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PRESENTS

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PIEZOCLEAN by Dr. Giacomo Tarquini

The first ultrasonic cavitation system for implant
decontamination

By Dr. Giacomo Tarquini

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INTRODUCTION

Peri-implantitis is defined as the peri-implant soft tissues inflammation associated with a progressive loss of supporting bone.

With regard to the therapeutic strategy of choice, the most recent scientific evidence indicates that the surgical approach is currently considered as the treatment of choice for peri-implantitis.

The most debated and controversial aspect, issue has been certainly that one related to the implant surface decontamination: although different methods (chemical, mechanical or manual) have been described over the years, we have not yet reached a consensus on which is the most effective decontamination protocol among all those proposed so far.

Taking advantage of the well-known bactericidal and bacteriostatic properties of ultrasound, the use of the new device "PIEZOCLEAN by Dr. Giacomo Tarquini" is particularly useful since it allows access even to the most inaccessible areas, such as the implant thread, the micro and nano roughness of the surface and the internal housing of the connecting screw, unlike what happens with traditional instruments, such as curettes or rotary instruments.



Three-holed stainless steel tip ES004E.



Surgyman handpiece with "PiezoClean" device inlaid.

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He works as a freelancer in Rome with activities limited to the disciplines of oral surgery, implantology and periodontology.

BIOLOGICAL RATIONALE

The biological rationale behind the "PIEZOCLEAN by Dr. Giacomo Tarquini" device is based on the biological effects - documented by an impressive number of scientific publications in recent decades - of ultrasonic cavitation on bacterial biofilm.

Unlike what happens with other means (chemical, mechanical or manual) that have shown a relatively modest effectiveness over the years, the shockwaves caused by the cavitation of the irrigating liquid are able to reach any area of the implant surface (even the nano and microporosity of the current titanium surfaces) as well as the internal housing of the connection screw: in this way the decontamination of the implant takes place completely (both on the external surface and inside it) without altering its original chemical-physical composition.

The possibility of obtaining a complete and predictable decontamination is extremely relevant to the therapy of peri-implantitis, since the ultimate goal of the peri-implant regenerative procedure is precisely to obtain a new osseointegration process ("re-osseointegration") identical in all respects to what occurred at the time of implant insertion.

In fact, it has been demonstrated that the possibility of obtaining a new osseointegration is extremely limited on turned surfaces and / or that have been physically or chemically altered while it occurs in a much more consistent way around micro-rough titanium surfaces as long as they are properly decontaminated.

To maximize the effects of regenerative therapy, it will therefore be essential to be able to obtain a complete and predictable implant decontamination while maintaining all the surface properties unaltered.

SURGICAL PROTOCOL AND CLINICAL CASE

The use of the ultrasonic implant decontamination device "PIEZOCLEAN by Dr. Giacomo Tarquini" is essentially indicated for the treatment of intraosseous defects that require regenerative therapy in accordance with the principles of G.B.R. ("Guided Bone Regeneration").

The "PIEZOCLEAN by Dr. Giacomo Tarquini" device allows you to perform a complete decontamination of the implant without altering the macro and micro-geometry of the surface.

The "PIEZOCLEAN by Dr. Giacomo Tarquini" device is composed of a metal part (insert) and a medical silicone part (cavitation chamber) (Fig.01);



Fig. 01

The stainless steel insert is provided with three micro-holes (one axial and two lateral) (Fig.02-03) to facilitate the circulation of cooling water inside the cavitation chamber; Insert the tip into the Surgyman ultrasonic handpiece for Surgysonic® device, and tighten it with a torque wrench;

Then assemble the silicone cap (cavitation chamber) by tilting it slightly to help the interlocking on the metal insert (Fig. 04), continue with a rotating motion to make it adhere well to the tip;



Fig. 02

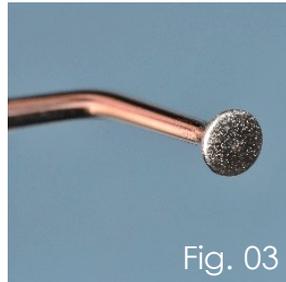
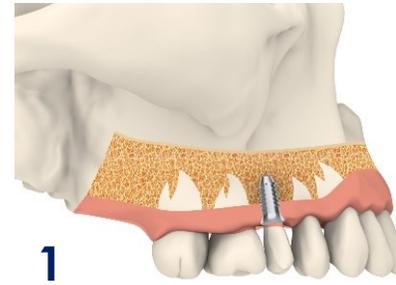


Fig. 03



Fig. 04

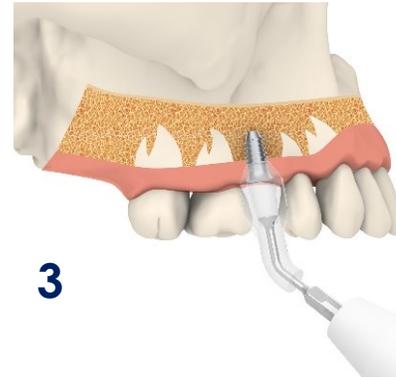
STEP BY STEP



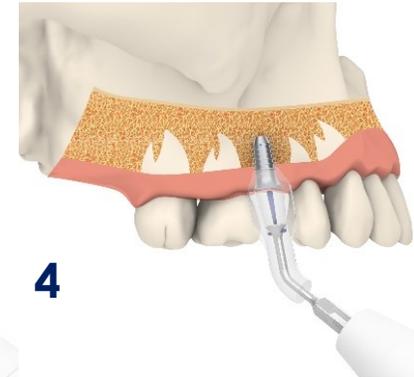
1



2



3



4



5

PARAMETERS

TIP ES004E



Conical tip with three holes for axial and bi-lateral irrigation.

ES004E

U	40
V	80
P	50
MAX POWER	50

U: Suggested power
V: Suggested vibra
P: Suggested water pump
MAX POWER: Maximum power

GUIDELINES

- **DON'T** seal the area completely to avoid overheating of the irrigation liquid;
- **AVOID** the contact of the implant with the tip.

- Preoperative periodontal probing (Fig. 05);



- Full-thickness flap elevation (Fig. 06);



- Debridement of reactive tissue by the means of ES012CT and ES030ACT tips (Fig. 06) around the implant and within the intrasosseous defect (Fig. 07-08);



Fig. 06



- The cover screw is then removed in order to decontaminate both outer and inner surface of the implant;
- The cavitation chamber is placed around the exposed part of implant; it is recommended to avoid contact between the metal insert and the implant head (Fig. 09);
- A new sterile cover screw is positioned (Fig. 10):



Fig. 09

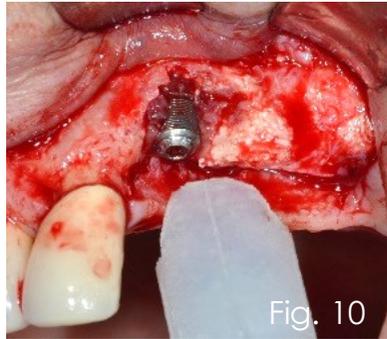


Fig. 10

- Use the ultrasound device (Surgysonic® range) for a time of 3 minutes setting the following parameters: U 40 - V 80 - P 50;
- A short pause every 60 seconds is advisable in order to avoid cooling liquid overheating;
- Be careful not to make a tight seal between cavitation chamber and crestal bone in order to avoid cooling liquid overheating;
- Carry out the regenerative protocol of choice (eg by means of resorbable or non-resorbable membranes) (Fig. 11,12 - 13);

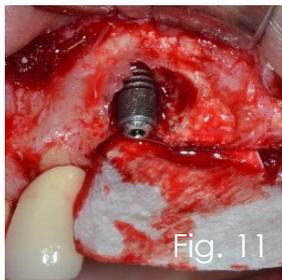


Fig. 11

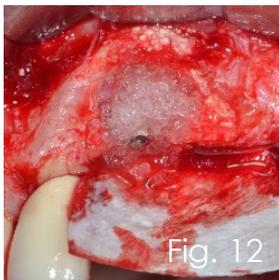


Fig. 12

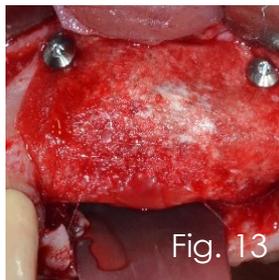


Fig. 13

- Flap suture according to the selected technique (Fig. 14);



Fig. 14

- At the moment of flap elevation peri-implant bone defect appears completely filled and previously exposed implant threads are fully covered with newly formed tissue. (Fig. 15,16-17).



Fig. 15

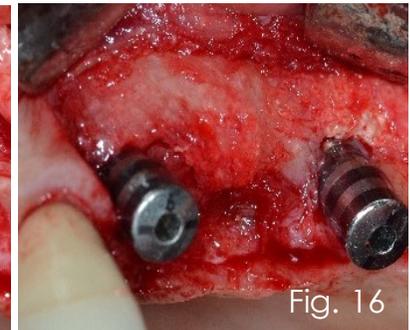


Fig. 16

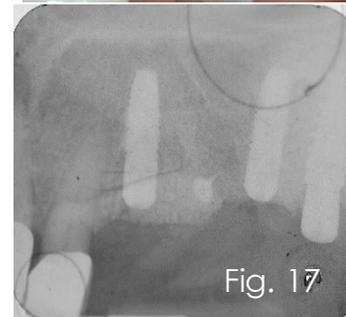


Fig. 17