

LONG-TERM SUCCESS OF COMPLEX IMPLANT-PROSTHETIC REHABILITATION IN THE ABSENCE OF ORAL HYGIENE (1977-2024). A CASE REPORT

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ABSTRACT

A lack of adequate oral hygiene, resulting in the accumulation of supragingival tartar, and the absence of professional checkups over time have allowed, against all odds, the "survival" of one-piece, Italian-style immediate-load implants placed in 1977. Likewise, the retention of subperiosteal implants made of "Vitallium" alloy has made it possible to restore, in an eighty-year-old patient, the outdated "mixed" rehabilitation, apparently no longer functionally and aesthetically suitable.

KEYWORDS: *occlusal trauma, peri-implantitis, oral hygiene, one-piece implants, subperiosteal implants*

INTRODUCTION

An 84-year-old female patient presented to us due to a fracture of the upper denture made in 1977 by Prof. Ugo Pasqualini. This full-arch prosthetic restoration was constructed with mixed support on dental abutments from 1.5 to 2.3 and implant support on subperiosteal implants placed in the posterior sectors of quadrants 1 and 2.

An intraoral examination in 2017, revealed a clinical picture characterized by the presence of a fracture of the upper denture made of gold-ceramic alloy, in quadrant 2; upper root remnants resulting from widespread carious infiltration of the prosthetic abutments; lower fixed full-arch denture, also with mixed support, was in apparently good condition; significant accumulations of tartar above the gums with clear signs of inflammation of the periodontal tissues, especially around the remaining teeth and not around the one-piece, immediately loaded Italian-style implants (Fig. 1-6).



Fig. 1. *The patient's mouth 40 years after implant-prosthetic rehabilitation.*

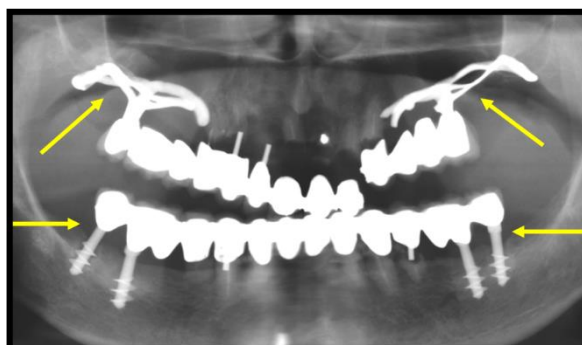


Fig. 2. *The orthopantomography shows that the implants, highlighted by the yellow arrows, have remained perfectly efficient without any bone loss (2017).*



Fig. 3. *Arrows indicating the health of the lower one-piece implants.*

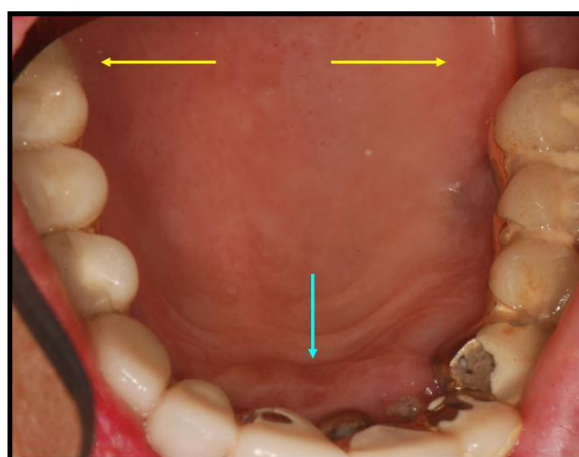


Fig. 4. *Palatal view of the upper arch. The yellow arrows indicate the good mucosal behavior of the subperiosteal implants, while the blue arrow highlights the inflammation of the mucosa around the natural elements.*



Fig. 5. Detail of the right subperiosteal implant after 40 years of function. The slight dehiscence of the buccal mucosa does not indicate inflammation despite the plaque.



Fig. 6. The contralateral implant, although covered in tartar, maintains its activity without inflammatory symptoms.

The first level radiographic examination (Fig. 2) highlighted the need to proceed with the removal of the compromised upper dental abutments. The same diagnostic examination, especially considering the time elapsed, did not reveal any signs of bone resorption affecting the upper subperiosteal implants and those placed in quadrants 3 and 4 (one-piece Tramonte screw titanium implants, with 4.0 mm diameter threads and a 2.5 mm core). The presence of a lesion affecting 4.4 of likely endoperiodontal origin and widespread signs of periodontal disease were also highlighted.

Given the clinical picture and the urgency of restoring masticatory function, it was decided to proceed with the reuse of part of the upper prosthesis by designing a fixed rehabilitation that could exploit the existing subperiosteal implants, as they were still functionally valid.

We therefore proceeded, in a single session, to remove all the tartar accumulations present in the upper quadrants and extract the root remnants. Then, we moved on to insert, in the premaxilla area, six one-piece titanium implants (Garbaccio bicortical screws) with a thread diameter of 3.5 mm and a core of 2.2 mm (Fig. 7). The positioned implants were joined together with a 1.2 mm diameter titanium bar, electrowelded to ensure immediate loading with a temporary resin restoration (1); however, the crowns (two on each side) supported by the subperiosteal implants (implants made of "vitallium," an alloy primarily used in the 1970s) were left in place (Fig. 8).



Fig. 7. The new minimally invasive immediate-load implant-prosthetic procedure.

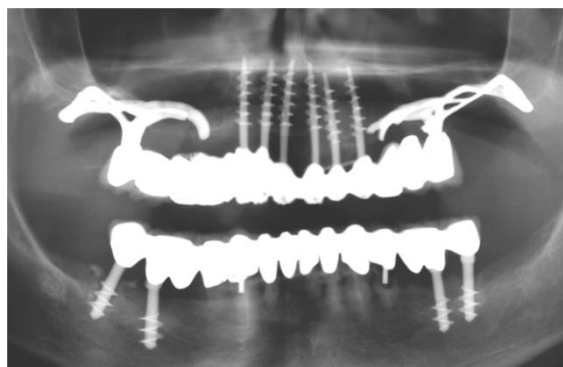


Fig. 8. The OPT of the completed case (2017).

Professional hygiene of the lower teeth was postponed to another session, to not contaminate the operatory field (Fig. 9).



Fig. 9. After oral hygiene, the view of the lower distal sectors demonstrates how the Italian School's one-piece implants have maintained the health of the mucosa and bone tissue, despite the lack of oral hygiene over 40 years (1977-2017).

With the patient's consent, it was also decided to postpone treatment of the dental problems present in the natural teeth of the lower jaw. The decision to proceed this way was justified by the need to ensure the restoration of chewing function and aesthetics, albeit with temporary prosthetic elements, in a single appointment. The patient immediately underwent an adequate professional hygiene session (2017) and, once the case was completed, did not return for follow-up visits. After 7 years (2024), at the report of her daughter, she died maintaining her implant-prosthetic rehabilitation.

DISCUSSION

The clinical case is described not so much to illustrate how a minimally invasive restoration of an old and no longer functional implant-supported prosthetic rehabilitation was carried out, but rather to highlight how persistent poor oral hygiene did not directly result in the loss of functional implants. In general, implant loss is associated with the onset of infectious-inflammatory diseases. Peri-implant disease involves predisposing factors, causes, and/or contributing factors that can act individually or in combination. Biomechanical overload, the presence of pathogenic bacteria, previous periodontal disease, smoking, diabetes, and systemic diseases represent significant risk factors.

The specific clinical case, upon physical examination, showed abundant plaque and tartar accumulation due to a lack of oral hygiene, both at home and at the dentist's. Plaque is a physiological accumulation of mixed organic and inorganic substances, with a significant microbial content, particularly bacteria, which, in addition to adhering to the surface of teeth, can tenaciously attach to implant-prosthetic structures (2, 3, 4). The plaque composition is similar on both teeth and implant abutments, primarily consisting of aerobic Gram-positive cocci and non-motile Gram-negative bacteria (5, 6, 7).

In the presence of healthy soft tissue, implants and natural teeth are colonized by plaque composed predominantly of cocci and Gram-positive bacilli, while sites with widespread periodontal and/or peri-implant disease contain biofilms with a significant quantity of rod-shaped, fusiform, and spiral-shaped bacteria, significantly more prevalent than coccoid and mobile forms (8). The microbes found at implant failure sites belong mainly to the *Fusobacterium* and *Bacteroides* species. Furthermore, a notable difference has been highlighted between the bacterial morphotypes of totally edentulous patients and those of partially edentulous patients; this seems to indicate a greater predisposition to peri-implantitis in partially edentulous patients. The so-called periodontal pathogens would decrease in the implant sulcus of totally edentulous patients, even though, in these subjects, they would remain present for a long time (9-12). In determining the damage to the peri-implant tissues, the primary role of bacteria is limited, since if a solution of continuity is not established through the muco-gingival seal of the circumferential tissues, they are unable to invade the underlying tissues because they are unable to perforate the seal itself.

Therefore, an important role, even in the absence of plaque and tartar, must be attributed to chronic mechanical stress due to occlusion trauma, which can alter the muco-gingival seal and allow the transfer of bacteria into the deep tissues, transforming from saprophytes into opportunistic pathogens (13-16).

From data available in the literature, it emerges that in the muco-implant seal at the level of the crestal margin, in the absence of occlusal load and, in particular, of stress-inducing pressure factors (dysfunctional occlusal load), a very regular spontaneous bacterial stabilization persists. The orderly and relatively repetitive presence of Gram-positive cocci hinders the development of pathogenic peri-implant microbiotic conditions that can favor bacterial invasion of the deep tissues, leading to infection and, therefore, peri-implantitis. Therefore, it is only the absence of biomechanical stresses (occlusion-static-dynamic load) that guarantees the maintenance of a healthy balance between the implant screw-bone-mucosa system on the one hand and the bacterial front on the other (17).

The bacterial component, in fact, maintains a constant saprophytic-commensal, non-invasive-aggressive effect, regardless of the morphologies that progressively develop along the transmucosal tract and the interface between the implant and the crestal bone margin.

In our specific case, despite the presence of massive bacterial plaque associated with tartar accumulations, no significant negative effects were observed on the implant structures, as they are the pillars of a prosthetic rehabilitation under conditions of occlusal equilibrium. Therefore, it is clear that a lack of oral hygiene alone cannot compromise an implant-prosthetic rehabilitation; however, this type of rehabilitation has a high probability of failure when it cannot withstand occlusal loading under conditions of imbalance. This latter situation undoubtedly represents the predisposing condition for the bacterial profile to transform from saprophytic to pathogenic (18, 19).

CONCLUSIONS

The fact that a healthy organism, intact in its structural, functional, metabolic, and immune components, can be attacked ab initio by various types of microbes present in the oral cavity, regardless of factors that facilitate their transformation from a saprophytic to a pathogenic state, contradicts biological principles. The reported clinical case highlights that, even in the presence of inadequate oral hygiene conditions, it is possible to maintain prosthetic rehabilitations supported by implants in good condition for years. While this is an event that can be observed in daily clinical practice, it does not justify patients' failure to comply with basic oral hygiene rules. Indeed, implant-supported prosthetic rehabilitations require healthy peri-implant tissues and the entire oral cavity. Patients should therefore be advised to follow home hygiene instructions and professional reminders in order to reduce the risk of infectious-inflammatory complications of the periodontal and peri-implant tissues, even under optimal technical conditions of the prosthetic device, which should be maintained in correct occlusal harmony over time as a primary principle of clinical prevention (20-22).

Conflicts of Interest Statement

"The authors have no conflicts of interest to declare".

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