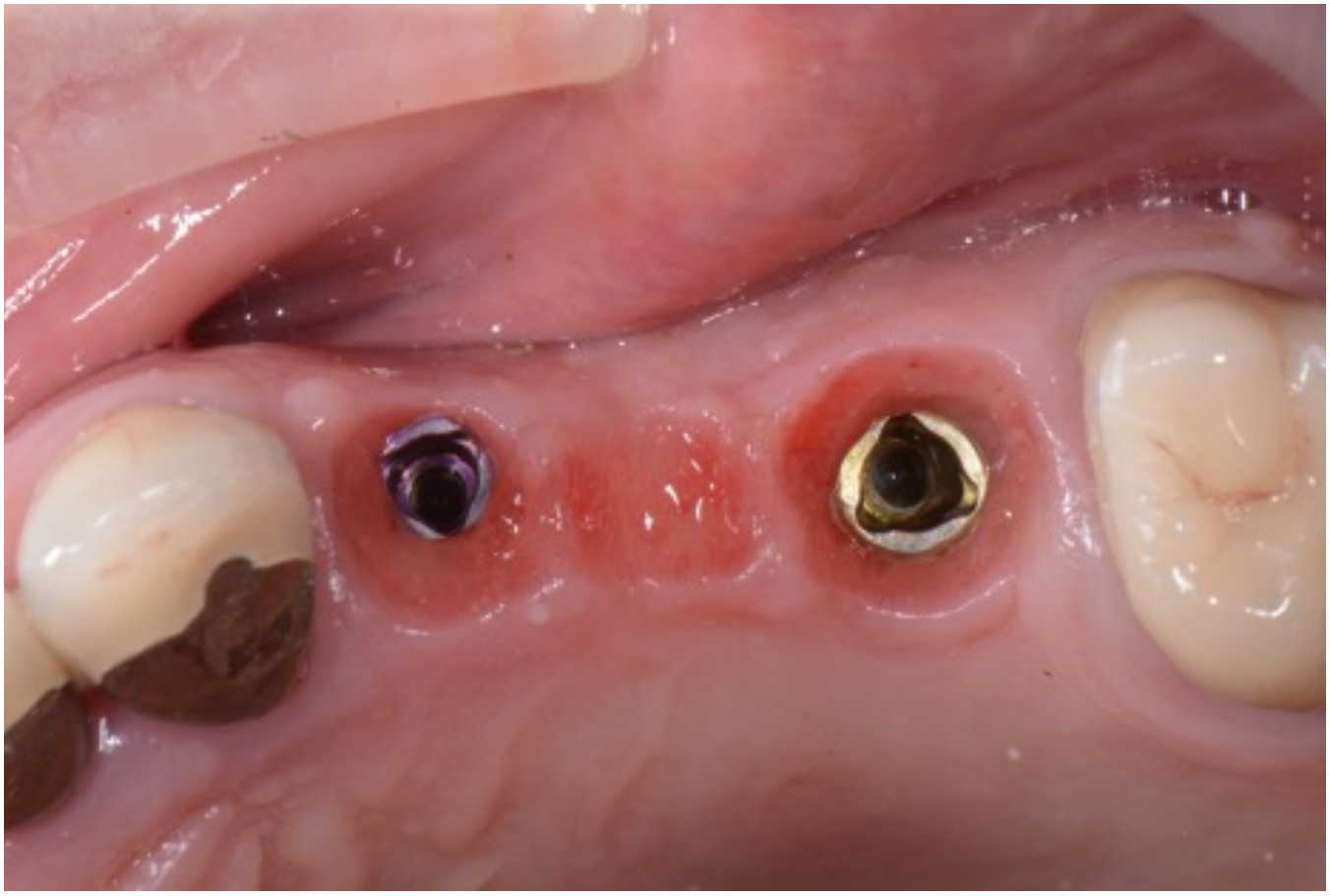
CLINICAL CASES- SILVERPLUG

Implants containing SilverPlug tracked over 4 years
Preventing Bone Loss and Peri-Implantitis- Dr. Matteo Antonini



CASE REPORT N.	
PATIENT	**YOUR**
PRODUCT	**SILVERPLUG**
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1. INTRODUCTION

One therapeutic option for replacing one or more missing teeth involves the use of osseointegrated implants with the construction of a prosthetic element fixed on them. The clinician selects an implant from a wide range of models ready for placement, and the custom-made prosthetic element is usually initially crafted in resin for functional testing. Later, the provisional resin crown is replaced with a final ceramic crown.

These two elements are interconnected through the interlocking of a protruding part on one of them (usually the prosthetic component) with various shapes (hexagon, octagon, tri-lobed, conical, etc.) and a cavity precisely matching the protruding shape, allowing a perfect fit with a tolerance reaching 50 microns in the best implementations. A tightening screw secures the two components once they are correctly interlocked.

The tightening screw must be tightened with a force recommended by the implant manufacturer. After tightening, the access channel to the screw must be sealed with composite resin matching the artificial tooth's color, both for preventing food entry and for aesthetic and functional reasons.

To prevent composite material from entering the screw head and making it impossible to engage with a screwdriver if removal is necessary (prosthetic element fracture, implant maintenance, peri-implantitis therapy, etc.), it's essential to cover the head with a easily removable filler. In clinical practice, fillers like Teflon tape for hydraulic use, hydrophilic cotton, thermoplastic materials, or impression materials not designed for this purpose are used. Moreover, it's known that a micro-gap exists between the implant and the prosthetic part, causing micro-movements that facilitate anaerobic bacteria colonization of the filling material.

Extensive literature shows that all materials used so far are quickly colonized by bacteria, becoming a reservoir for pathogenic bacteria responsible for inflammation and infection of peri-implant tissues and, in the long term, dental implant rejection (peri-implantitis).

SilverPlug is a certified medical device designed specifically to fill the space, preventing the composite used to seal the access hole to the implant tunnel from coming into contact with the screw. Simultaneously, its characteristics drastically reduce spaces for bacterial proliferation and, consequently, the bacterial load in the entire implant-prosthetic complex.

2.1 Patient Information

T.U., 56 years old, comes to our attention with missing teeth in positions 1.4, 1.5, and 1.6. He requests the replacement of these missing elements with implants. The bone thickness in the 1.6 area is insufficient for an implant, so a maxillary sinus lift with lateral access is planned.

2.2 Clinical procedure

We proceed with the execution of a maxillary sinus lift with lateral access and simultaneous placement of two implants: Nobel Replace 4.5x10 and Nobel Replace 3.7 x 13. After the osseointegration of the implants (after 4 months), we took the impression for the provisional bridge screwed onto implants 1.4 and 1.6. After 15 days, we proceeded with the application of the same. According to the protocol, the provisional bridge is disinfected with hypochlorite, and the implant lumens are disinfected with H2O2 and then filled with chlorhexidine gel. Finally, the provisional bridge screwed onto the implants is applied.

2.3 Pathological examination

The 1.4 and 1.6 implants show perfect osseointegration with both native bone and bone regenerated through maxillary sinus lift. Tissues appear healthy, the temporary bridge fits well on the implants, and it has a shape suitable for the patient's masticatory physiology. From an objective clinical examination, there are no ongoing pathologies or signs of inflammation. The access channels of the crowns screwed onto the implants are patent, requiring closure.

Next

2.4 Treatment with the SilverPlug

SilverPlug is inserted into the access tunnel, and the access hole is sealed with composite resin. The expectation is that the access channel is adequately sealed without composite invading the screw head; the composite sealing material will be kept away from the screw head thanks to SilverPlug. The presence of SilverPlug will reduce colonization by pathogenic bacteria, preventing them from filtering through the gap between the prosthetic part and the implant. It physically occupies space and, with the silver zeolite, hinders bacteria colonization on its external surface.

SilverPlug is adapted for the temporary and engaged in the access hole. It is inserted and positioned with a plugger. Subsequently, the access hole is sealed with temporary composite.

2.5 Follow-up: Clinical parameters to be evaluated

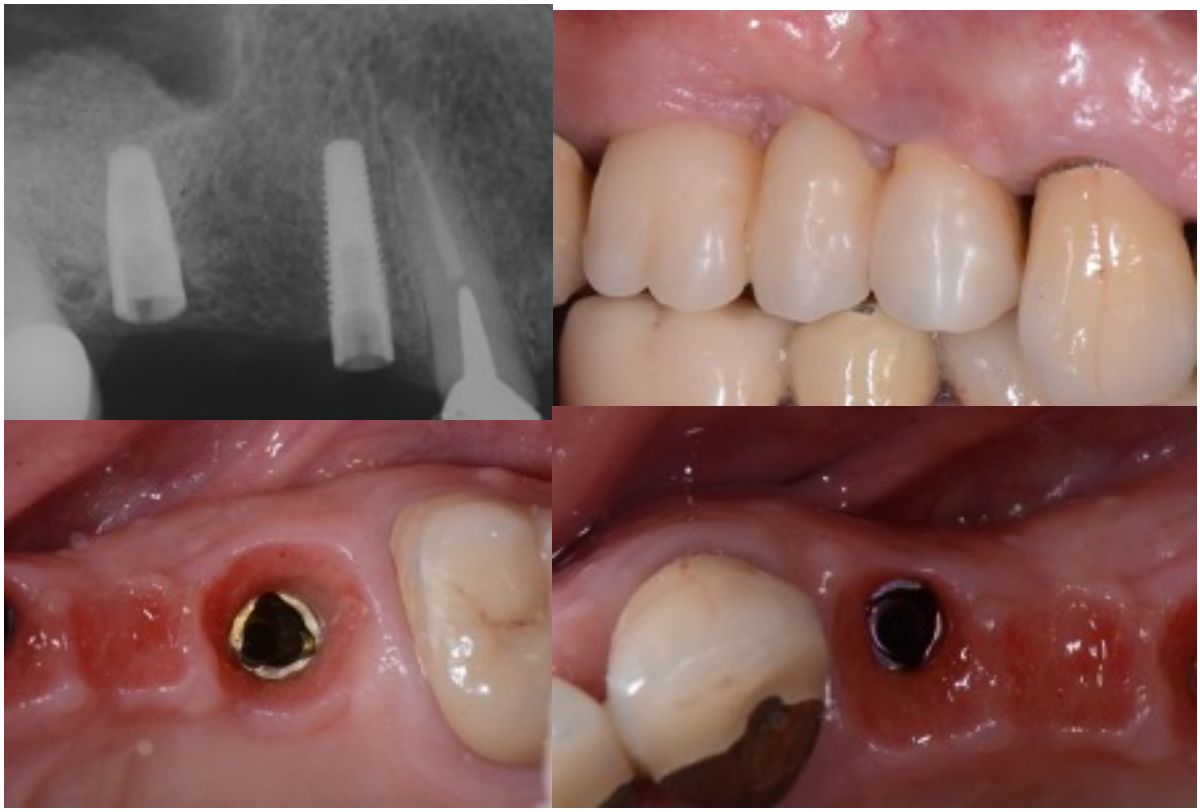
We have adopted the following objective clinical signs as control parameters:

1. Chromatic appearance of peri-implant tissues: they appear red in case of inflammation or infection.
2. BoP (bleeding on probing): a circumferential probing is performed to observe the presence of inflammation and/or bleeding.
3. Circumferential palpation: suppurative discharge from the peri-implant sulcus is observed in the presence of infection.
4. Olfactory evaluation: presence of a foul odor upon removal of the sealing composite: if there are anaerobic bacteria, the removal of the composite seal emits a characteristic putrefaction odor, often noticed by the patient. This is sensed only during the removal of the composite sealing the access channel.
5. Control X-ray to assess possible bone resorption.

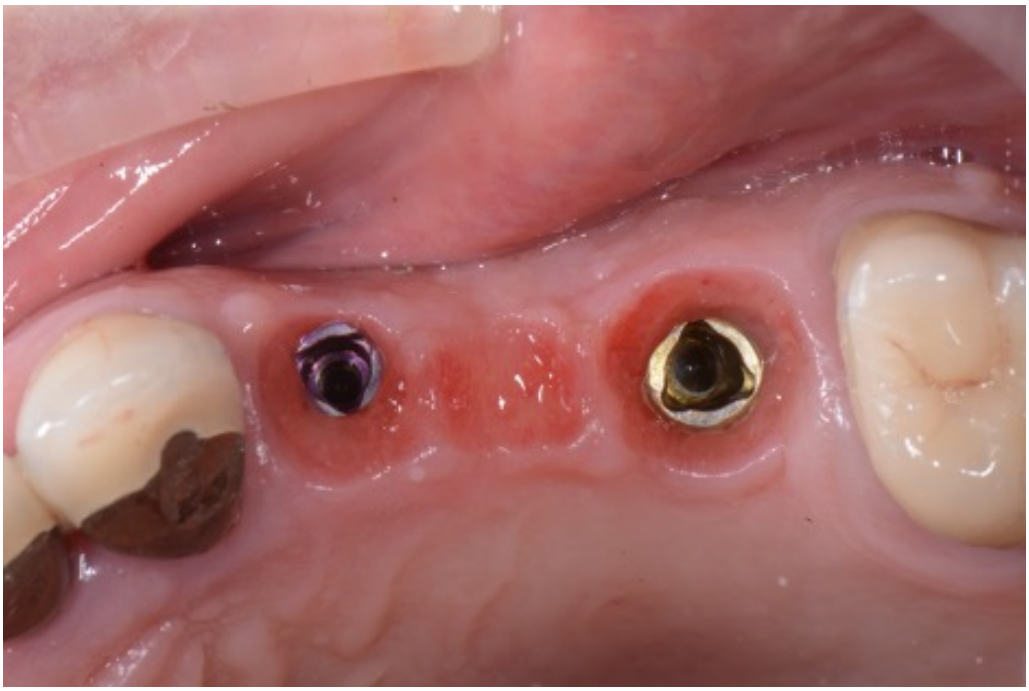
2.6 Follow up a 1 Year

After 1 year, the provisional is removed to take the impression for the final restoration. Tissues around the provisional crown appear pink and perfectly healthy upon clinical observation. The transmucosal pathway shows no signs of inflammation or infection. Circumferential probing is negative (negative BOP). Palpation reveals no purulent exudate. There is no odor of putrefaction, and the radiographic appearance of the bone is regular.

2.4-6 Treatment SilverPlug Immediate Placement 1 Year Follow Up



Immediate Placement



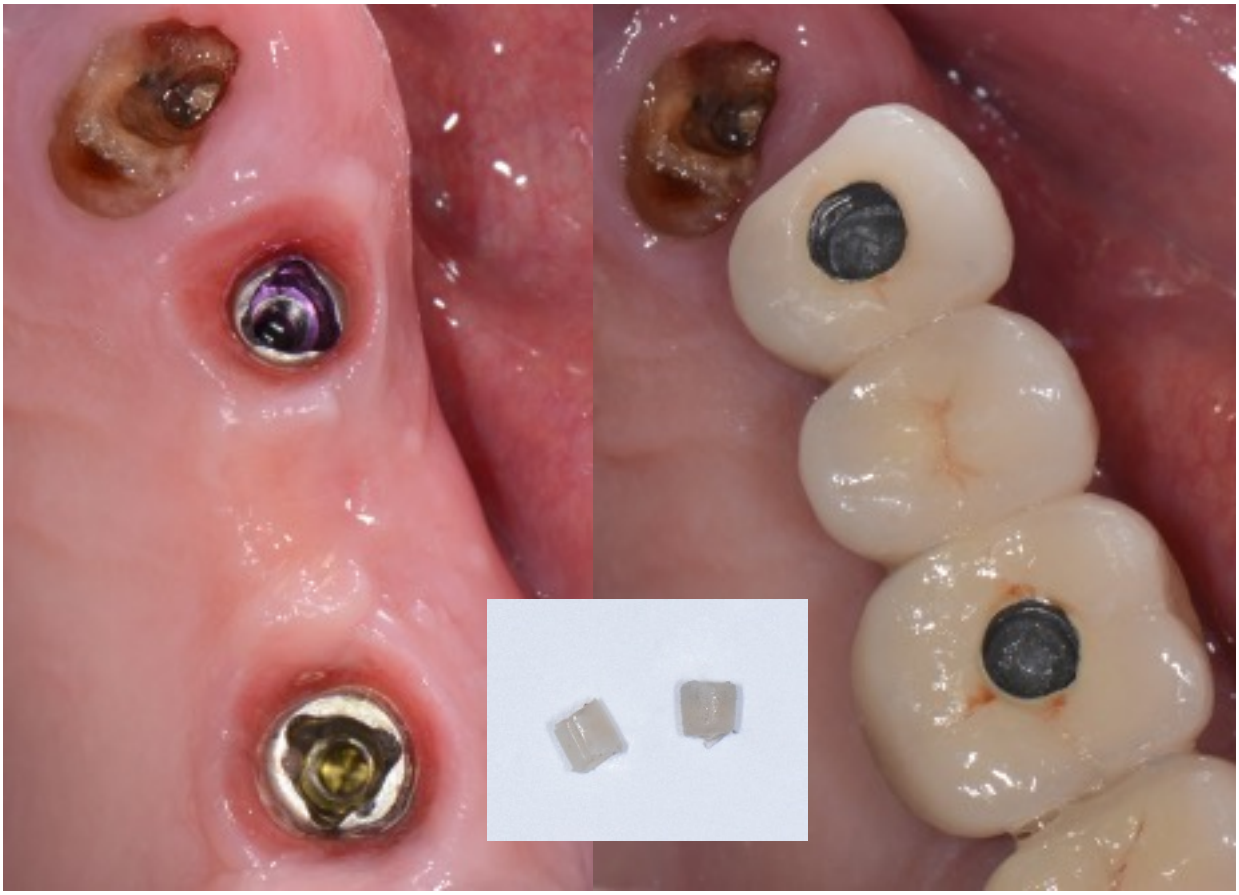
1 Year follow up

The final zirconia bridge has been produced by the laboratory and screwed onto implants 1.4 and 1.6. Following the standard procedure, the bridge has been disinfected with hypochlorite, and the implant lumens with H2O2. The bridge has been positioned and secured with two tightening screws tightened to the correct torque. Two SilverPlugs have been applied to seal the access tunnel to the tightening screw, preventing it from being blocked by the composite used to seal the access hole.

2.7 Follow up a 4 Years

Due to the fracture of element 1.3, the permanent bridge (1.4, 1.5, 1.6) is removed to be replaced by a temporary bridge from 1.3 to 1.6. In this circumstance, the tissues are examined and checked. Tissues around the temporary crown appear pink and perfectly healthy upon clinical observation. The transmucosal pathway shows no signs of inflammation or infection. There is no odor of putrefaction. No bleeding occurs during probing (negative BOP), and no purulent exudate is observed upon palpation.

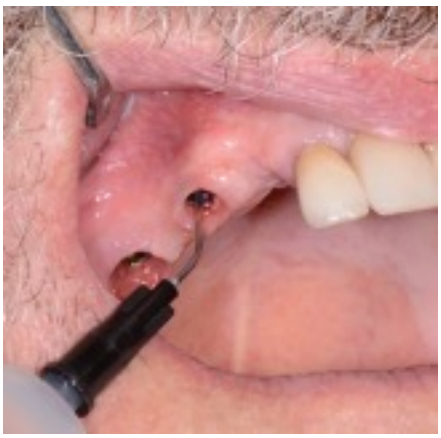
The zirconia permanent bridge is thus replaced with a temporary bridge. In this case as well, SilverPlug is applied, and the access holes to the tightening screws are sealed with composite.



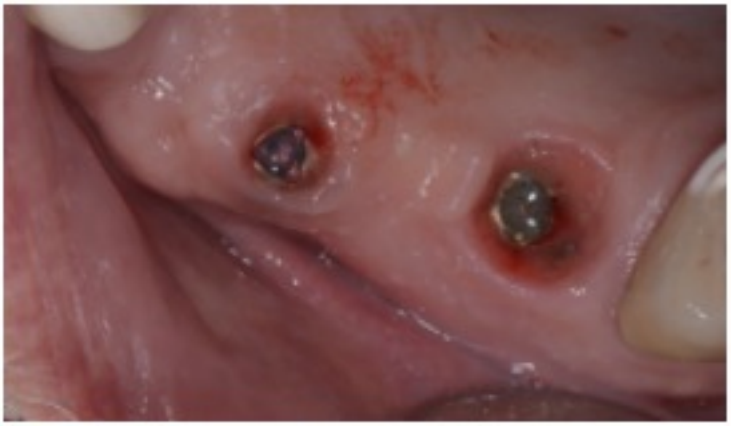
SilverPlug cut to length and inserted

2.8 Follow-up at 4 years and 3 months

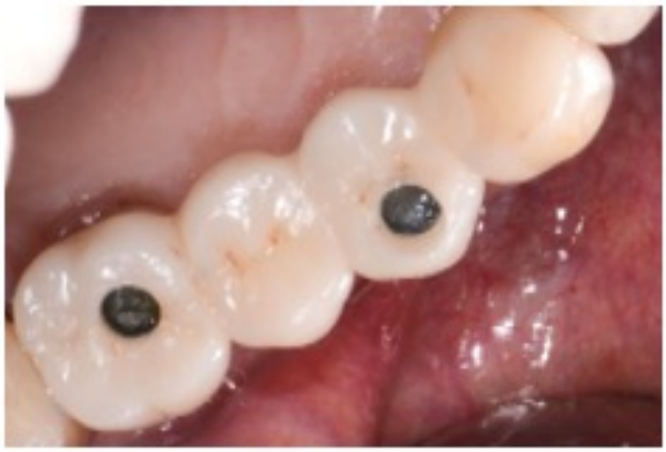
After 3 months, the temporary bridge is removed to be replaced by a permanent bridge. The tissues are examined and checked. Tissues around the temporary crown appear pink and perfectly healthy upon clinical observation. The transmucosal pathway shows no signs of inflammation or infection. There is no odor of putrefaction. No bleeding occurs during probing (negative BOP), and no purulent exudate is observed upon palpation. According to the protocol, the implants are filled with disinfectant gel, and the final ceramic bridge is positioned and secured with screws tightened to the correct torque. The access tunnel is sealed with SilverPlug, and finally, the access hole is closed with composite.



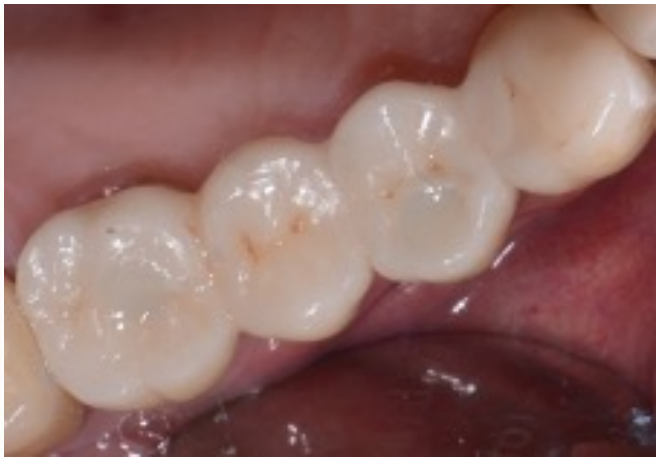
Access tunnel sealed again with SilverPlug



No indications of inflammation or infection



SilverPlug prior to composite



Final Bridge Placed and Sealed

1. DISCUSSION

From the literature, it is well known that there is no effective connection between the implant and prosthesis to prevent the entry of bacteria into the implant-prosthetic system. In the case at hand, the entry of bacteria through saliva is facilitated by the fracture of the implant neck. Given the specific conditions of anaerobiosis, lack of immune defenses, abundance of nutrients, and ideal temperature, colonies of pathogenic bacteria develop within the implant-prosthetic system, leading to inflammation of peri-implant tissues (mucositis) and peri-implant infections (peri-implantitis). It is also necessary to place an insulator between the composite used to seal the access hole and the tightening screw.

All materials used so far (uncertified) have proven to be a breeding ground for bacteria. The bacterial load within the implant-prosthetic system exits through the gap between the implant and prosthetic element, colonizing peri-implant tissues.

Depending on the patient's genetic susceptibility, this bacterial load can cause chronic inflammation or act as a trigger for an infectious process that can lead to the loss of bone tissue and implant failure. The use of SilverPlug proves to be a valuable ally even in extremely high-risk cases in the long term, preventing implant diseases, and demonstrates that its design is suitable for the purpose.