

## THE CLINICAL CASE

Simple implant-prosthetic rehabilitation  
in the era of 3D printing

## DIGITAL@LYRAETK

i-PHYSIO®.  
Revolutionizing implantology

## THE INTERVIEW

The simplification and rationalization of  
implant prosthetics with i-Physio®



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## Digital the beautiful, **indeed wonderful one**

**D**ear Friends and Colleagues,  
In this issue of DentalTech we talk about **#fulldigital #modelfree** and therefore we talk about the digital workflow for the rehabilitation of single tooth gaps or partial edentulism, with implant-supported prosthetic restorations. Here we show you an example of simple and accurate digital workflow, that is also beautiful because it can be easily handled by everyone: democratic! We are talking about intraoral scanning with i-Physio® protocol by Lyra ETK and 3D printing with Dfab® by DWS Systems. Why i-Physio®? Because it is a scan healing abutment that is inserted immediately with the implant (even better if the implant is a post-extraction one, to fully exploit the healing potential of the surgical site) and is never removed, until the definitive restoration is delivered. i-Physio® is available in different shapes and heights, therefore it is ideal for preparing the tissues for the delivery of the definitive abutment, which will take place without problems. With i-Physio® scanning is simplified: there is no need to unscrew anything, you simply capture the master model with the scan healing abutment in situ, the antagonist and the bite. In the case of scanners with a high resolution (HR) option such as the iTERO Element 5D Plus®, it is always possible to integrate the additional scan of the scan healing abutment into HR. The scan is sent to the dental technician who, starting from a high quality mesh/library overlay, models in CAD. The CAD models can be manufactured through a chairside additive protocol, with the Dfab® printer, printing a superstructure in Irix Max®, a hybrid composite material certified as definitive (because it is loaded with 42% ceramic) to be cemented extraorally on ti-bases supplied by the implant company, and to be delivered immediately (screw-retained solution); or as in the case we present here, the CAD files of the individual abutments are sent to the implant company for the manufacture of the custom abutments, whereas the prosthetic structure is printed directly in the dental office in Irix Max®, with Dfab® (cemented solution), which we always prefer, even if it's not chairside). It's up to you!  
Finally, I take this opportunity to invite you all to **the International Congress of the Digital Dentistry Society (DDS) (<https://conference.digital-dentistry.org/>) that I am organizing in Florence, Italy from 18 to 19 October 2024**. We will present many interesting things and at least two atomic innovations that will change the world of implant dentistry. The Congress will consist of a series of debates between the best researchers and clinicians in the world, on the topic of digital technologies in clinical practice. An extraordinary event, of the highest scientific level. Looking forward to seeing you all in Florence!

*Francesco Mangano*

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**Prof. Carlo Mangano**

*Medical Surgeon,  
Specialist in  
Anesthesia and  
Resuscitation and  
Odontostomatology.  
Founding Member  
and Past President of  
DDS (Digital Dentistry  
Society).*



## Simple implant-prosthetic rehabilitation in the era of 3D printing

We present a case of partial edentulous rehabilitation achieved through an easy, **#fulldigital #model-free** protocol. This involved an implant-supported bridge molded from hybrid composite material (filled with 42% ceramic and certified as a definitive restoration) using modern TSLA (til-tered stereolithography) technology with a Dfab® printer (DWS Systems, Thiene, Vicenza, Italy). The restoration was cemented onto custom abutments milled by the Implant Company.

The patient, a 65-year-old male with no general health problems and good oral hygiene, came to our attention for the resolution of a problem of multiple edentulousness, affecting elements #14 and #15 (right upper first and second premolar). The implants chosen for prosthetic rehabilitation were NATURACTIS (LYRA ETK, Sallanches, France). At the same time as the implants were inserted, the most suitable scannable healing

abutments type i-PHYSIO® (LYRA ETK) were screwed onto them, carefully selected according to the type of tooth to be replaced, and the thickness and height of the peri-implant soft tissues present. These abutments serve the dual function of custom healing screws, which shape the tissues for the insertion of the final restoration, and scanbodies for capturing the implant position through optical impressions. Therefore, once inserted, they should not be removed until the final prosthetic restorations are delivered.

After a period of two months had passed, which was necessary for the completion of osseointegration, we therefore proceeded to capture the position of the implants by optical impression with powerful intraoral scanner (iTero Element 5D Plus®, Align Technologies, San Jose, USA). As mentioned above, there was no need to mount any scanbody dedicated,

**Fig. 1.** i-Physio® in position #14 and #15, occlusal view.

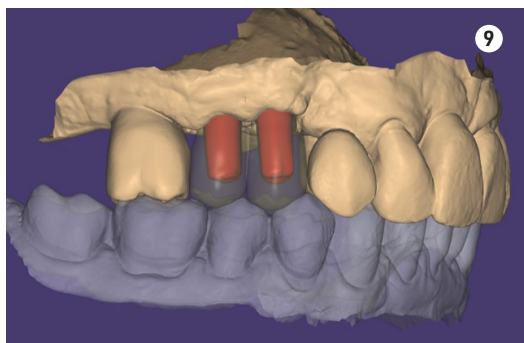
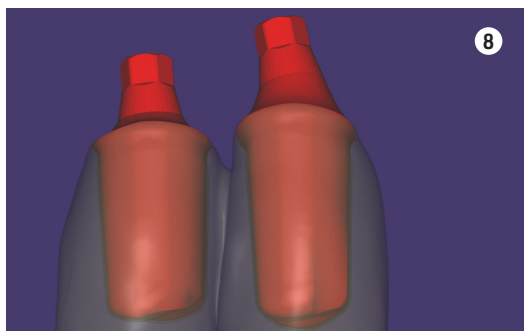
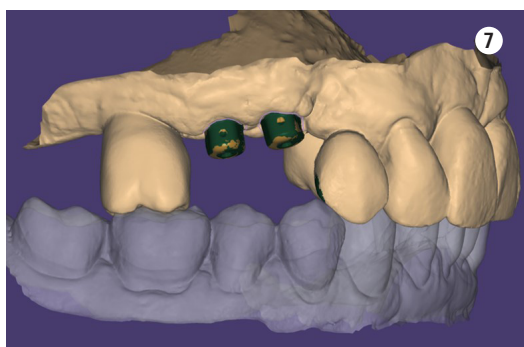
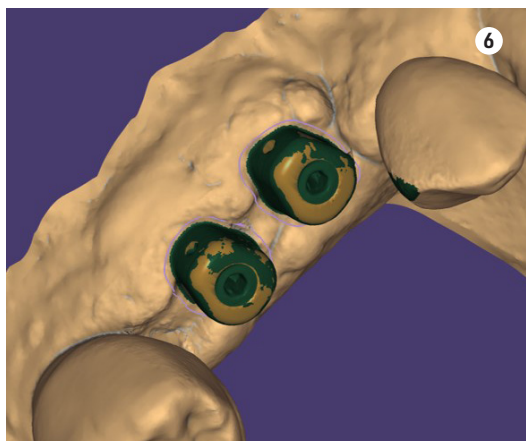
**Fig. 2.** i-Physio® in position #14 and #15, lateral view.

**Fig.3.** Intraoral scan with iTero Element 5D Plus®, side view.



as the scannable healing abutments served the dual function of custom healing screws and implant position transfer devices in CAD. Therefore, scanning was simplified and consisted of capturing the master model with i-PHYSIO® (LYRA ETK) in situ, the antagonist model, and bite. The scan was sent to the dental laboratory, which proceeded to modeling, through computer-assisted-design (CAD) software (Galway®, Exocad, Darmstadt, Germany) of customized abutments and definitive bridge (cemented prosthesis). The customized abutments were sent to the implant company that milled them, in this case in titanium; the bridge, on the other hand, was fabricated in-house through TSLA printing technique using a Dfab® laser printer (DWS Systems). The material chosen for printing was a hybrid composite (Irix Max® indeed, also from DWS Systems), loaded with 42% ceramic, ricato con ceramica al 42%, e

and therefore certified for printing definitive restorations. Thanks to the Photoshade® proprietary technology (DWS Systems), the operator was able to print the restoration in the desired color, because he could choose from various natural color gradients. The bridge was polymerized in Dcure furnace® (DWS Systems), and was ready for delivery. The patient was then called in for the third and final appointment, following those necessary for implant insertion (first appointment) and intraoral scanning (second appointment): that for delivery of the final restoration. The operator unscrewed the scannable healing abutments i-Physio® (LYRA ETK) and without any difficulty (with the soft tissues already "prepared" for the insertion of the final custom abutments, the lower portion of which was "copied" from that of the coded abutments used) screwed in the custom abutments in titanium.



**Fig. 4.** Intraoral scan with iTERO Element 5D Plus®, occlusal view.

**Fig. 5.** Detail of the i-Physio® captured in the intraoral scan of the master model.

**Fig. 6.** Occlusal detail of the i-Physio® in the CAD software.

**Fig. 7.** The i-Physio® in CAD software, side view.

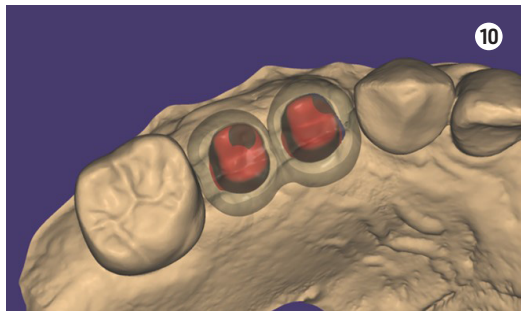
**Fig. 8.** Detail of CAD modeling of the bridge and individual abutments.

**Fig. 9.** Modeling placed in the context of the virtual patient's mouth in CAD.

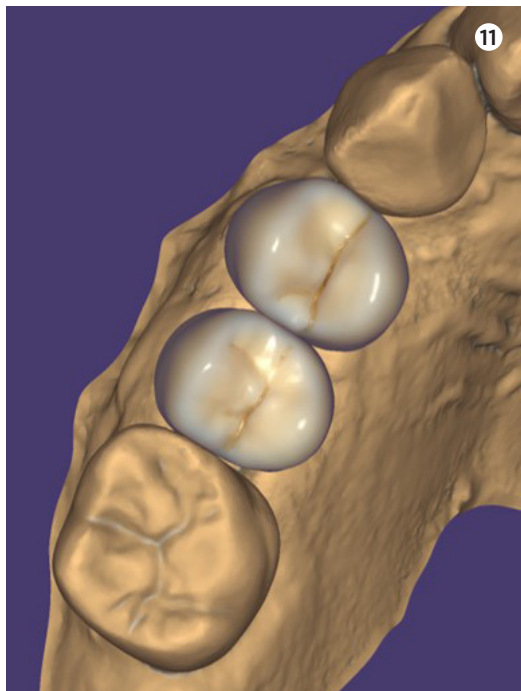
On them, he finally cemented the final restoration. Clinical precision was absolute, given by the high quality of the intraoral scan (iTERO Element 5D Plus®, Align) combined with the high quality of the custom milled and 3D printed hybrid composite restoration (Irix Max®, DWS). Digital can be really simple and affordable if you choose the best solutions!

Nothing prohibits making everything even in additive chairside, should one opt for a screw-retained superstructure: it would theoretically be possible, with the patient at the chairside, to pre-alert the technician, send him the scan, and receive the CAD model (screw-retained superstructure) in 5 to 10 minutes, time for a coffee. Having received the model, all you have to do would be to print

**Fig. 10.** Occlusal view. Note the support that individual abutments provide to restoration.

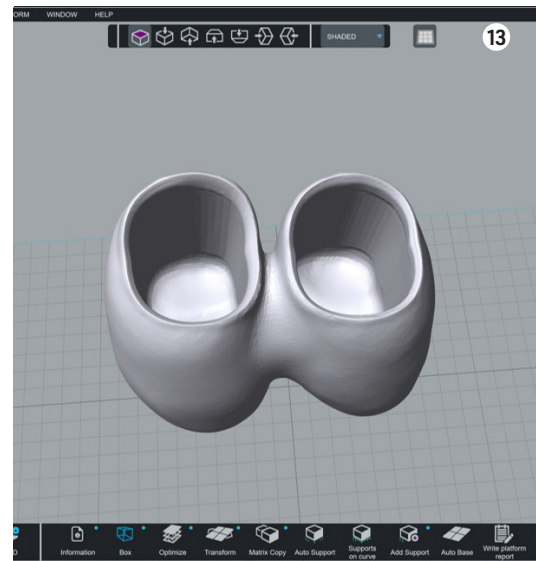
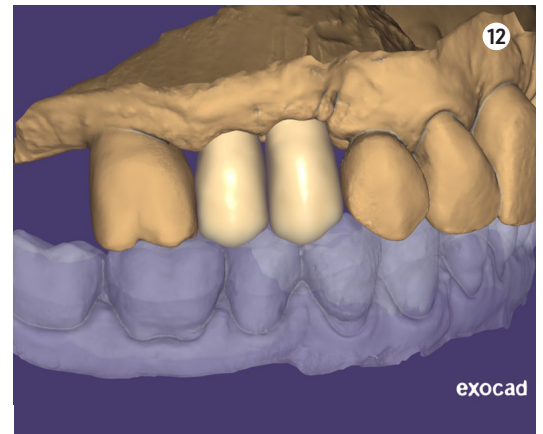


**Fig. 11.** Truesmile photorealistic rendering® by Exocad of the restoration modeling, occlusal view



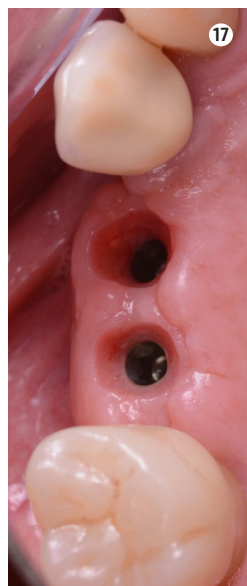
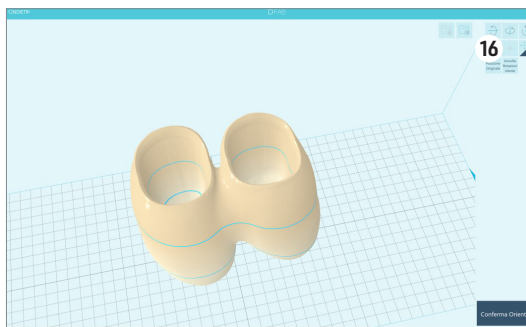
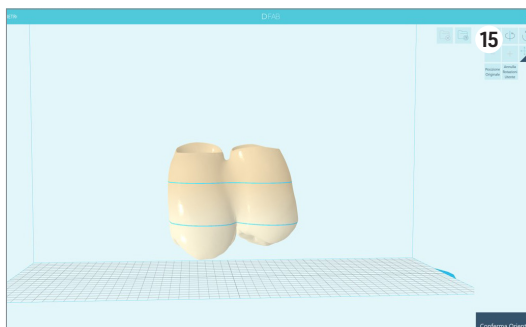
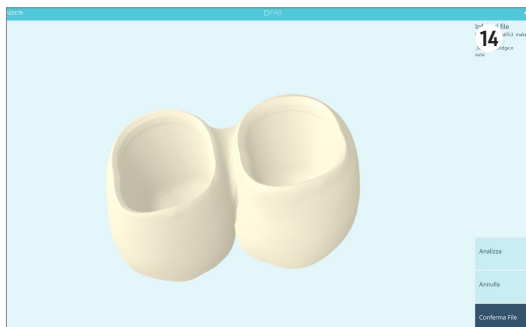
**Fig. 12.** Truesmile® photorealistic rendering of Exocad's modeling of the restoration, side view.

**Fig. 13.** The final restoration file is ready for printing.



the final bridge in hybrid composite with DWS's Dfab® printer, a procedure that takes a maximum of 10 to 15 minutes, including polymerization in the proprietary furnace. At this point, all that would need to be done would be to extraorally cement the printed restoration onto the respective tibases, and screw it onto patient. This would be a chairside of absolute quality, as evidenced

by recent in vitro and in vivo scientific work, elegant and economically sustainable. But we love cemented prostheses ... and we don't change our minds, because we believe that the support given to the restoration by one or more individualized abutments, whether they are entirely titanium or hybrid (titanium and zirconia) is essential, and we don't like restorations with occlusal screw holes.



**Fig. 14.** Loading the STL file of the restoration into the proprietary Nauta Photoshade® software of DWS Systems.

**Fig. 15.** Setting color levels in Nauta Photoshade®. The software allows the setting by the operator of three color levels, corresponding to what is in the loaded disposable cartridge inside the Dfab printer® for the required printing session.

**Fig. 16.** Detail of the rrestoration ready for automatic media generation in Nauta Photoshade®.

**Fig. 17.** Excellent tissue health after removal of i-Physio scan healing abutments®.

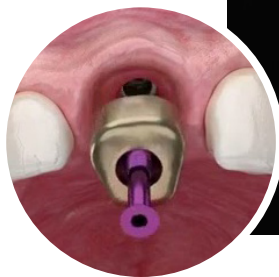
**Fig. 18.** Insertion of individual abutments milled by LYRA ETK.

**Fig. 19.** The tilted stereolithography (TSLA)-printed restoration using the Dfab® (DWS Systems) printer in 42% ceramic-filled hybrid composite (Irix Max®) is delivered to the patient, cemented onto individual abutments.

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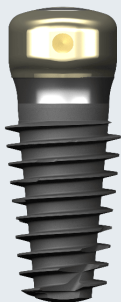
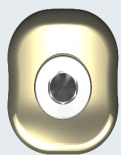
# i-PHYSIO®

Revolutionizes  
implantology  
by simplifying and  
streamlining  
workflows



i-Physio® is a 3-in-1 anatomical solution that replaces the healing abutment, scanbody and temporary abutment. It is screwed onto the implant and remains in place until the final prosthesis is delivered. The scan is taken directly on i-Physio® and can also be used as

an abutment to make a temporary crown. i-Physio® is available in different anatomical shapes and heights in order to condition the soft tissue in the most natural and esthetic way possible. It is available in different connections to fit most implant systems.

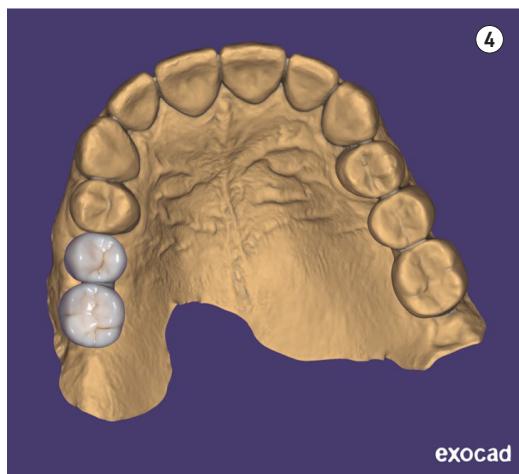
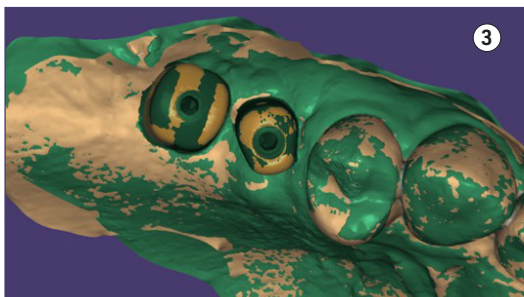


## SIMPLE, FAST, SAFE

It is no longer necessary to disassemble the healing screw for scanning, as i-Physio® is a scannable healing abutment and can be scanned with intraoral scanners directly in the mouth. This simplifies clinical procedures, allowing the operator to speed up the scanning procedure, and save steps that expose the implant connection. This reduces the risk of bacterial contamination of the connection.

## AESTHETIC

The shapes and heights of i-Physio® are designed to achieve better, natural soft tissue aesthetics in all areas of the mouth.

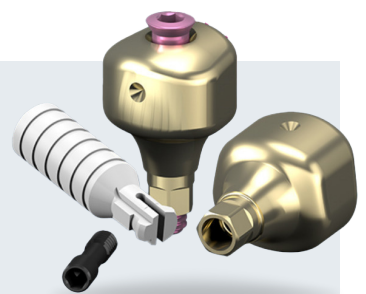


**Fig. 1.** iPhysio® Profile Designers in place.  
**Fig. 2.** Digital impression with iTERO Element 5D Plus®.  
**Fig. 3.** i-Physio® in CAD Software.  
**Fig. 4.** CAD modeling.

### ACCURATE AND PREDICTABLE

Thanks to the i-Physio® CAD libraries, the mesh/ library transition is extremely accurate. The coupling of i-Physio® scans also allows the technician to automatically retrieve the design of the gingival part of the prosthetic component. i-Physio® acts as a true link between dentist and dental technician, ensuring continuity in emergency profile management throughout treatment. Some features of i-Physio® are:

- Zirconia-coated titanium
- Limits bacterial plaque attachment
- Reduces tissue inflammation
- High scanning accuracy
- Concave convex emergence profile
- Creation of a gingival seal with the concave side
- The convex part supports the soft tissues
- The color indicates the height of the i-Physio® chosen
- The screw is kept in the abutment to avoid the risk of it falling out



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**Dr. G. Marco Morello**

*Graduated in Dentistry and Dental Prosthetics from the University of Turin in 1995, where he earned a master's degree Level II in Dental Prosthetics.*



## The simplification and rationalization of implant prosthetics with i-Physio®

DentalTech interviews Dr. G. Marco Morello, an implantologist with 25 years of experience, among the creators and promoters of the i-Physio® system

**Francesco Mangano**

**Dr. Morello, what is your clinical experience with the i-Physio® system?**

**Dr. G. Marco Morello**

After more than a decade of practicing surgery and implant prosthetics, I felt the need to create a new component. In most cases, in the first or second surgical time we have available only a healing screw of varying diameter but always of circular section, with more or less flared emergence. Few are the anatomical situations in which the section of a natural tooth has a round gingival emergence, and therefore there arises, from a prosthetic point of view, a need to model a form of transition from the deep area of the intra- mucosal path, always circular, to a complex and festooned form of the prosthesis at the level of the gingival margin. Various protocols have been proposed to condition the gingival volume three-dimensionally with a provisional.

While effective, these protocols require several sessions and thus present significant costs, justified almost only in highly esthetic areas. We started using the i-Physio® system routinely in 2016, and after an eight-year follow-up, we can say that biological and prosthetic expectations have been confirmed.

It would be beyond interesting to evaluate the biological results of an i-Physio® system that allows for no abutment removal (one time, one abutment technique).

**Francesco Mangano**

**What were the most important stages in its development?**

**Dr. G. Marco Morello**

With Mr. G. Lucente, the dental technician of the practice, in 2014 we started to model composite forms using Esthetibase® (t- base) ETK implant carriers or abutments as a base. We relied on CBCT images of natural teeth sections (maxillary central incisors, premolars, and molars) at the level of the bone crest. Talking with Mr. Cedric Lancieux, director of the research and development division at LYRA ETK, we found that he also had a similar idea. Together we then realized several prototypes of different shapes and materials.

**Francesco Mangano**

**What are the advantages of this method?**

**Dr. G. Marco Morello**

The system is based on healing abutments that are



more anatomical than traditional cylindrical screws, made in anodized titanium with a concave sub-gingival portion to condition the soft tissues toward an emergence profile suited to the shape of the prosthetic element. Four different shapes (A, B, C, D) were made to reproduce the cervical sections of the tooth to be replaced (incisors, canines, premolars and molars). There are four heights (from 1mm to 4mm) to choose from depending on the thickness of the intramucosal path. To make this step easier, there is a try in abutment kit to check which component is best suited to the case without opening the sterile package. Angulated i-Physio® (form A only) have also been made to correct the unfavorable implant axis by 10° or 20° and allow a solution initiated. The i-Physio® healing abutments are not only useful for obtaining a gingival bed suitable for a more anatomical prosthesis. We have called the i-Physio® system a gateway to digital dentistry because its shape (asymmetrical) and its supragingival surfaces with micro-grooves (to avoid mirror effect at the intraoral scanner) allow it to be used as a scan body, either for a digital impression or an analog on. Thus, 3shape, Exocad, and Zirkon Zahn libraries are available for laboratories that will reproduce the position of the implant analogue but more importantly, the real advantage of the method, the exact morphology of the subgingival area. Since it is not necessary to remove the component to make the impression, the soft tissues will not be able to collapse in any way by changing their shape as is always the case with a traditional pick-up impression. It will be easier for the dental technician to shape the crown by connecting the subgingival shape (imposed by the shape of the i-Physio®) to the supragingival shape dictated by aesthetics and prosthetic space. The system also includes a specific retentive pin-shaped component that connects on top of the screw channel to anchor any temporary.

**Francesco Mangano**

**What advantages do you think there are in the D form?**

**Dr. G.Marco Morello**

Its special feature is that the screw axis is decen-

tralized with respect to the distal-medial width of the component. This shape is designed for aesthetic areas because it gives the clinician the opportunity to place the implant in the area with more basal bone (usually on the palatal side) but to push and support the soft tissues on the buccal side while maintaining a more convex and therefore more aesthetic profile.

This morphology is particularly useful in cases of post-extractive implantation of maxillary incisors, canines and pre-molars. With colleagues Dr. M.Bresciano, Dr. E.Poglio and Dr. A.De Maria and D'Addetta and Lucente Laboratories, we published a clinical case in the International Journal of Periodontics and Restorative Dentistry (2023; 43: 345-352) highlighting the advantages of this component.

**Francesco Mangano**

**How do you handle temporaries with the i-Physio® system?**

**Dr. G.Marco Morello**

In the case of a post-extractive implant in the esthetic area requiring a provisional, we used two solutions with the i-Physio®:

- after making an impression prior to surgery, a request is made to the laboratory to produce a preliminary provisional with incisal/ occlusal supports and a more generous apical perimeter. Then, after choosing the most suitable i-Physio®, the retention pin of the provisional is adapted, the head of the provisional is isolated and is relined the provisional with acrylic resin incorporating the entire supragingival portion and the retention pin;
- if a provisional has not been made prior to extraction, it is possible to take an analog or better digital impression on the i-Physio® and ask the laboratory to produce a provisional quickly.

**Francesco Mangano**

Thank you very much Dr. Morello for sharing your experience with us in DentalTech, see you in one of the next issues!