THE RELEVANCE OF A NEW GENERATION OF MONOBLOC POSTS AND IMPRESSION COPINGS FOR IMPLANT-SUPPORTED FIXED PARTIAL DENTURES: A 2-YEAR CLINICAL PROSPECTIVE STUDY WITH THE FM-CLIP SYSTEM ON EVL IMPLANTS (SERF)

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KEY WORDS

Dental implant
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The use of monobloc posts for implant-supported fixed partial dentures is interesting for biomechanical and biological reasons, but it suffers from a lack of precision during the impression phase. The use of a new generation of monobloc posts associated with individual impression copings with a piston offers a simple and efficient impression procedure for small and medium implant-supported fixed partial dentures. This article presents the FM-Clip system for EVL implants composed of new straight monobloc posts and small impression copings with a piston for precise impressions and easy production of implant-supported fixed partial dentures.

INTRODUCTION

The accuracy of impression techniques is essential for the success of implant therapy. It determines the level of the passivity of the armatures as well as the precise fit of the screws in the fixed implant-supported prosthesis[1] and allows the preservation of peri-implant tissue health.

The use of machined monobloc posts seemed an interesting technique to simplify implant-supported prosthetic protocols. However, this technique lacks precision in recording the interface between the implant and the soft tissue and presents some difficulty in repositioning the monobloc post within the impression before casting.[2,3] This would necessitate the use of gingival retraction cords around the implant monobloc post, a step that is long, delicate, and unpleasant for the patient.

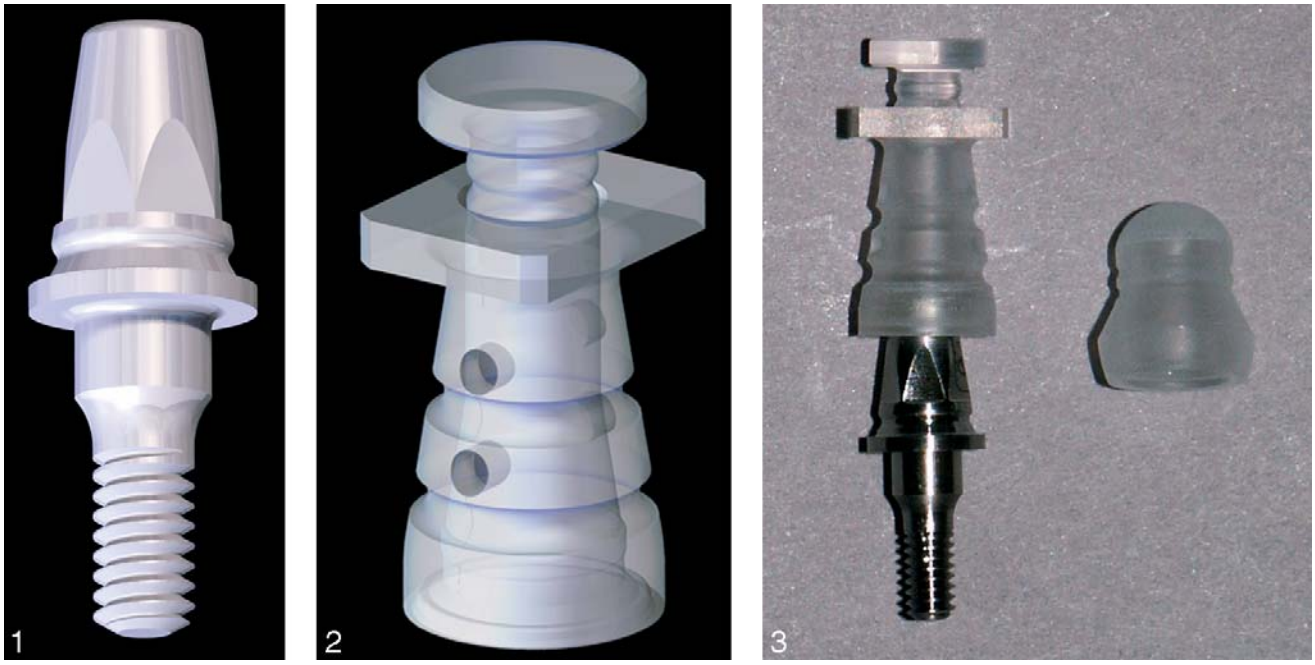

FIGURE 1. New generation of titanium monobloc post with a round internal-angle cervical limit (FM-Clip system). This shape allows it to clip individual impression copings.

FIGURE 2. Individual impression coping FM-Clip with removable piston and side spouts for the evacuation of the excess impression material.

FIGURE 3. The FM-Clip set: a titanium monobloc post, an individual impression coping FM-Clip in 2 parts (a perforated coping sleeve and a piston), and a protection cap.

However, monobloc posts remain interesting from a mechanical and biological point of view.[4,5] Their biocompatibility with osseous and gingival peri-implant tissues is remarkable, as is their tolerance to occlusal forces, for they are machined in titanium. The correction of axis, height, or even shape of the monobloc post is restricted to only the most external part of the piece, far from the transgingival collar zone, which is machined and smooth.

To improve the use of these monobloc posts, some pick-up systems were developed and marketed.[6–9] The newest system, called the FM-Clip system (*Faux Moignon-Clip* in French, which in English means ''Monobloc Post-Clip''), was developed for EVL implants (SERF, Décines, France)[10,11] to make monobloc posts more precise and easy to use with simplified prosthetic steps. This system uses new straight monobloc posts (1 short and 1 long) with a round internal-angle gingival limit (Figure 1) and small impression copings (with piston) fitted to the post's anatomy (Figure 2). It therefore becomes possible to take direct, precise impressions of the post and to eliminate the repositioning problem of the monobloc post in the impression. Implant analogues are no longer required. Delivered in the same packaging, a single-use protection cap will allow the gingival tissues around the post to be maintained during the manufacturing of the prosthesis (Figure 3).

This study describes the proper use of the FM-Clip system to simplify the fabrication of fixed implant-supported prostheses.

MATERIALS AND METHODS

The FM-Clip system was developed and evaluated in our office for 2 years before it was marketed in June 2005. The prototypes were tested and used according to the following protocol.

First, the monobloc posts were blocked (FM-Clip System, SERF) with a torque wrench (SERF) in their definitive position just before impression. The new-generation monobloc posts were then covered, one after the other, with the clipped piston impression copings (FM-Clip) previously

FIGURE 4. Coping sleeves filled with light silicone, individually positioned on the new-generation posts and activated with the piston. The impression material escapes through the side spouts of the coping sleeves.

FIGURE 5. Global overimpression taken with putty silicone on the entire dental mandibular arch.

filled with a light addition silicone (President, Coltene/Whaledent Inc, Cuyahoga Falls, Ohio) (Figure 4). The small pistons were pushed and the light silicone was fused through the side spouts of the coping sleeves. Finally, the global impression was taken with a Putty Soft silicone (President, Coltene/Whaledent Inc) (Figures 4 and 5). When the impression was removed, the accurate recording of the posts' limits could be visualized.

The monobloc posts were then covered with small protection caps during the laboratory phase. Note that these new monobloc posts do not require removal and repositioning in the impression as do previous generations of monobloc posts; this system does not require implant analogues for the master cast.

At the laboratory, the impressions were cast in an epoxy resin (Exakto-Form, Bredent, Senden, Germany) (Figure 6). The resulting working cast allowed the fabrication of an interim fixed-

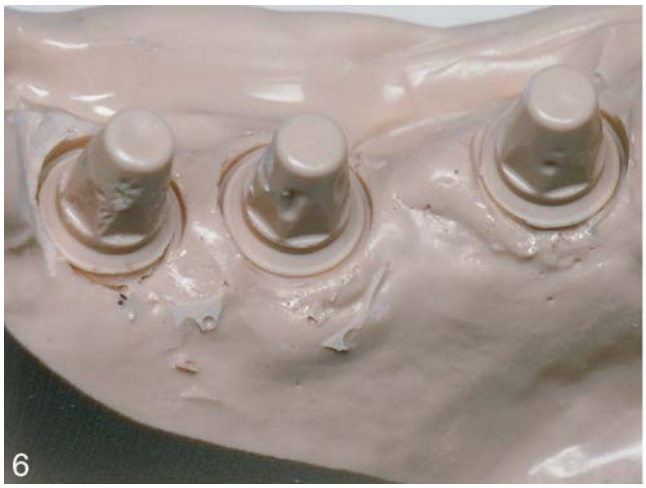

FIGURE 6. Working cast in a high-quality epoxy resin. Notice that the direct impression from the new monobloc posts is very precise, particularly in its relation with the peri-implant tissues. It easily allows the realization of a quality interim fixed partial denture or even the definitive prosthesis directly.

FIGURE 7. Definitive prosthesis made from the epoxy-resin master cast: a conventional metal-ceramic fixed partial denture sealed in a definitive way.

resin prosthesis (for functional and esthetic evaluation of the implants) or even the definitive metal-ceramic fixed partial denture (Figure 7). The same cast can, moreover, be used for both prostheses, facilitating transfer of the patient to his or her general practitioner, with the interim fixed-resin prosthesis and the master cast. The referring dentist then fabricates the definitive prosthesis as if it were a conventional metal-ceramic fixed partial denture.

During a 2-year period with these prototypes, we strictly followed this protocol. Our prospective study was based on 60 short fixed partial dentures. Each prosthesis was designed to replace 2 or 3 posterior teeth (as shown in our clinical illustration), always on 3 implants. We followed the radiological aspect of the bone level around the implants for 1 year. Six months after implantation, the implants were loaded with an interim resin prosthesis. The final prosthesis was made after 6 months of functional and esthetic evaluation of the implants.

RESULTS

The final collection of data was made in September 2005. During this prospective study, the survival rate of implants and prostheses was 100%. Moreover, there was no significant bone loss around the implants during the 6 months after the loading. However, this was a short-term study on simple and short span bridges; therefore, these results were very common. The results on the FM-Clip system itself were much more interesting: no monobloc post was unscrewed since we began this protocol in June 2003. All impressions were always usable, with neat cervical limits, after the first impression. No second attempt was necessary, allowing a saving of time and money.

DISCUSSION

Unlike the former monobloc posts, which were manipulated, reamed, polished, and directly used for the fabrication of the prosthesis, these new monobloc posts are sold sterile and are directly screwed into their implant. The risk of contamination or damage of the junctional space is then nil. Furthermore, as monobloc posts are screwed only once into the implant, the artificial deepening of the peri-implant junctional space is avoided: this tissue will generate and stabilize only once. However, these implants must be parallel in the prosthesis.

This system demands the use of high-quality casting material (a specific epoxy resin) to mold perfectly the posts' machined forms as well as to obtain a master cast solid enough to directly make the prosthesis.

However, if the FM-Clip system gives impressions of great precision with neat implant outlines, its optimal usage remains limited. Indeed, because the monobloc posts do not have a blocking hexagon on their base, they are not antirotational. They are locked only by the initial tightening with the torque wrench and maintained in position by the fixed denture's infrastructure that covers them. Thus, this system is indicated in cases of fixed dentures on multiple implants and should not be used for single-tooth replacement treatment. Moreover, the FM-Clip system is not appropriate for complete implant-supported fixed dentures because it would be very difficult to manage parallelism among all these posts on a critical number of implants. Therefore, in spite of its great biological and mechanical tolerance, this monobloc-post concept remains limited to short and medium implant-supported fixed partial dentures.

CONCLUSION

This first prospective study of the FM-Clip system evaluates this easy impression procedure, even if long-term studies are still necessary to point out significant implant survival rates with prostheses built on this kind of new titanium monobloc post. If long-term results are relevant, the use of such a system could offer a new way to make high-quality implant-supported fixed prostheses with easy, high-precision, time-saving, low-cost impressions.

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