



Initial situation

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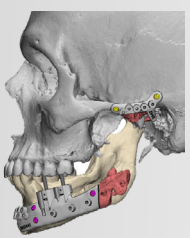
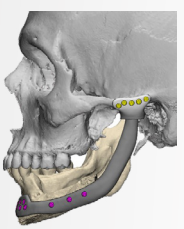


Virtual planning

3



Personalized prostheses

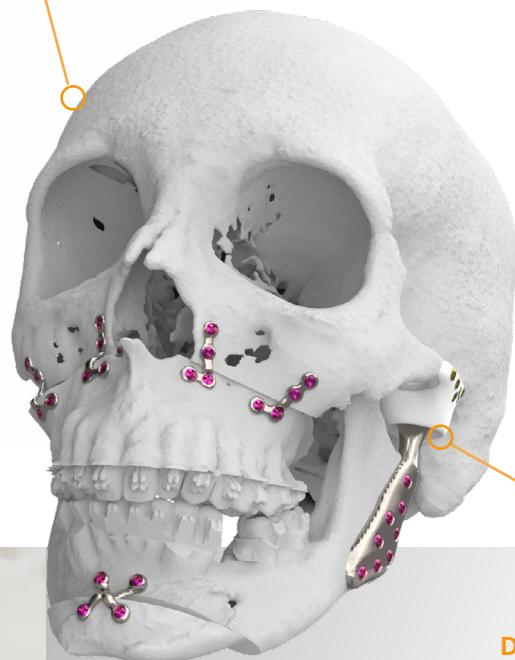
SURGERY

At the end of the planning stage, the surgeon receives a detailed report for approval, with all the specifications.

SOLUTIONS

- We provide the option of using **surgical guides** that ensure the perfect planning of the case.
- **Personalized prostheses**, designed alongside our bioengineering team. Fits the patient's skull perfectly
- Provision of a **surgical kit** to help carry out the procedure
- **Printed model** to make it possible to practice with a study of the case.
- We offer **surgical guides for positioning** to ensure maximum predictability in the final result.

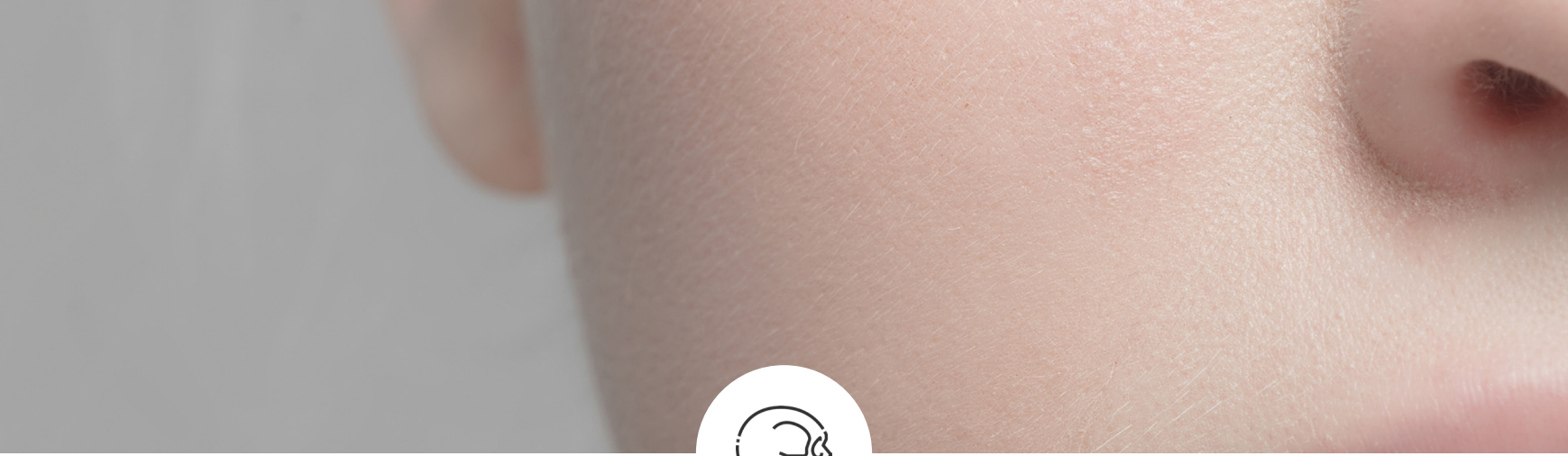
The surgeon can plan the restoration using all of the information obtained with Avinent CMF, minimizing any risk.



DIFFERENTIAL FACTOR

- **Printed model**

During the planning, we offer the professional the printed models of the patient alongside the models of the TMJ prosthesis in Polyamide so they can analyze the joint function in detail. Thus, we ensure an optimum balance for each case and can proceed to manufacture the plate and fossa based on the revision of the physical models.



Orthognathic Surgery

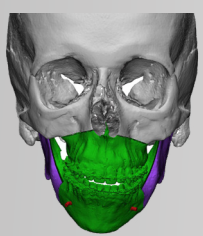
The best results thanks to surgical guides

In orthognathic surgery, it is a great help to study surgical movements to predict the changes that the soft tissues will undergo. By studying and preparing a virtual osteotomy, Avinent CMF obtains the exact cutting direction to create a surgical guide that the professional will use to guide the procedure.

Aside from surgical guides, Avinent CMF designs intermediate and final positioning guides to aid the professional during the osteotomy, as well as the personalized plates for securing it in the final position that is planned virtually.

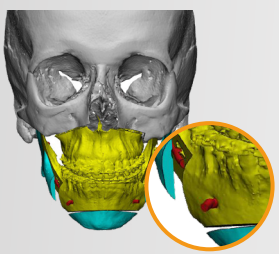
What is our **workflow** in orthognathic surgery?

1



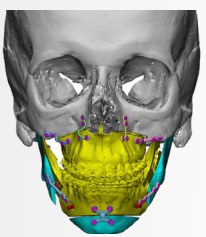
Initial situation

2



Planning and guide

3



Personalized plate

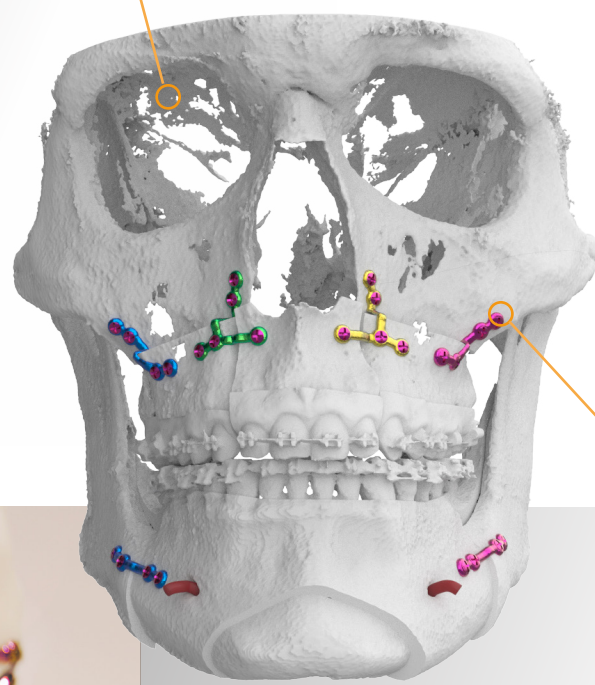
SURGERY

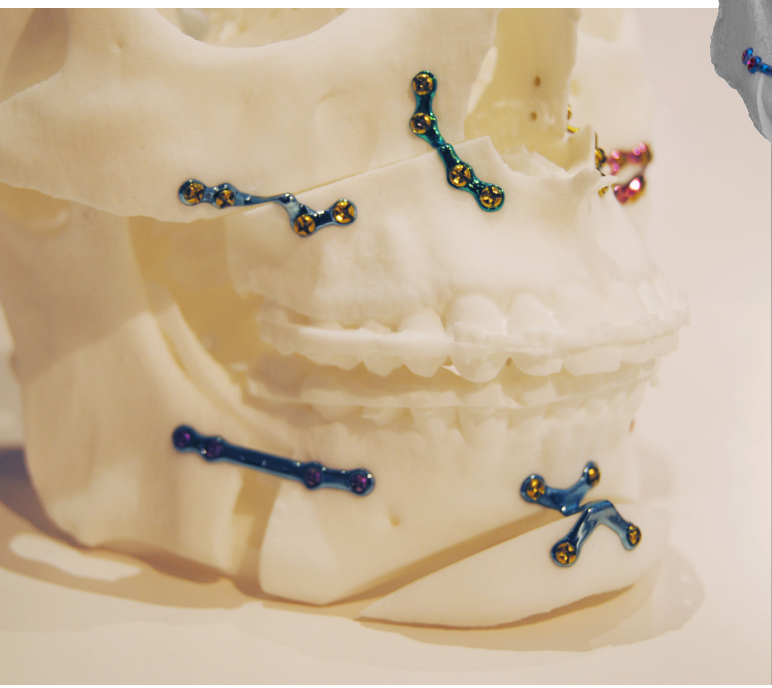
At the end of the planning stage, the surgeon receives a detailed report for approval, with all the specifications.

SOLUTIONS

- We provide the option of using **surgical guides** that ensure the perfect planning of the case.
- **Personalized plate**, designed alongside our bioengineering team. Fits the patient's skull perfectly .
- Provision of a **surgical kit** to help carry out the procedure
- **Printed model** to make it possible to practice with a study of the case.
- We offer **surgical guides for positioning** to ensure maximum predictability in the final result.

Correct functional and esthetic problems related to mandibular growth, a poor bite or uneven facial appearance.

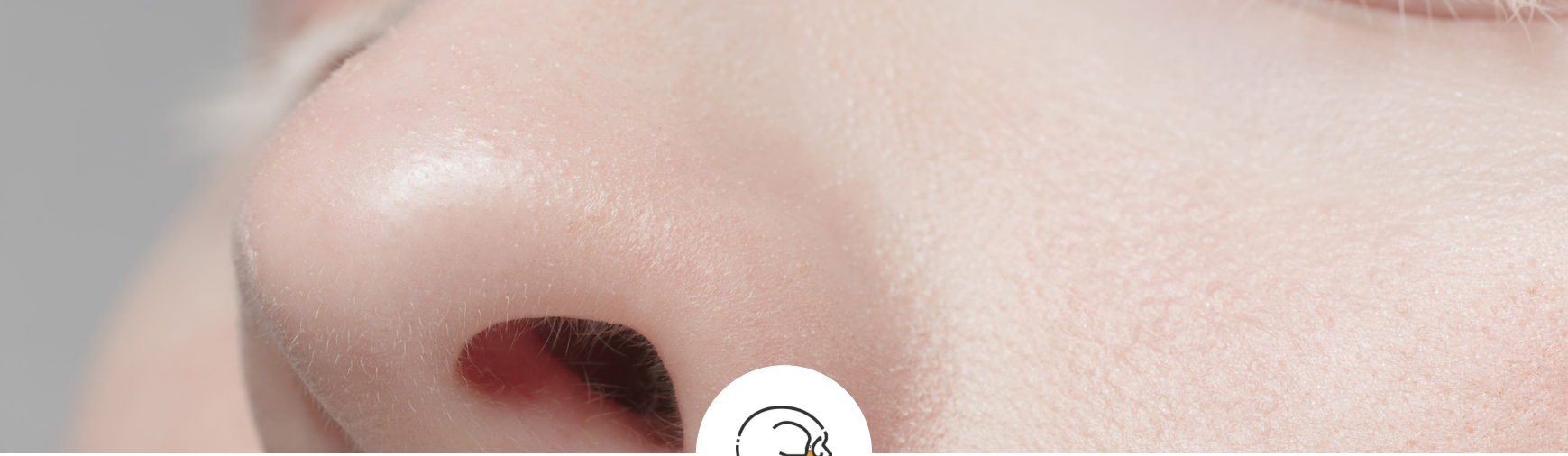




DIFFERENTIAL FACTOR

- **Anodized color**

By giving each of the plates a different surface color, we ensure they can be differentiated and thus positioned correctly during the surgery.



Surgery for panfacial fractures

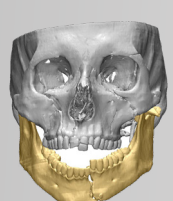
Competitive advantages for a delicate process

Panfacial fracture surgery is highly complex, as the restoration process is very delicate. One of the advantages of virtual planning is being able to study the movements of the bone structure in these fractures.

With the virtual surgical movements, it is possible to correct defects and design positioning guides to facilitate the surgeon's work. This plan will then be used to design fully personalized plates. With the detailed report with the specifications, within its range of solutions Avinent CMF offers positioning guides.

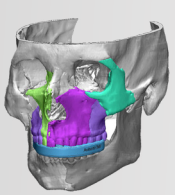
What is our **workflow** in panfacial surgery?

1



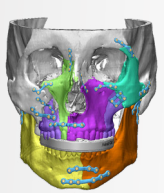
Initial situation

2



Planning and positioning guide

3



Positioning guide + personalized plates

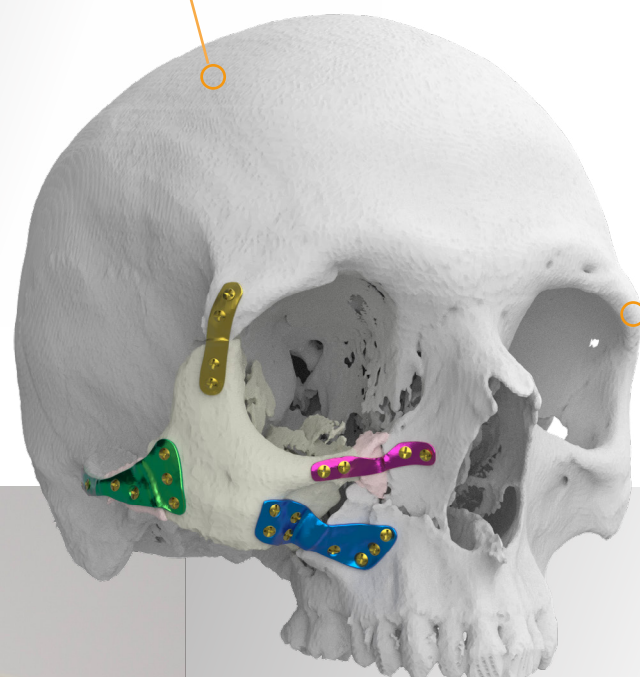
SURGERY

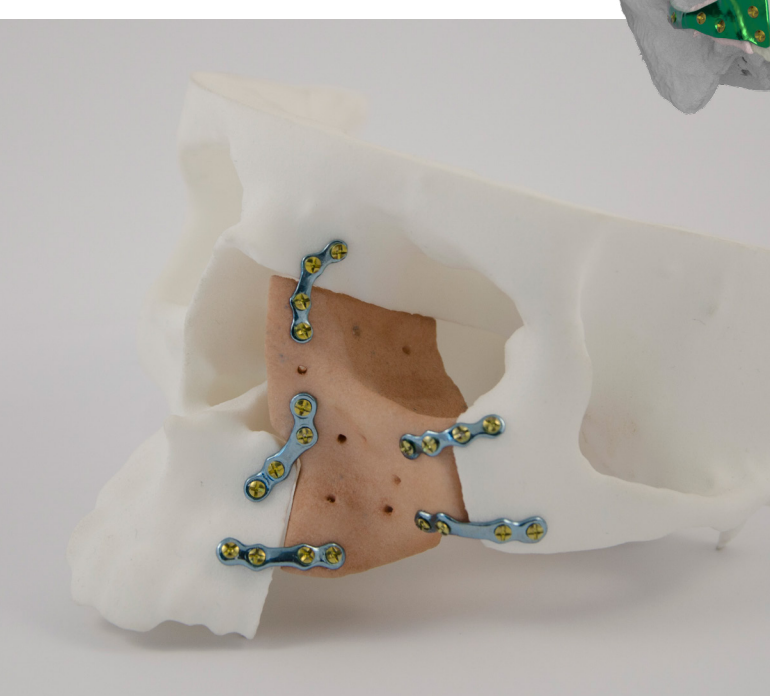
At the end of the planning stage, the surgeon receives a detailed report for approval, with all the specifications.

SOLUTIONS

- **Personalized plates**, designed alongside our bioengineering team. This adapts perfectly to the patient's fractures.
- Provision of a **surgical kit** to help carry out the procedure
- **Printed model** to make it possible to practice with a study of the case.
- We offer **surgical guides for positioning** to ensure maximum predictability in the final result.

Reposition fractures in their initial functional position to facilitate the delicate process of anatomical restoration.





DIFFERENTIAL FACTOR

- **Planning and anodizing**

Being able to work with the symmetry of the healthy side and simulate the correct position of the fractured fragments makes it possible to achieve an optimum functional and esthetic result for the patient. In addition, differentiating the various plates with different colors facilitates the surgeon's work during the surgery.

Eye socket surgery

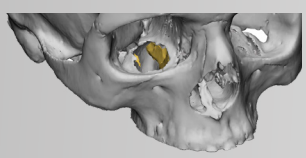
The perfect fit, with the patient in mind

Using the data obtained of the .STL files or CT scan of the patient, Avinent CMF can design an implant that perfectly suits the anatomical characteristics of the human eye socket in any situation.

This process makes it possible to carry out an exact reconstruction of the defects, even in cases of significant biparietal fractures. We design and produce with the patient's final welfare in mind.

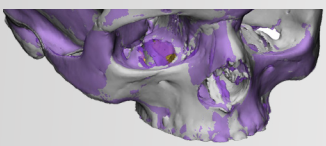
What is our **workflow** in eye socket surgery?

1



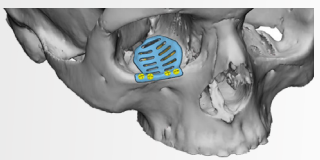
Initial situation

2



Virtual planning

3



Personalized eye socket

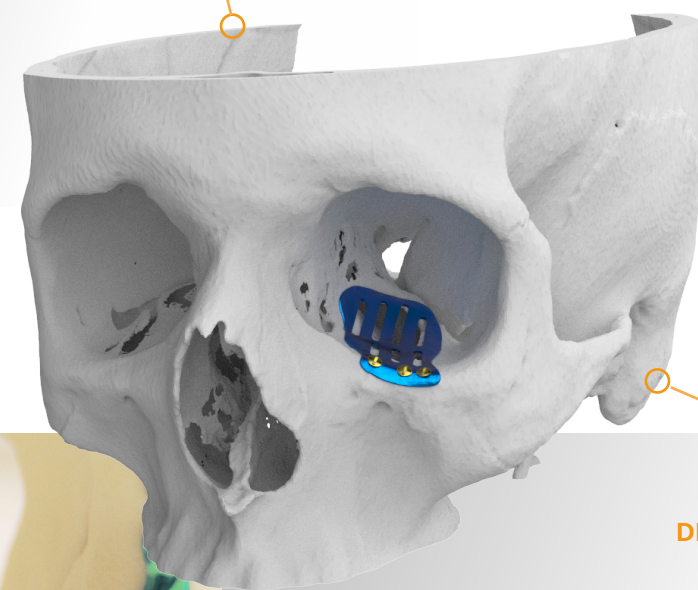
SURGERY

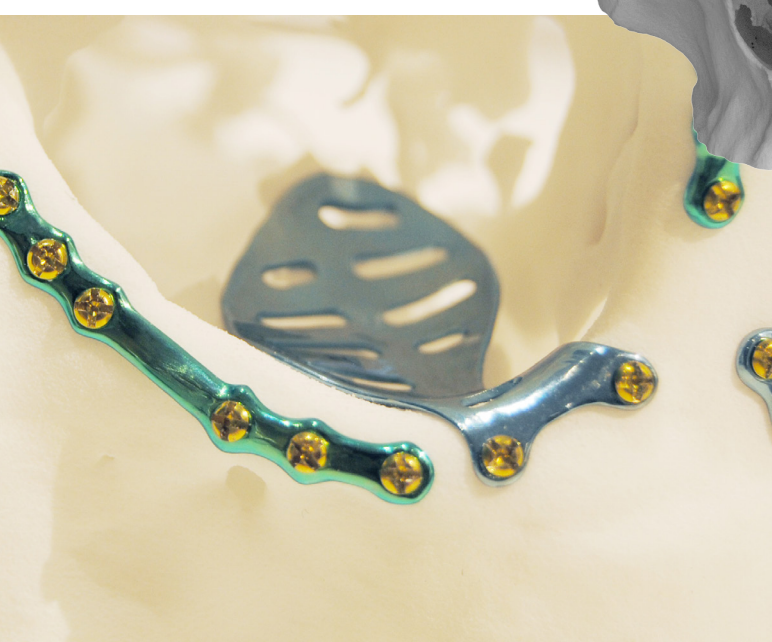
At the end of the planning stage, the surgeon receives a detailed report for approval, with all the specifications.

SOLUTIONS

- We provide the option of using **surgical guides** that ensure the decompression of the eye socket
- **Personalized eye socket**, designed alongside our bioengineering team. Fits the patient's eye socket perfectly .
- Provision of a **surgical kit** to help carry out the procedure
- **Printed model** to make it possible to practice with a study of the case.

The use of 3D study models is essential in these cases, as the symmetry of the orbital floors requires special attention when designing the plate





DIFFERENTIAL FACTOR

- **Absolute precision**

Its compete adaptation to the floor fracture and the patient's anatomy provide perfect precision in its positioning, to the extent it is not even necessary to secure it with screws.

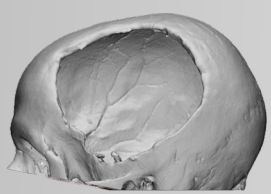
Craniofacial surgery

Increases accuracy, improves the procedure

Virtual planning, in conjunction with anatomical stereolithographic models, helps the specialist plan the surgery and thus reduce its duration. Visualization of the soft and hard tissue deformations gives the procedure greater predictability. If the surgeon needs to design and plan surgical guides, Avinent CMF has all the virtual information to increase the accuracy of the design, as well as the pre- and post-op stages of the implant.

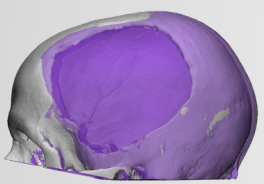
What is our **workflow** in cranio-maxillofacial surgery?

1



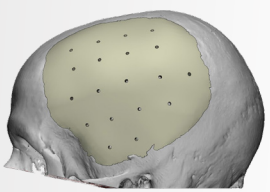
Initial situation

2



Virtual planning

3



Personalized prostheses

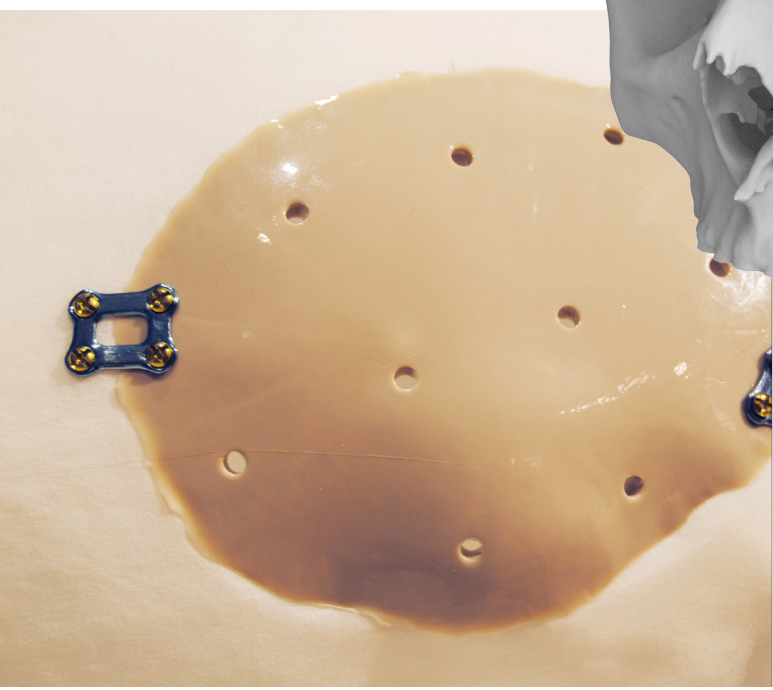
SURGERY

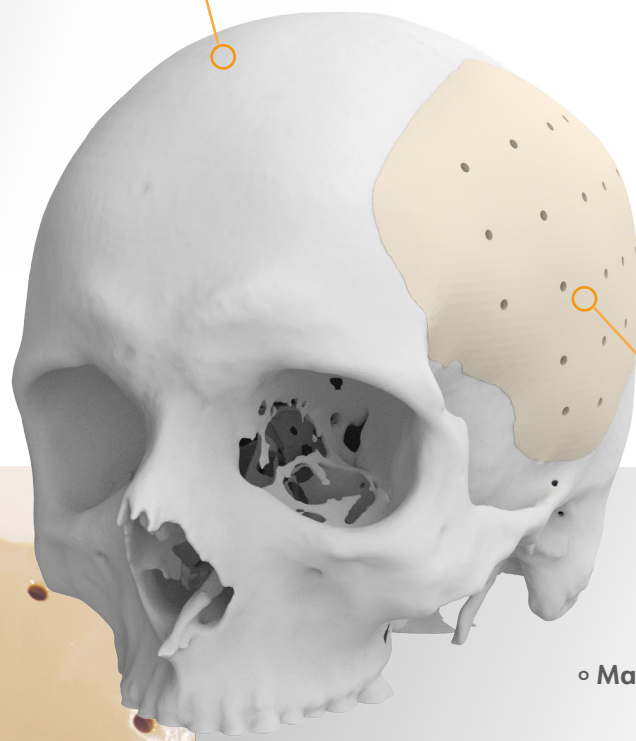
At the end of the planning stage, the surgeon receives a detailed report for approval, with all the specifications.

SOLUTIONS

- We provide the option of using **surgical guides** that ensure the perfect adaptation of the implant.
- **Personalized prostheses**, designed alongside our bioengineering team. Fits the patient's skull perfectly
- Provision of a **surgical kit** to help carry out the procedure
- **Printed model** to make it possible to practice with a study of the case.

In craniofacial surgery, **cutting guides** can be used, so AVINENT CMF offers the most efficient model of products and services.





DIFFERENTIAL FACTOR

- **Materials and technology**

The possibility of manufacturing them in PEEK or Titanium provides good versatility to our cranioplasty solutions. In addition, the size of the defect to reconstruct is not a limiting factor due to the different manufacture solutions available to us.

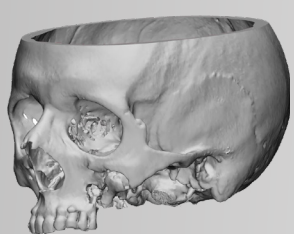
Personalized implant surgery for the temporal muscle

An advanced solution for an accurate result

To replace the temporal muscle, we can use a number of transformations in the architecture of the implant for ideal technical characteristics. This surgical procedure is carried out to replace the temporal muscles of the face, used to reconstruct other areas that need them.

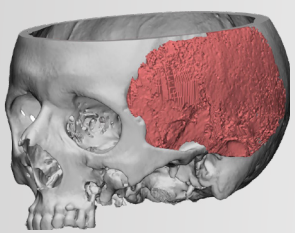
What is our **workflow** personalized implant surgery for the temporal muscle?

1



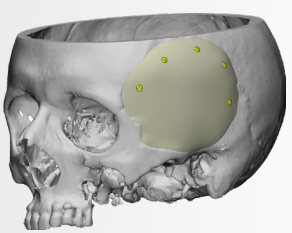
Initial situation

2



Virtual planning

3



Personalized prostheses

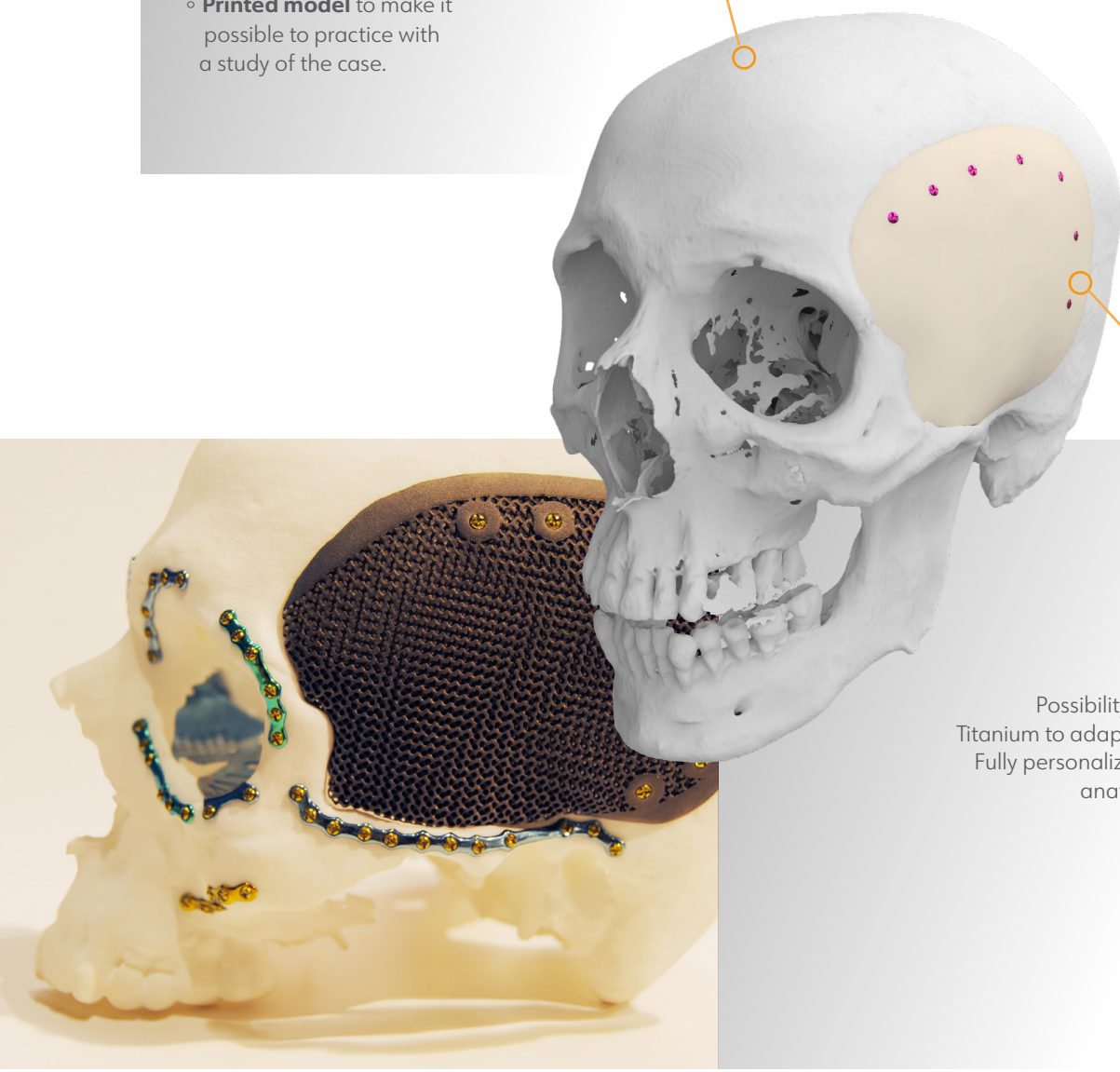
SURGERY

At the end of the planning stage, the surgeon receives a detailed report for approval, with all the specifications.

SOLUTIONS

- **Personalized prostheses**, designed alongside our bioengineering team. Fits the patient's skull perfectly
- Provision of a **surgical kit** to help carry out the procedure
- **Printed model** to make it possible to practice with a study of the case.

In personalized implant surgery for the temporal muscle, we seek to design an implant that **adapts** perfectly to the shape of the patient's muscle.



DIFFERENTIAL FACTOR

- **Titanium or PEEK**

Possibility of manufacture in PEEK or Titanium to adapt to the needs of each case. Fully personalized to adapt to the patient's anatomy and final appearance.

PEEK implant surgery to provide volume

An advanced solution for an accurate result

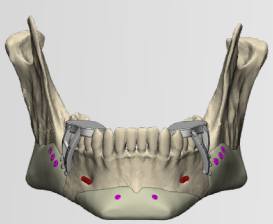
We use PEEK for proper accurate reconstructions of the cheekbone, mandibular angle and chin, among others, since it is a fully biocompatible material. The virtual design and the 3D printing of the models can help ensure the success of the treatment and enable 100% accurate work. This type of implant improves the appearance and definition of certain muscles and is specifically designed for each patient.

What is our **workflow** in surgery using PEEK implants to provide volume?

1

Initial situation

2



Virtual planning

3

Personalized prostheses

SURGERY

At the end of the planning stage, the surgeon receives a detailed report for approval, with all the specifications.

SOLUTIONS

- We provide the option of using **surgical guides** that ensure the position planned.
- **Personalized prostheses**, designed alongside our bioengineering team. Fits the patient's skull perfectly.
- Provision of a **surgical kit** to help carry out the procedure.
- **Printed model** to make it possible to practice with a study of the case.

PEEK implants are designed to provide volume, taking into account the **patient's anatomy and facial characteristics** to achieve a natural, realistic result.

DIFFERENTIAL FACTOR

- **Positioning guides**

Apart from having the anatomical reference perfectly defined, we can offer positioning guides that increase accuracy in their placement.

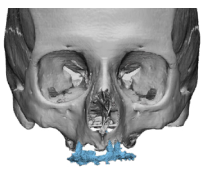
Surgery with personalized subperiosteal implants

For cases of severe maxillary atrophy

Avinent's subperiosteal implants (ISP) are fully personalized and adapted to the basal bone of cases with severe maxillary atrophy that are not candidates for a standard endosseous implant treatment. They are adapted to the bone structure of each patient, anchored in the areas with the best bone quality, enabling a fixed dental restoration to be passively secured to the connections of the titanium structure. It is designed to offer excellent esthetic and functional results for the patient and provide the clinician with the security of obtaining the results they had planned.

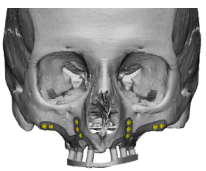
What is our **workflow** in surgery with ISP?

1



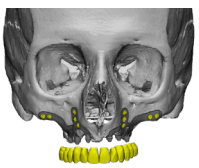
Initial situation

2



Virtual planning

3



Personalized mesh

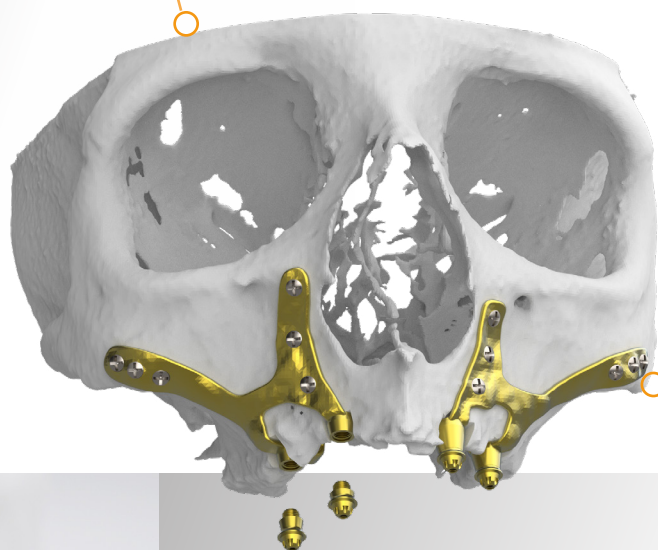
SURGERY

At the end of the planning stage, the surgeon receives a detailed report for approval, with all the specifications.

SOLUTIONS

- We provide the option of using **surgical guides** that ensure the perfect positioning of the connections.
- **Personalized mesh**, designed alongside our bioengineering team. Fits the patient's skull perfectly
- Provision of a **surgical kit** to help carry out the procedure
- **Printed model** to make it possible to practice with a study of the case.

A treatment that improves the whole process, the surgery, the post-operative period and the patient's overall experience.



DIFFERENTIAL FACTOR

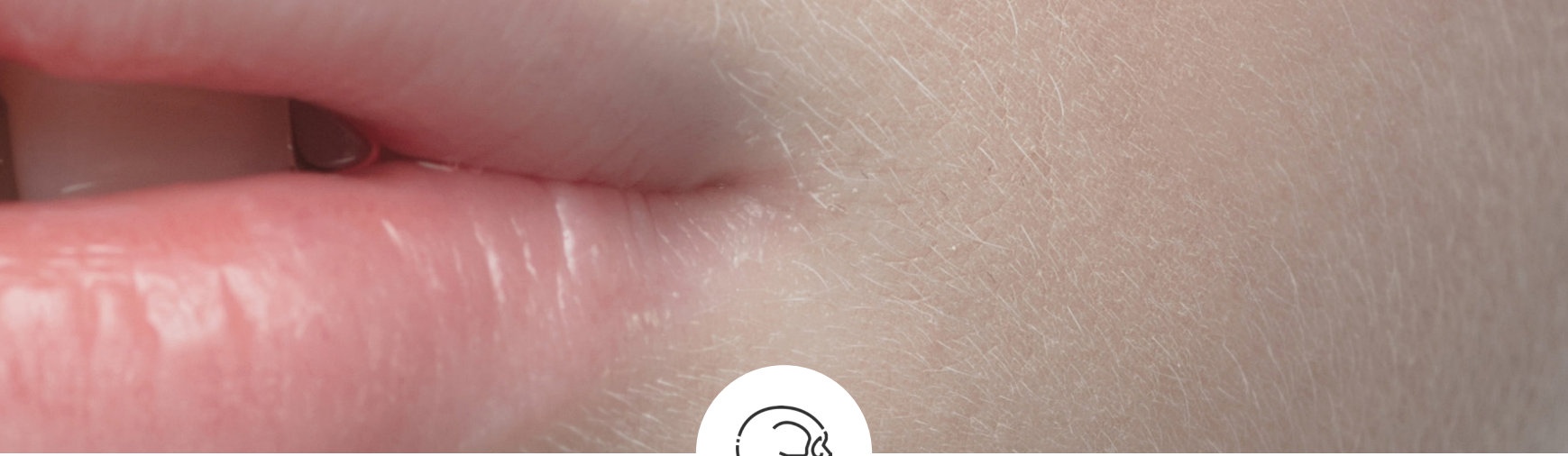
- **Prosthetic versatility**

Our experience in the world of dental implantology enables us to offer a variety of solutions using different connections for the ISP depending on the requirements of the subsequent prosthetic restoration.

- **Specific Transepithelial Abutments for Subperiosteal implants**

With a convergent design without edges that guarantees the continuity of the connection, favoring the adaptation of the mucosa and allowing good vascularization to ensure long-term tissue stability.

* Transepithelial abutments must be used with screwdrivers 0328 and 0726, with a torque of 35 Ncm



Regenerative surgery

Customized to the needs of the surgery

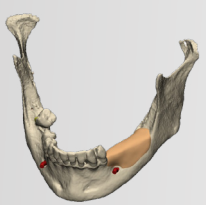
The titanium mesh with a custom design adapted to the shape of the defect and with a high level of mechanical stability is used to simulate the space in guided bone regeneration treatments. The co-design process between the clinician and a biomedical engineering team makes it possible to personalize the mesh template or design an occlusal barrier that fully adapts to the bone defect, which prevents the manual handling of the mesh during surgery. This reduces surgery times and ensures subsequent restoration treatment needs are completely fulfilled.

What is our **workflow** in regenerative surgery?

1

Initial situation

2



Virtual planning

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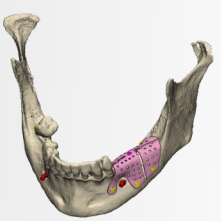


Personalized mesh

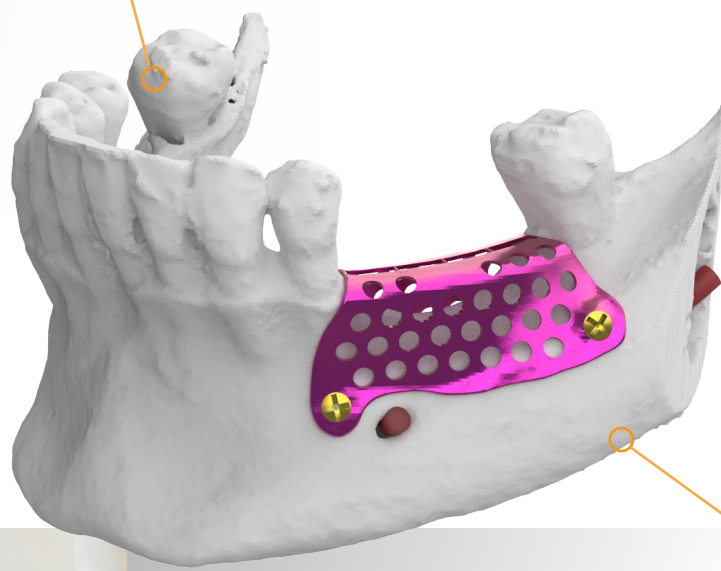
SURGERY

At the end of the planning stage, the surgeon receives a detailed report for approval, with all the specifications.

SOLUTIONS

- **Personalized mesh**, designed alongside our bioengineering team. Adapts perfectly to the patient's defect .
- Provision of a **surgical kit** to help carry out the procedure
- **Printed model** to make it possible to practice with a study of the case.

The optimized thicknesses and the position of the screws provide a stable closure of the tissues, reducing the risk of exposure.



DIFFERENTIAL FACTOR

◦ Upper groove

Once the volume to regenerate has been simulated, we design the mesh taking into account the possibility of placing dental implants in the future without removing the mesh. We also adapt its design to improve its removal once the bone has been regenerated.

◦ Design of the mesh

We design the mesh with a template that is custom made for each clinical case

Extremely realistic models, **an exhaustive study of the case**

From start to finish. With all the materials and technologies.

Avinent CMF uses 3D printing to produce model of organs to simulate surgery, thus reducing operating times and providing reassurance for the patient and the professional, offering the specialist a complete digital flow that notably increases the predictability of the case.

Thanks to a wide range of additive manufacturing technologies, 3D printing methods and materials, highly realistic results can be obtained, designed to prepare cases, offering health professionals a wide range of possibilities to take on and resolve any situation.

We have the possibility of printing with the most advanced technologies including material jetting, SLA, DLP, CDLP, MultiJet, SLS, LSD and SML, all printed with optimum, sterilizable materials. Extremely realistic models, designed with the patient in mind, so you achieve the results you are expecting.

In addition, these hyperrealistic models are of great use during clinical practice and in the training of future professionals.

Surgical instruments, **solutions for everything**

Teaming up with Titamed

Avinent CMF provides all the surgical instruments required to carry out operations. Our surgical instruments, such as the screws and screwdrivers supplied, are designed to solve all types of cases and respond to the multiple variables with regard to dimensions.

With Titamed we offer different measurements depending on the prosthesis, the case and objective of the procedure. The principal challenge of these tools lies in being as versatile as possible, in any type of situation, to ensure optimum accuracy.

titamed.

This surgical kit box is designed to facilitate the surgeon's work as it makes it possible to keep the equipment needed for the procedure organized and quick and easy to access.

Depending on the needs of each case and the prosthesis designed, there are a wide range of dimensions to respond to the multiple variables of a procedure.

Lengths

Available from 4 mm to 18 mm

The availability of screw lengths in relation to its diameter varies depending on the application of each of them.

Diameters

1.6-1.9-2.2

1.9-2.2

2.1-2.4-2.7

The emergence diameters are designed for possible complications during the placement of the plate.

Co-design, **the key to success**

Alongside the best professionals

Co-design between the doctors and Avinent's bioengineering team leads to more accurate decision-making with the perspective and experience of both fields, to achieve the perfect final result.

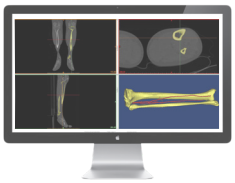
Preparing for surgery becomes a collaborative practice that seeks to make use of the knowledge and skills of both disciplines, to improve the surgical process and the results for the patient, implementing more efficient, custom solutions.

This process entails close collaboration in the stages of planning and preparing for surgery.

Segmentation,
digital versatility

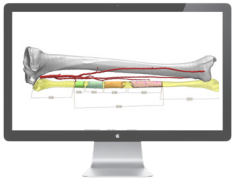
Avinent CMF obtains all of the information from the CT scan and converts it into a virtual file, so it can be viewed and printed in 3D.

This is very advantageous to the professional, as they can obtain detailed information on the affected area of the patient, analyzing the dimensions of the injury and simulating the optimum restoration.



CT SCAN

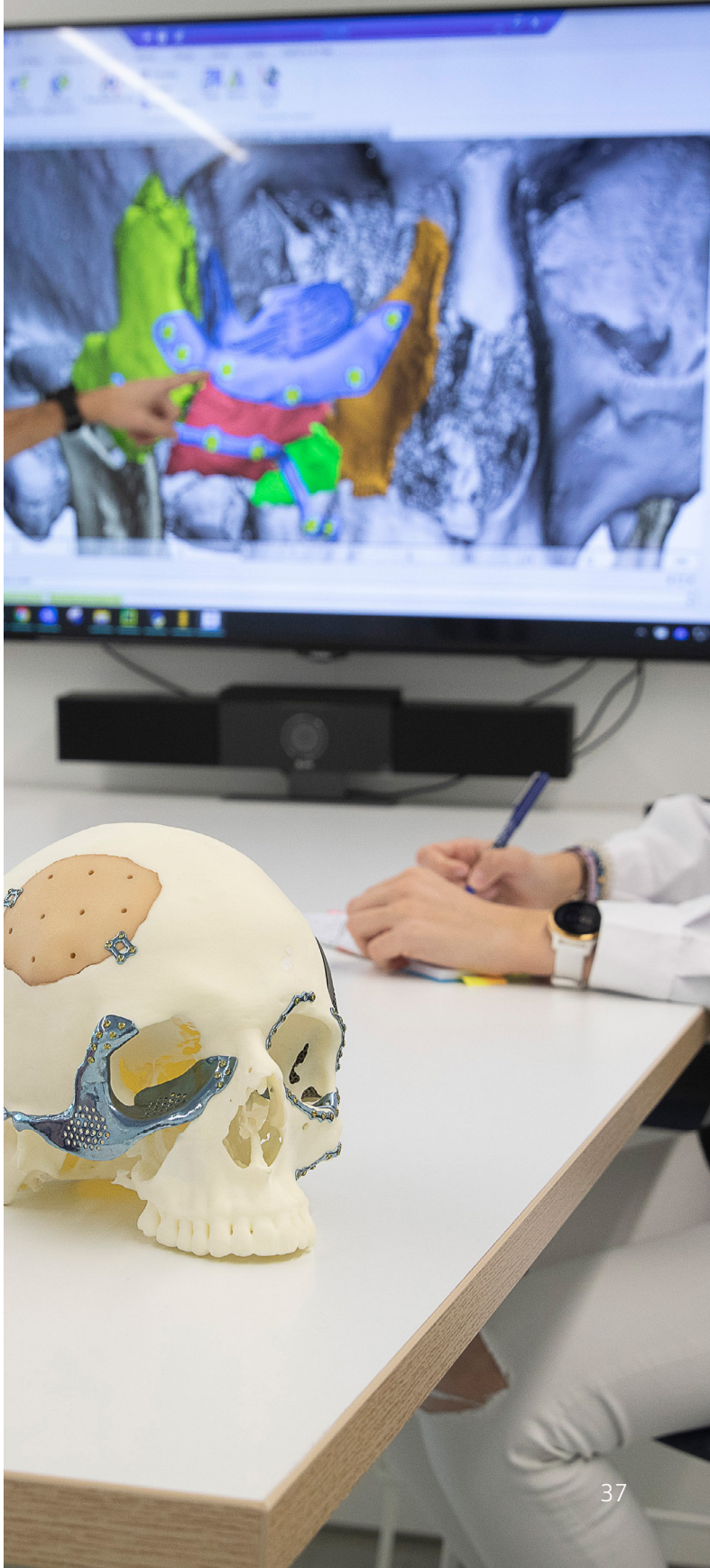
First the CT scan of the patient is needed in .DICOM



Segmentation

Then an Avinent CMF technician will conduct the segmentation reconstructing it in 3D.

It will then be evaluated as to whether to do 3D printing, virtual planning, 3D design or reconstruction.



Innovation and customization from start to finish.

Avinent CMF provides answers to people's health problems with personalized solutions, the result of extensive work in scientific research and technological innovation.

Avinent CMF is a line that began with the objective of improving the patients' quality of life and facilitating surgical practice for professionals. The company's successful business experience, as well as its positioning at the cutting edge of the digital world, is the solid base on which Avinent CMF was founded.

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