1ST PRIZE 2019

Clinical advantages of the socket-shield technique and iphysio®abutment

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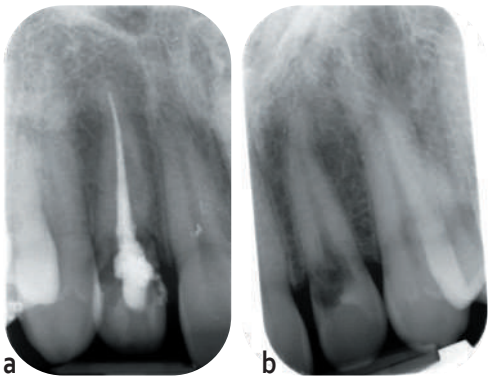
The substitution of lateral incisors in the maxillary region with implant-based restoration poses a major challenge for clinicians seeking aesthetic integration in terms of both the quality of the prosthesis and maintenance of bone volume and soft tissue architecture.

Tooth extraction, especially from a thin vestibular bone plate, always results in a profound change in the architecture of hard and soft tissue {1,2].

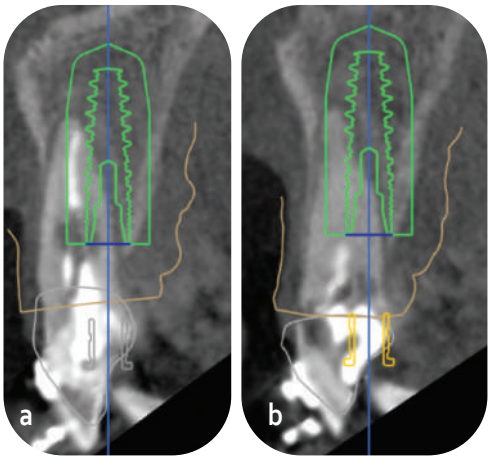
The concept of extraction and implantation with "immediate aesthetics" thanks to a temporary crown with no occlusal function has become established as the reference protocol in appropriate clinical situations, and when preservation of aesthetics is the top priority. The treatment is shorter and less traumatic for the patient [3,4].

The socket-shield technique (SST) was designed to conserve tissue volume while preserving a vestibular root fragment during extraction [5,6]. The protocol requires a post-extraction implant with immediate aesthetics where possible.

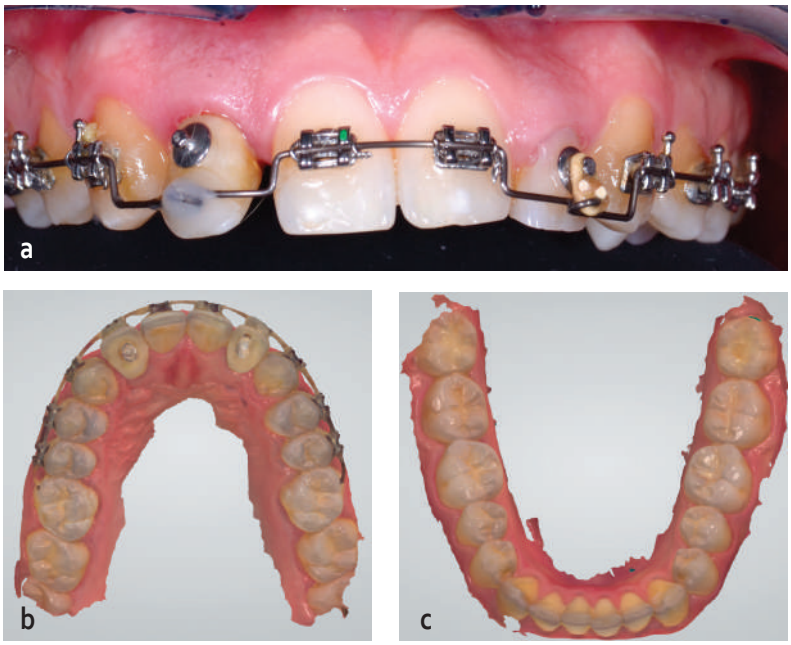
During a surgical intervention, it is never easy to manipulate and adapt the temporary abutment as well as modifying and rebasing the empty provisional crown to obtain an anatomical emergence profile. Using the iphysio® profile designer simplifies immediate aesthetics by reducing the



1a-b. 12 and 22 are affected by external root resorption up to the level of the alveolar bone on the palatal side.



3a-b. Cone beam, prosthetic projection, extraction and immediate implantation planning using implant planning software.



2a-c. Digital impression.

number of adjustments and manipulations to the implant head, while guiding mucosal healing with an adapted emergence profile.

Clinical case

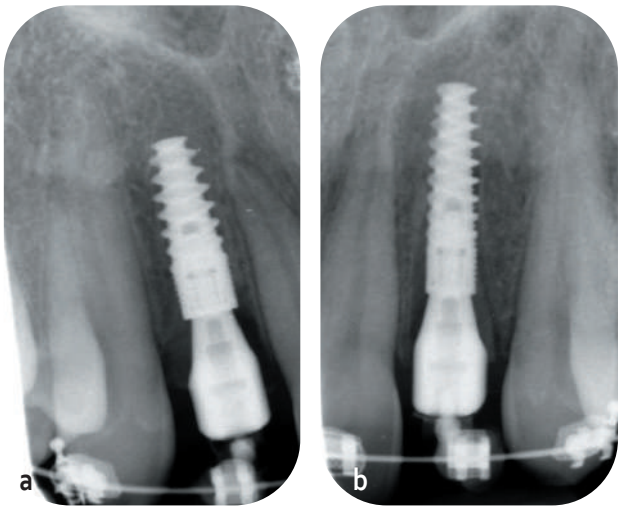
A 27-year-old-patient was referred to the practice for treatment of root resorption in 12 and 22 (fig. 1). To comply with his request to preserve his teeth, he was initially offered orthodontic extrusion, endodontic treatment and direct restoration. Three months after commencing treatment, 12 had a horizontal fracture at the resorption level and 22 a crack at the root. Extraction of both roots was therefore recommended. The new treatment plan included extraction and implant-based restoration.

A digital impression of both arches and the occlusion was created (Fig. 2) and a maxillary CBCT was performed. This revealed an extremely fragile vestibular bone plate in the alveolus of 12 and 22 (Fig. 3). The periodontal biotype was thin.

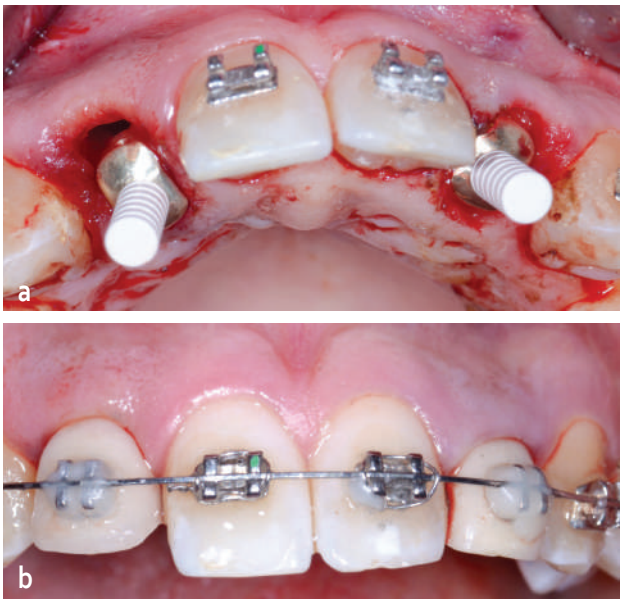
To preserve the anatomy of these alveoli, extractions and implantation were planned using SST, guided surgery and immediate aesthetics. The planning software allows the digital impression to be superimposed on the CBCT data to select the best prosthetic axis for implant placement (Fig. 3), and to produce a template for simplified guided surgery and two provisional crowns with two palatal wings for easy positioning in the oral cavity.

The roots of 12 and 22 were extracted in accordance with the SST protocol and two Naturactis implants (Lyra-ETK) (Ø 4 x 12 mm for 12 and Ø 3.5 x 14 mm for 22) were placed with the aid of the surgical template. As the implants have an insertion torque of more than 35 N, it was possible to screw in two 4 mm-high iphysio® D (Lyra-ETK) abutments to manage the prosthetic emergence profile (Fig. 4).

The iphysio® abutments also have a clip-on height-adjustable PEEK accessory to connect the temporary crowns for immediate aesthetics. They were fixed to this component with relining resin (Fig. 5). We chose the iphysio D because it is the most suitable model for teeth in the maxillary aesthetic region. Its distinctive feature is that the more coronal part of the component, which

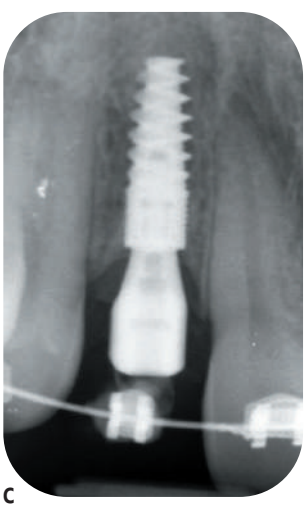


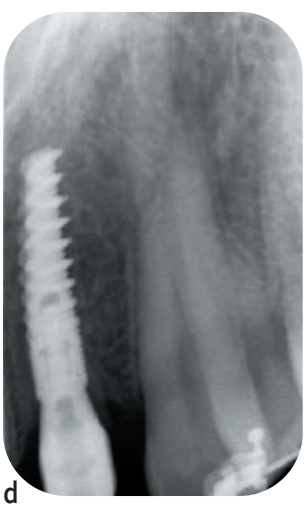
4. Retro-alveolar radiographs at the time of implant placement a. Implant in 12.
b. Implant in 22.



5a. Screwing in the Profile Designer iphysio® D-shape and clipping of temporary supports on for immediate aesthetics. b.Temporary crowns in place.

6. Soft-tissue healing around the iphysio® abutments and retro-alveolar radiographs after 4 months.
The prosthetic emergence profile is already ready for the standard crown.





7. Screw-retained standard prostheses made of monolithic zirconia with cut-back and laminated ceramic in the vestibular area at 1-year follow-up.

8. The gingival contour is stable over time and blends with that of the adjacent teeth. The occlusal scheme has not changed.

functions as the profile designer, is positioned away from the trans-screwing screw. This supports the soft tissue on the vestibular side.

After 4 months, retro-alveolar radiographs of the implants showed minimal bone loss and stable soft tissue around the iphysio abutments (Fig. 6). The digital impression is taken directly on the iphysio abutments without removing them, which confers a significant clinical benefit in terms of protection of the soft tissue and [7] saves time in the chair. This component can be used as a scanbody which will be recognized automatically by laboratory software. Using this digital model, the prosthetists produce two monolithic crowns that are trans-screwed onto a titanium base intended for gluing (Esthétibase, Lyra ETK). To improve the aesthetics, a resin model is printed and the zirconia crowns are prepared using the cut-back technique before being finished with ceramic layering.

Clinical monitoring of standard restorations is carried out at 6 months and one year (Fig. 7 and 8). It is notable that the soft tissues and the vestibular bone table, especially the papillae, are maintained.

Conclusion

This clinical case demonstrates that SST, as shown by Gluckman et al. [8] is a less traumatic and less time-consuming protocol that guarantees the predictability of the aesthetic result. The procedure does not require bone chips or connective tissue grafting. The use of the iphysio® component provides several clinical benefits: it simplifies the management of immediate aesthetics because it eliminates the need to rebase the provisional crown on a temporary abutment; it promotes the healing of soft tissues via a process that integrates the emergence profile of the definitive crown; it does not require unscrewing and re-screwing for the impression to be taken, which limits the trauma to soft and hard tissues; and, finally, it enables the implant position and the three-dimensional geometry of the soft tissues to be transferred to the laboratory without the loss of information associated with the pick-up technique.

The author would like to thank Mr Cédric Lancieux and the laboratories of Mr Giuseppe Lucente and Mr Fabio Daddetta for the successful outcome of this clinical case.

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2ND PRIZE 2019

Implant dentistry - Esthetics - Digital dentistry

A simplified trilogy thanks to a unique healing abutment

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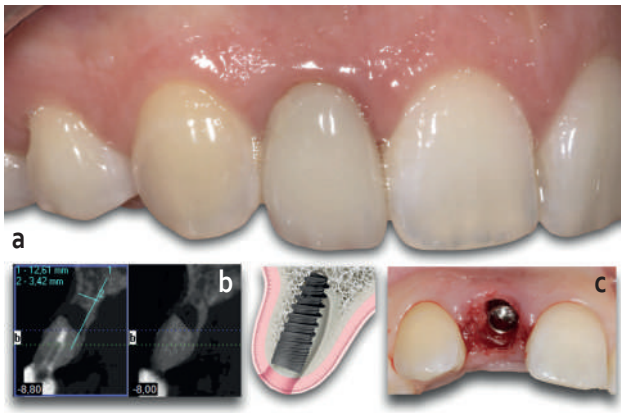
Of all the innovations in modern dentistry, one tool has been awarded the ADF [French Dental Association] Innovation Award in 2018 not because it offers a new technology, but because it simplifies existing techniques by combining their advantages and eliminating their disadvantages. That is why it has been called a "3 in 1" tool.
There is no doubt that the iphysio is a groundbreaking tool in that it is all-purpose in the true sense of the word. It combines an anatomical healing abutment, a temporary restoration abutment, and a scanbody for digital impressions.

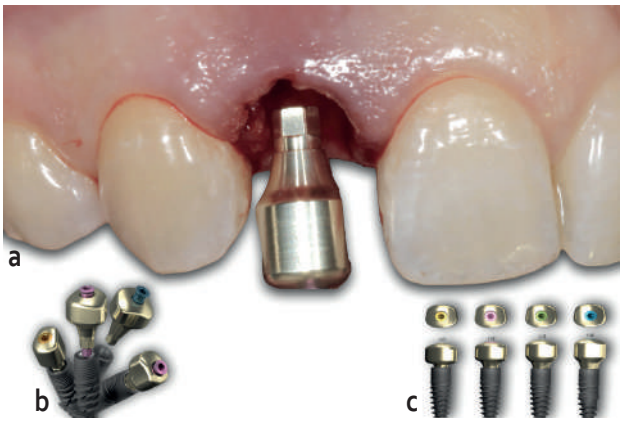
The iphysio® tool presented in this article is distributed by Lyra through a dedicated site. However, it was developed with the aim of making it widely available so it can be used by as many clinicians as possible. While the company is part of ETK (formerly Euroteknika), it has intentionally expanded its reach to include the most widely used implant brands on the French market. Currently there are around a dozen of them.
In this article, we outline the concept behind this tool and its advantages over standard abutments, and illustrate its use with a clinical case that is achievable for everyone, both for surgeons whose sole concern is to facilitate the prosthetic procedures requested by the referring dentist, and for those in general surgical practice concerned to improve patient comfort and to optimize on a predictable basis the esthetic outcomes inseparable from the success of an implant.

Clinical case

A patient seeks advice regarding mobility of her crowned right lateral incisor (fig. 1). The surgical strategy adopted is described by Chu et al, a technique called "the Dual Zone Concept" [1]. Its aim is to promote tissue preservation in order to achieve an optimal esthetic outcome in the anterior zone. It is based on the principle of atraumatic tooth extraction followed by immediate flapless implant placement. The alveolar gap is filled with osteoconductive



1a. Initial situation: corono-radicular mobility of 12 with apical cystic image. The cervical line and papillae are correctly aligned and must be preserved. b. Cone-beam radiograph: the thin vestibular bone plate remains present and vascularized in the absence of flap elevation. c. Extraction and immediate implant placement followed by placement of a bone graft in the alveolar gap.



2a. Selection of the iphysio® healing abutment. b. Shapes A/B/C/D. c. Heights 1/2/3/4 identified with colored screws.

particles (sourced here from a bone bank). An immediate temporary crown is then made to provide a provisional esthetic and, more importantly, to support the supra-implant soft tissues and prevent collapse of the interproximal papillae.

The transgingival iphysio® abutment seems to be the ideal tool for managing the interface between implant and transitional prosthesis. It will also prove to be very reliable and minimally traumatic when the impression is taken. We set out to verify this by testing its three promised objectives.

Healing/Profile designer

The two criteria for selecting healing abutments have always been the implant platform and transgingival height. Abutments are usually cylindrical. When a surgeon is concerned about gingival emergence, particularly in esthetic zones, he or she tends to use individualized temporary prostheses or even standard abutments modified with resin [2]. Doing this makes it possible to recreate the anatomical gingival contours and create a prosthetic cradle into which the final prosthesis can be fitted with minimal trauma. All of these steps are important in ensuring prosthetic success, which is itself an integral part of the therapeutic success of implants, along with tissue stability [3].

Simply put, the iphysio® healing abutments come in four shapes (incisors/canines, premolars, narrow molars and wide molars) and four heights (1, 2, 3 and 4 mm), which makes it possible to recreate the natural cervical dental emergence. Here, the chosen abutment is a 2mm high Shape A incisor (fig. 2).

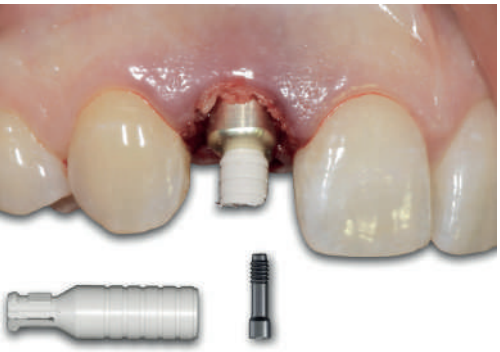
Temporary abutment

Implant-supported temporary crowns, whether immediate or delayed, are mainly used in esthetic anterior zones. It is often difficult to implement during the surgical step in the operating theatre, partly because of the need to maintain asepsis, and partly for technical reasons. It also requires a prosthetic ancillary instrument set, which can be restrictive, depending on the brand of implant, and this often results in an unsightly screw shaft at the free edge of the incisor. Ideally, an impression should be taken as soon as the implant is placed so that the provisional crown can be made by the dental technician or clinician using the so-called "chairside" technique [4].

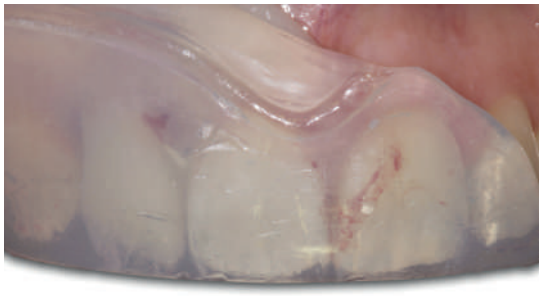
The design of the iphysio® integrates a smart solution that consists of clipping a temporary PEEK abutment into the screw shaft socket of the iphysio® (fig. 3).

Note that at this stage, the surgical procedure is complete and there is no further need to handle either tissues or implant parts.

The colored screw from iphysio® is replaced in advance by a shorter screw supplied with the temporary abutment. This abutment is indexed. It can be divided (using Gouge forceps) at the appropriate height to enable an underbite. Resin is used to fill the area around the supra-implant abutment, ideally using a casting technique with a pre-



3. Replacement of the original screw with a short screw supplied with the PEEK temporary abutment. The latter is cut to the right coronal height for insertion into the groove of the iphysio® while observing indexing.



4. Provisional crown made of Bis-GMA resin using casting. Transparent silicone.

5. Alteration and extra-oral finishes to the provisional crown on analog. The peripheral contours mimic the natural tooth morphology and should support the cervical line and gingival papillae.

fabricated silicone key. Bis-GMA temporary resins adhere perfectly to PEEK (fig. 4).

A set of recycled iphysio® abutments for extra-oral touch-ups can be used to perfect the prosthetic contours and create optimal emergences that guarantee tissue preservation and support for the gingival papillae.

The criteria for success are the same as those for a provisional screw-retained abutment: adjusted and polished limits, static and dynamic tooth and underbite.

Feedback has shown that clipping the temporary tooth in situ is highly effective, and obviates the need for sealing cement.

In the event of accidental occlusal overstraining by the patient, the temporary abutment acts like a "safety fuse" and the temporary abutment is unclipped and released from the iphysio®. The component can then simply be re-clipped after rinsing with chlorhexidine. This protects the freshly placed implant from any risk of overstraining that could compromise optimal osseointegration.

Impression

From a clinical perspective, physical and chemical impressions, which are poorly tolerated by patients, are very user-dependent in terms of precision and would therefore appear to be somewhat random, and a source of potential failure due to defective part fitting. By contrast, a review of 132 studies published between 2007 and 2017 [5] demonstrates the high degree of precision and reproducibility of digital impressions for reconstructions involving up to 5 components. Beyond that, a distortion of the image could compromise the effectiveness of a large-scale reconstruction [6].

In addition, the use of customized impression transfers, and replicas of provisional crowns in the sub-gingival region, is the most reliable solution for conventional implant impressions because it allows the laboratory to perfectly reproduce the required volumes, which guarantee tissue stability [7].

From a technological perspective, abutments that can be scanned by optical systems have been available for several years (Encode abutments) [8] and make it possible to dispense with a some of the impression transfer handling steps that are frequently reported in the literature as being invasive for fragile supra-implant tissues and a potential cause of esthetic failure [9].

With iphysio® abutments, after the usual osseointegration period for implants, the provisional abutment can simply be unclipped for optical reading and then re-clipped. Thus, the fragile supra-implant gingival pseudo-attachment will not have been damaged by part handling (fig. 5).

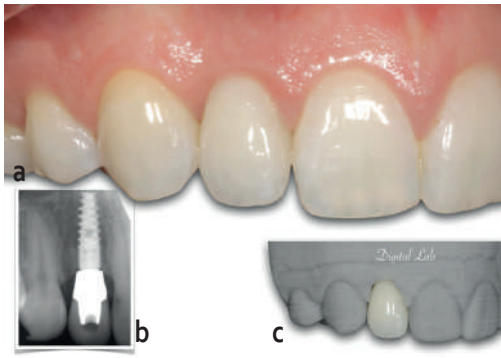
The precision of the impression depends, of course, on the correct insertion of the iphysio® abutment into the implant (check tightening to 15 Ncm), but above all it depends on the precision of the optical camera. The iphysio® can be read by any camera on the market as long as the generated .STL file is open and can be exported. These unfamiliar terms, which are peculiar to computer scientists, obscure what is actually a very simple procedure that is accessible to any clinician and is comparable to the transition from silver-nitrate film photography to digital photography and the associated .JPG files [10].

Moreover, an internal study carried out in the dental practice on differential timing of impressions has shown that the time it takes to obtain an implant impression using a physical or chemical method can be divided by three by taking an optical impression on iphysio®, and the gap widens as the number of implants increases:

- physical or chemical impression: 30 minutes for 1 implant / +5 to 10 minutes per additional implant with increasing stress for clinician and patient;
- digital impression with scanbody: 20 minutes for 1 implant / +5 per additional implant because it is still nec-

6. Healing at 4 months, vestibular and palatal view of the peripheral gingiva: the provisional crown was deliberately vestibulo-verted and its height reduced so as not to interfere with static and dynamic occlusion during this period.

7. Only at the time of the impression (here digital) is the provisional crown removed without withdrawing the healing abutment.
It is not necessary to take an impression of the sub-gingival emergence because this anatomical profile is shaped by the iphysio®.



8a. The final layered ceramic prosthesis on an e.max® coping is sealed onto an anatomically shaped zirconium oxide abutment, which in turn is cemented onto a titanium esthetic base.
Esthetic integration is primarily based on tissue preservation and is evaluated using the Pink Esthetic Score [11].
b. Follow-up radiograph at 6 months. c. Prosthesis made by the Digital Lab laboratory on a 3D printed model.

essary to screw/unscrew transfers;
- digital impression on iphysio®: 10 minutes regardless of the number of implants. No handling of the part is required. No irritation of tissues. No discomfort for the patient or stress for the clinician.
For clinicians who do not have an optical camera, a physical impression in situ of iphysio® can also be taken (also in 10 minutes, regardless of the number of implants), and the prosthetist is then responsible for the digital scanning of the plaster cast model so that it can be digitally integrated into the Cad/Cam software.
In the laboratory, at the present time, only the 3Shape program can load the iphysio® library.
The benefit of the "Profile Designer" is that the prosthetist does not have to arbitrarily "imagine" a hypothetical prosthetic contour that is often interrupted by a thin cylindrical emergence that is not very anatomical and cannot support the papillae, because here the prosthetic emergence and contours are an exact replica of the profile of the iphysio® abutment.
And it is only on the day of final prosthesis placement that the iphysio® is finally unscrewed (fig. 6) to adapt the prosthetic cradle on which the final crown will be fitted firmly, without any insertion constraint (fig. 7).
From a clinical perspective, the clinician no longer has to force the gingival tissues or stretch the circular supracrestal fibers, an insertion that is often painful for patients and which, in the medium term, results in gingival recession.
The 6-month follow-up provides a basis for objectively achieving an esthetically perfect alignment of the gingivo-prosthetic contour with the cervical line (fig. 8).

Conclusion

iphysio® is a simple, reliable and reproducible solution for "3-in-1" management of supra-implant tissue . The solution of placing a temporary prosthesis remains a non-obligatory option, but involves a procedure that allows it to be linked to surgery straightforwardly with a view to supporting the papillae and esthetic cervical line in esthetic zones.
Although those skeptical of digital dentistry have good reasons for continuing to apply the traditional physical impression techniques they have fully mastered, iphysio® scannable abutments nevertheless offer an essential gateway to the world of digital dentistry, given the extent to which they simplify the implant impression procedure, doing so with remarkable precision.

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3RD PRIZE 2019

Potential of the iphysio® for immediate esthetics

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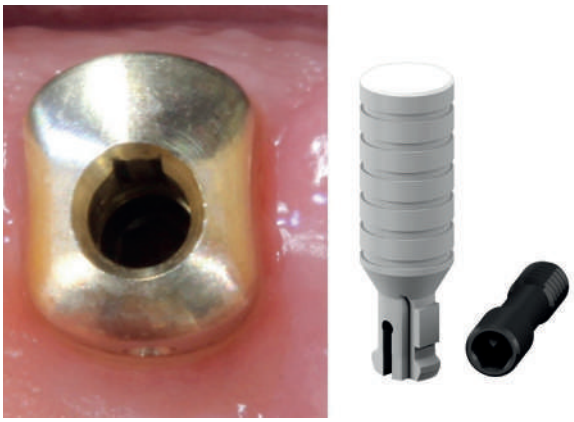
iphysio is a component developed by ETK and distributed by Lyra. Its originality lies essentially in its "multifunctional" nature: it can be used by the clinician as a healing screw, temporary abutment, scanbody and individualized abutment.

The iphysio® is available in different shapes (A, B, C, D) and four heights corresponding to the emergence of natural teeth. Shape A is intended for incisors, canines and premolars, shape B for premolars, molars and central incisors, shape C for molars and shape D for premolars and maxillary lateral incisors.
In the clinical case presented below, iphysio is used as an individualized abutment supporting a temporary tooth.

Clinical case

A patient presents to the practice due to mobility of 12 and 22 ((fig. 1). Initially, her periodontitis was stabilized with periodontal sanitation and hygiene education appropriate for her condition. Despite this, we observed that the mobility of 12 and 22 was terminal and they therefore needed to be extracted. We decided on the following treatment plan: extraction of 12 and 22 combined with placement of two implants during the same operating session. We set out to provide immediate esthetics in

1. Initial view of the clinical case.



2. Occlusal view of the iphysio® and temporary abutment with its short screw.

3. Extraction of 12-22. Placement des implants, iphysio® and temporary abutments.

4. Temporary teeth are made and clipped onto the iphysio®.

the chair using the iphysio®.

On the day of surgery, we began by extracting 12 and 22. We placed two implants here (ETK Naturactis diameter 3.5 and length 10 mm). The implants were inserted and achieved a primary stability of 40 N/cm [1].

Thanks to the set of sterilizable trial abutments, we can "try out" the different iphysio® shapes; we decided to use a shape D with an infra-gingival height of 2mm. The abutment will remain in place not just for the duration of bone and gingival healing, but also when the impression is taken. It will only be removed once, when the final restoration is definitively positioned and screwed in. With this in mind, we created a temporary tooth [2].

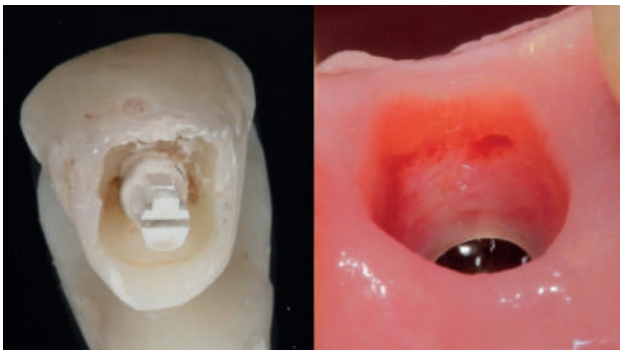
To use the iphysio® as a temporary abutment, we have to insert it using the black screw delivered with the temporary abutment. Iphysio® is also marketed with a long screw, which we remove and replace with a short screw, thus revealing the upper part of the screw shaft. This is the part into which the temporary abutment is inserted (fig.2).

The temporary abutment is made of PEEK and has a clippable part which is inserted into the iphysio®. It must be positioned so that the pin is facing in the direction of the notch inside the iphysio® (fig. 3). We adjusted the height of the abutment to take account of the patient's occlusion. The supra-gingival part of the iphysio is then coated with vaseline while preserving the abutment. Then the adhesive is applied to the temporary abutment (it can be removed during this step if necessary). The temporary tooth is then made using a self-molding technique with a silicone impression taken prior to tooth extraction.

Its retention is excellent. This principle can also be applied as a safety measure. This is so because if the patient accidentally bites down on the temporary tooth, it will become unclipped, thus protecting the implant from masticatory forces (fig. 4).

With the conventional technique, it is necessary to alter the temporary tooth in order to shape the emergence

5. Lateral view of the iphysio® after healing and digital impression.



6. View of the inner surface of the temporary prosthesis during removal and view of the gingival bed after removal of the iphysio®.

7. Layered ceramic crowns on zirconium coping.

8. View of the final crowns in place.

profile of a lateral incisor. The use of the iphysio® in shape D gives the emergence profile of a lateral incisor, which dispenses with the need to alter the temporary cap.

After 3 months, bone, gingival and implant healing is excellent [3]. The impression can be taken in order to make the final prosthesis. This is very easy to do: all that is required is to unclip the temporary tooth, which makes the iphysio® accessible. The impression of the supra-gingival part of the iphysio® is taken using an optical camera (fig.5). Once this is complete, the temporary tooth is put back in place by reclipping it on. At no point has the abutment been unscrewed. We worked at the supra-gingival level.

For this step, there is no benefit in taking an impression of the emergence profile [4], because the emergence profile of the iphysio® is stored on the computer.

The optical impression is sent to the prosthetist by email so that the final prosthesis can be made using Cad/Cam software. The prosthetist must have access to the iphysio® library. When placing the order, it is helpful to indicate the specifications of the iphysio® (in this case, iphysio® D2). In the prosthetic laboratory, the technician superimposes the iphysio® file from the library onto the scanned image. To do this, he or she selects 3 points on the iphysio® file, and then again on the scanned form. This records the position of the implant, as well as the gingival emergence profile.

The temporary tooth is unclipped, and the iphysio® abutment is unscrewed (fig. 6) so that the screw-retained final prosthesis can be placed (fig. 7, 8) [5]. The supra-implant biological space has therefore only been disturbed once.

Given the patient's periodontal status, minimal handling of peri-implant soft tissues ensures preservation of the peri-implant biological space, as well as its function as a biological barrier [6].

Conclusion

Use of the iphysio® is uniquely advantageous for the clinician. Its role in promoting healing makes it a "3-in-1" solution analogous to the famous Swiss army knife: it is an anatomical healing screw, a support abutment for the temporary prosthesis and also when the impression is taken, whether conventional or digital. The reduction in handling also helps to ensure better soft tissue quality. This ensures that the mucosal attachment is maintained. It protects the biological space and greatly reduces the risk of bacterial contamination.

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