Use of a new collagen hydrogel in the treatment of peri-implant pockets: a case series.

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DESCRIPTION

The article presents a case series (10 clinical cases) of non-surgical treatment of peri-implant pockets. In all cases, a new collagen *hydrogel* (H42®, Bioteck Spa, Arcugnano - Vicenza) was applied following removal of bacterial plaque using dedicated ultrasonic inserts and manual curettes.

The 10 treated patients (10 peri-implant pockets) had no systemic disease and had peri-implantitis.

The peri-implant pockets had the following parameters: mean pocket depth (PPD) of 6.3±0.5 mm and a mean plaque index (PI) of 2.0±0.7. Following mechanical treatment, the site was kept dry during the application of hydrogel, which was extruded directly from the syringe through appropriate needle, starting from the bottom of the pocket and filling it until the defect was filled.

At this point, the site was kept dry for 5 minutes through the use of a surgical aspirator, and the patient was discharged without restriction in oral hygiene or feeding. Patients so treated showed accelerated gingival tissue healing and reduced tissue inflammation, as early as 7 days.

Follow-ups at 30 and 90 days showed improvement in all parameters, with PPD decreasing by about 2 mm, while PI was halved.

INTRODUCTION

Peri-implantitis is an inflammatory disease of hard and soft tissues that arises around osseointegrated implants and progressively damages alveolar bone[1]. The prevalence of peri-implantitis is approximately 22% with respect to all implants[2]. Risk factors include a history of periodontal disease, smoking, poor plaque control, and lack of regular maintenance care after implant therapy.

Inflammation is caused by bacterial biofilm and, in dental implants, is facilitated by the fact that the soft tissues around an implant are poorly adhered compared to the soft tissues surrounding the root cement of a tooth element[3].

Peri-implantitis is initially treated with mechanical instrumentation (air polishing devices, Er: YAG lasers, titanium curettes, and ultrasonic curettes with plastic sleeves) to remove plaque.

In all cases, this is a prelude to a surgical approach to treat or, as a last option, remove the infected implant and restore bone volume.

To this end, it is helpful to reduce soft tissue inflammation and prevent reinfection in order to increase the predictability of surgery. In this regard, treatment that can prevent reinfection of the peri-implant pocket and promote soft tissue healing may be useful.

This case series illustrates the application of a new collagen hydrogel that, by exerting an occlusive action and promoting soft tissue healing, is an innovative adjuvant treatment in the resolution of peri-implantitis.

CLINICAL CASES

This case series included 10 patients (10 peri-implant pockets) without systemic disease and with peri-implantitis. The initial parameters were: peri-implant pocket depth (PPD) = 6.3±0.5 mm and plaque index (PI) = 2±0.7.

The treated pocket defects type were: 2 intra-osseous, 2 horizontal, 1 circumferential, 5 vertical.

Patients were assessed for tissue inflammation (1 high, 2 medium, 3 mild, 4 none), tissue healing status (1 no healing, 2 visible fibrin layer, 3 advanced healing, 4 healing), and perceived pain (NRS scale, 1-10).

At the first visit, the degree of inflammation was: high in 40% of patients, medium in 40% patients, mild in 10% patients and absent in 10% patients.

The mean perceived pain at the first visit was 3.1 ± 2.8.

After mechanical treatment with ultrasound and manual curettes, the pocket was filled completely with H42, starting from the floor of the pocket. During extrusion of the product and for the next 5 minutes (referred to as "setting time"), the site was kept dry by the use of a surgical aspirator.

The "setting time" promotes 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 7-day follow-up, the degree of inflammation had decreased dramatically: 90% of patients were free of inflammation. In addition, 80% of patients had advanced tissue healing. Pain had decreased in all patients (mean NRS 1.1 ± 0.3).

Follow-up at 14 days showed that all patients were free of inflammation and 80% of patients had completely healed soft tissue. Similarly, pain had completely disappeared in all patients (NRS 1).

Follow-up at 30 days showed that the tissues of all patients were healed and free of inflammation.

The peri-implant parameters had also improved: PPD at 4.35 ± 1.1 mm (31% improvement) and PI at 0.9±0.3. Follow-up at 90 days showed that peri-implant parameters were stable: PPD at 4.35 ± 1.1 mm and PI at 1.2±0.4. No recurrence of infection was observed. These preliminary results are encouraging and will be supplemented by further investigation.
An illustrative clinical case is presented in Figures 2-6.

DISCUSSION AND CONCLUSIONS

Peri-implantitis is a multifactorial inflammatory disease caused by bacterial plaque resulting in an immune response that progressively damages the connective epithelium.
This leads to the formation of peri-implant pockets and possible involvement of alveolar bone. In order to halt its progression, peri-implant pockets are initially treated with a non-surgical approach for plaque removal.
The standard procedure involves the use of mechanical instrumentation (air polishing devices, Er: YAG lasers, titanium curettes, and ultrasonic curettes with a plastic sleeve) 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 without disturbing the natural regenerative process, which takes about 4 weeks to complete. Several local-acting products exert their function by antibiotics and/or bactericidal substances, which, while effective in counteracting bacterial reinfection, can 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.
This *case series* shows that 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, is effective in promoting tissue healing and reducing inflammation of peri-implant pockets just 7 days after treatment and preventing any reinfection.
It also improves pocket depth (reduced by 2 mm at 90-day follow-up) and plaque index (halved at 90-day follow-up).
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.

Fig.1: H42® collagen hydrogel is presented inside syringes provided with male luer lock connector so that they can be matched to the most appropriate needle.

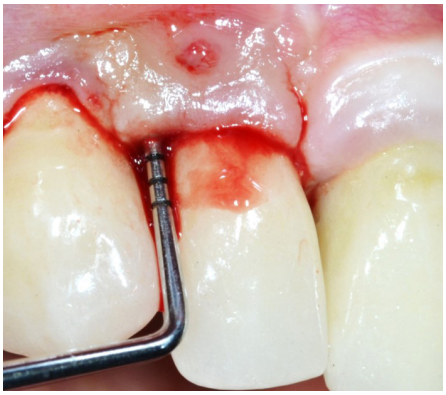

Fig.2: Perimplantitis of element 12. Initial PPD 7 mm - pain (NRS 1-10) = 10. Note the high degree of tissue inflammation and bleeding on probing. Note the presence of a fistula.

Fig.3: H42 was extruded starting from the bottom of the pocket until it flowed out of the pocket (*). The "setting" time allowed H42 to become stickier and adhere to soft tissues without leaking.

Fig.4: At 7-day follow-up, complete healing of the fistula is noted, while the soft tissues already appear healthy and free of inflammation.

Fig.5: At 30 days, the soft tissues continued to be healthy without inflammation. PPD decreased from 7 to 3.5 mm and pain (NRS scale) from 10 to 1. There was no recurrence of infection.

Fig.6: At 90 days, the results are stable in terms of soft tissue healing and absence of pain. PPD (3.5 mm) and pain (1, NRS scale) were stable. There was no recurrence of infection.

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