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Peri-implant mucositis: treatment with a new collagenic hydrogel

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Description

Mucositis is a peri-implant disease that is characterized by initial, reversible gingival inflammation that is localized to the peri-implant soft tissues without loss of bone structure.

The main clinical feature of peri-implant mucositis is bleeding after gentle probing. The article presents the case of a 64-year-old patient who, during a recall visit, showed bleeding on probing at the level of the implant at position 25 and a pocket depth of 5 mm both mesial and distal. The subsequent periapical radiograph showed no bone loss and confirmed the diagnosis of peri-implant mucositis. The latter was treated non-surgically with a new collagen hydrogel (H42®, Bioteck Spa, Arcugnano - Vicenza) following removal of the bacterial plaque using an Er: YAG laser.

Following mechanical treatment, the site was kept dry during the application of H42® hydrogel, which was extruded directly from the syringe through appropriate 25-gauge cannula needle, starting from the bottom of the pocket and filling it up to the gingival margin. At this point, the site was kept dry for 5 minutes through the use of a high-speed aspirator, and the patient was discharged without restriction in oral hygiene or feeding.

Follow-ups at 1 week and 3 months showed significant improvement in the clinical condition of the site, reduction of pocket depth from 5 mm to 3 mm and to 1 mm, on the mesial and distal aspect, respectively. Improvement in periodontal parameters was associated with complete healing of peri-implant tissues.

Introduction

In recent decades, implant rehabilitation has become a widespread and increasingly predictable procedure, thanks to the evolution of surgical and prosthetic protocols as well as of the materials used to make implants[1-4].

At the same time, the increase in implant rehabilitations has led to an increase in peri-implant pathologies such as mucositis and peri-implantitis. Both peri-implant diseases originate mainly from the accumulation of bacterial biofilm that triggers inflammation of gingival tissues and the progressive damage of the alveolar bone[5]. Mucositis has a prevalence of about 43 % of implants[6] and represents the stage preceding peri-implantitis[7]. Mucositis is characterized by initial, reversible gingival inflammation but without the bone loss seen in peri-implantitis. It is therefore important to intervene early with treatment of mucositis in order to prevent its evolution into peri-implantitis.

The diagnosis of mucositis involves the presence of bleeding on gentle probing and clinical signs of inflammation, erythema, swelling/hyperplasia, and/or suppuration[8]. Often, these clinical signs are associated with increased probing depth resulting from swelling and/or decreased probing resistance[8]. All non-surgical protocols in cases of peri-implant disease should include the following steps: a) diagnostic evaluation update, b) patient re-motivation, c) decontamination, d) detoxification[9].

In cases of mucositis, the nonsurgical protocol appears to be the most suitable approach and should be associated with a somewhat favorable prognosis, provided the clinician succeeds in decontaminating and detoxifying the implant site[9].

Peri-implant diseases, including mucositis, are important diseases because of their high prevalence rate and the absence of standard therapy[10]. The main goal of treatment is to remove biofilm and any calcified deposits, without altering the implant surface, with the ultimate goal of recovering the healthy condition of peri-implant tissues[9]. In the following clinical case, a new collagen-based hydrogel (H42®, Bioteck Spa, Arcugnano - Vicenza) was used at the end of the decontamination and detoxification procedures to seal the site and prevent reinfection of the peri-implant tissues and to promote healing of the peri-implant tissues.

Clinical Case

At the patient's recall appointment, the clinician updated the oral health diagnosis with a circumferential probing of all the dental elements present. The analysis showed on the implant at position 25, probing values of 5 mm associated with bleeding on both the mesial and distal aspects (Fig.1-2). The gingival tissues appeared clinically edematous and swollen (Fig.1). Subsequent periapical radiography confirmed the absence of bone loss (Fig.3), performed at the same time as the diagnosis of peri-implant mucositis.

After mechanical treatment with Er: YAG laser (Pluser, Doctor Smile, Lambda S.p.A.,Vi), the site was dried repeatedly, either with microbrush or paper cones (Fig.4-5). Next, the peri-implant pocket was completely filled with H42® (H42®, Bioteck Spa, Arcugnano - Vicenza), by conveying the product with a 25-gauge cannula needle, starting from the bottom of the pocket and reaching the gingival margin (Fig.6-7). During product extrusion and for the next 5 minutes (referred to as "setting time"), the site was kept dry by the use of a high-speed aspirator. The "setting" time promoted the adhesion of H42® to the connective tissues within the pocket. In the days following treatment, patients did not have to observe any special precautions in dental hygiene or diet.

At the next follow-up appointment one week after treatment, the tissues appeared to be in a clinically stable condition (Fig.8a), which was also verified by applying the probe perpendicular to the vertical axis of the prosthetic construct supported by the implant in position 25 (Fig.8b).

The comparative clinical images in Figure 1 and Figure 8 b, taken one week apart, produce clinical evidence of a particularly promising outcome.

Follow-up at 3 months showed soft tissue healing, and periodontal probing showed the decrease in pocket depth from 5 mm to 3 mm on the mesial aspect and from 5 mm to 1 mm on the distal aspect (Fig.9).

Figure 10 documents the clinical (Fig.10a-c) and radiographic (Fig.10d) stability of the case at one-year follow-up.

Discussion and Conclusions

Mucositis is a peri-implant disease caused by the accumulation of bacterial plaque that triggers an immune response that progressively damages the connective epithelium[5]. This leads to the formation of peri-implant pockets that can evolve into peri-implantitis involving the alveolar bone. It is therefore important to intervene early with the treatment of mucositis in order to prevent their evolution into peri-implantitis. In order to arrest its progression, peri-implant pockets affected by mucositis are initially treated with a non-surgical approach to remove the plaque and promote soft tissue healing. In cases of mucositis, the nonsurgical protocol appears to be the most suitable approach and should be associated with a favorable prognosis, provided that the clinician succeeds in decontaminating and detoxifying the implant site[9]. The standard procedure involves the use of mechanical instrumentation (air polishing devices, Er: YAG lasers, titanium

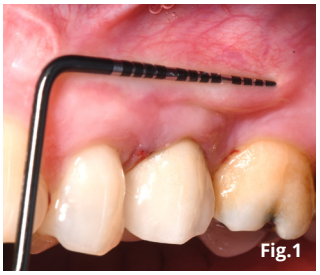


Fig.1

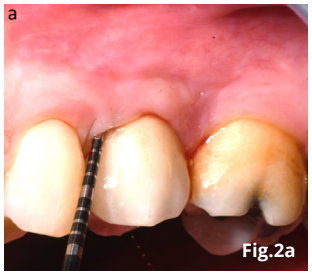


Fig.2a

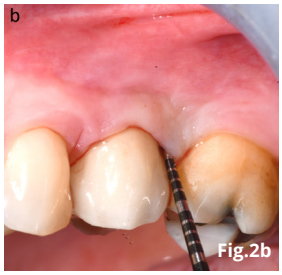


Fig.2b

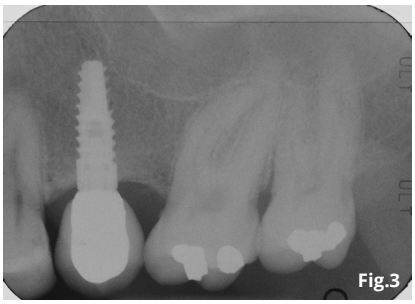


Fig.3

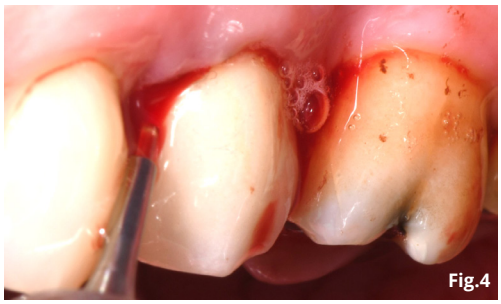


Fig.4

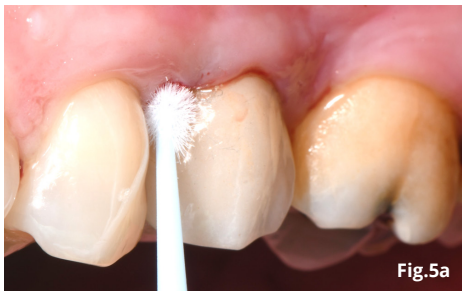


Fig.5a

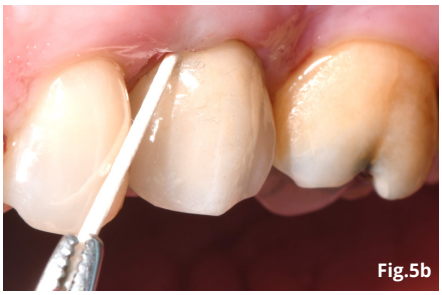


Fig.5b

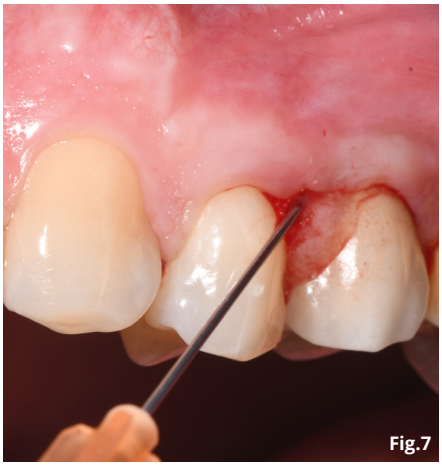


Fig.7

Fig.6

Figure 1. The periodontal probe, applied perpendicularly to the long axis of the implant-supported prosthetic restoration, allows for the display of loose tissue tone and edematous appearance.

Figure 2a-b. The periodontal probe detects 5 mm probing depth on both the mesial (a) and distal (b) aspects of the implant at position 25, associated with bleeding.

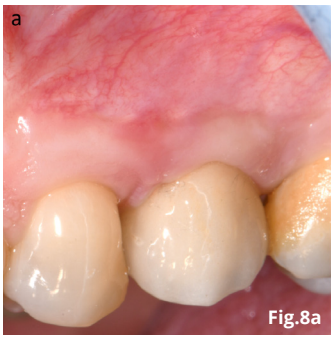
Figure 3. The diagnosis of mucositis is confirmed by periapical radiography showing no bone loss.

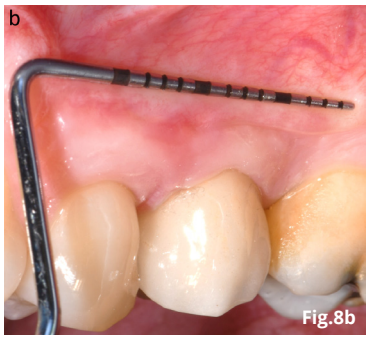
Figure 4. Mechanical treatment of the peri-implant pocket affected by mucositis, using Er: YAG laser. Several fragments of mineralized deposits are observed escaping from the inflamed peri-implant sulcus, documenting an effective mechanical decontamination action, a conditio sine qua non to be able to achieve healing of plaque-induced mucositis.

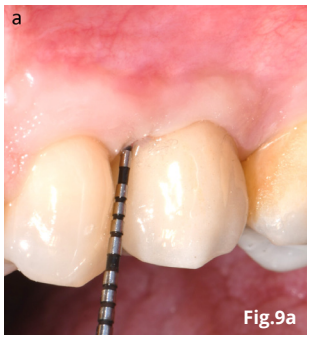
Figure 5a-b. The treated site is dried by microbrush (a) and paper cones (b) in preparation for treatment with the collagen hydrogel H42® .

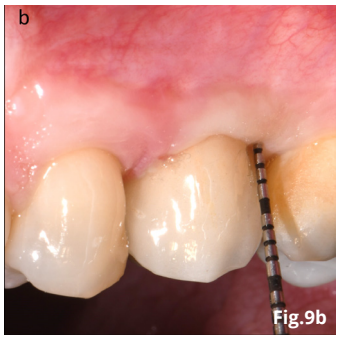
Figure 6. H42® collagen hydrogel is presented inside syringes provided with male luer lock so that they can be matched to the most appropriate needle.

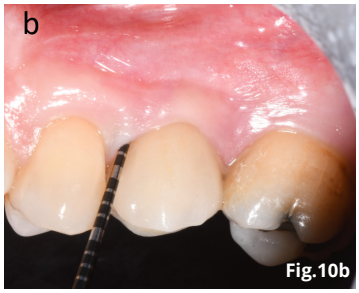
Figure 7. Filling the peri-implant pocket with collagen hydrogel H42®. The latter is extruded via 25 G cannula needle from the bottom of the pocket toward the gingival margin.

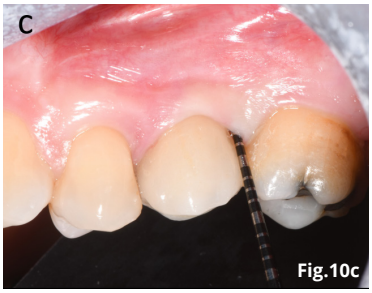












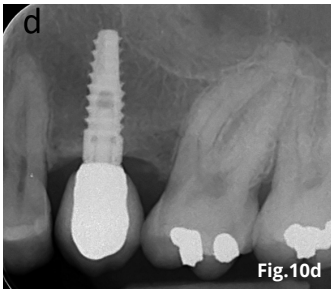


Figure 8a-b. Clinical appearance of the case one week after treatment (a). The periodontal probe, applied perpendicularly to the long axis of the implant-supported prosthetic construct (a) allows the clinical stability of the peri-implant mucosal seal to be assessed, which is definitely satisfactory already after one week compared with the initial clinical condition.

Figure 9. At 3-month follow-up, the periodontal probing was reduced from 5 mm to 3 mm, on the mesial aspect (a) and to about 1 mm on the distal aspect (b), so it was possible to successfully resolve the mucositis of this site with a nonsurgical approach while safeguarding the longevity of the implant-supported prosthetic restoration.

Figure 10a-d. Clinical images (a-c) and periapical radiograph (d) at one-year follow-up, documenting the clinical stability of the case. The periodontal probe applied vestibularly and perpendicularly to the vertical axis of the implant highlights the stability of the peri-implant mucosal seal (a). Absence of bleeding on probing is noted (b-c).

curettes, and ultrasonic curettes with plastic sleeves) to remove the bacterial biofilm that causes inflammation and damages the gingival tissues. However, one of the most difficult challenges is to protect the treated site after treatment without disturbing the natural regenerative process, which takes about 4 weeks to come to completion[11]. Several local-acting products exert their function by antibiotics and/or bactericidal substances, which while effective in counteracting bacterial reinfection, may interfere with the natural process of tissue regeneration. Collagen, on the other hand, is the protein that makes up most connective tissues (including gingival tissue), and its supply provides a *scaffold* for the proliferation of fibroblasts and cells involved in gingival tissue regeneration. The present clinical case shows the use of the new collagen *hydrogel* (H42®, Bioteck Spa, Arcugnano - Vicenza) consisting of type I collagen, resorbable polymers and ancillary amounts of vitamin C, following mechanical treatment, in a peri-implant pocket affected by mucositis.

Results at 1-week follow-up showed the tissues in a clinically stable condition and free of the initial edematous appearance. Follow-up at 3-month follow-up confirmed healing of the gingival tissues and reduction in pocket depth (reduced by 2 mm mesially and 4 mm distally). Subsequent follow-up at 12 months showed excellent maintenance of peri-implant tissues and preservation of alveolar bone (fig.10). The H42® *hydrogel* exerted its occluding function, preventing bacterial recolonization, and at the same time, the collagen provided the necessary scaffold for fibroblasts to colonize the defect and promote healing of the gingival tissues around the implant. No side effects were observed.

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