PERIO TRIBUNE
The World's Periodontic Newspaper
SEPTEMBER 2024 www.dental-tribune.com YEAR XI, N. 2

# Use of a new collagen hydrogel in the treatment of periodontal pockets: a case report

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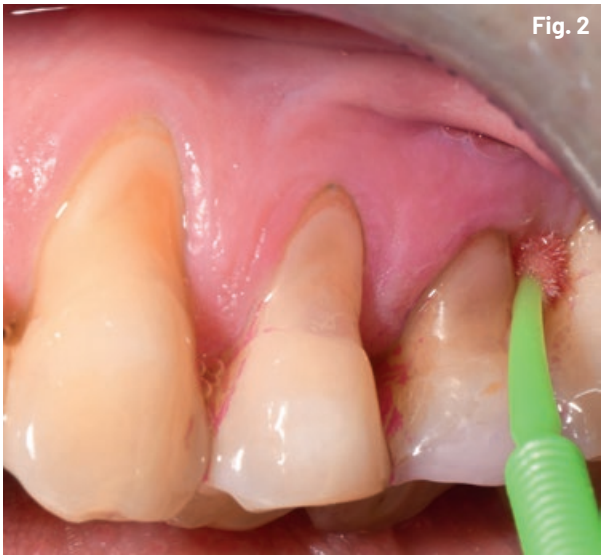
**ABSTRACT**

The present case report concerns a 60-year-old patient with generalized stage III grade B periodontitis, who had been treated at the author's clinic for 18 years and who, during periodic oral hygiene sessions, scheduled every four months, identified periodontal pockets 6 mm deep at the level of element 26. The treatment involved the use of a new collagen hydrogel (H42, Bioteck S.p.A., Vicenza, Italy) following nonsurgical laser-assisted periodontal instrumentation performed in a site-specific manner. The instruments used were an Er: YAG laser, ultrasound equipment and manual curettes also making use of plaque detector solutions in order to improve the clinician's professional performance.

The site was kept dry during the application of hydrogel, 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 by the use of a high-speed aspirator, and the patient was discharged without restriction in oral hygiene or feeding. At 1-month and 2-month follow-up, a significant reduction in inflammation, a significant improvement in the quality of the mucosal seal was observed, and probing values (PD) were in the normal range. At 3-month follow-up, the periodontal probe detected a 2 mm probing value (PD) again in the absence of bleeding, associated

**Figure 1.** A plaque detector solution was applied at the site both to motivate the patient to a congruent home hygiene protocol and to perform site-specific nonsurgical periodontal instrumentation. **Figure 2.** After congruous nonsurgical periodontal instrumentation, the site should be meticulously dried at the subgingival site, also using a micro-brush, before product application.

with a 2 mm recession, for an overall reduction in probing depth of 4 mm from 6 mm (PD) at baseline, and also in CAL from 6 to 4 mm. In addition, comparative periapical radiographs at study baseline and at three months follow-up indicated a slight improvement in bone mineralization at the treated site, quite significant in such a short time frame.

## INTRODUCTION

Periodontitis is a chronic multifactorial inflammatory disease that affects about 150 million people in Europe[1]. Bacterial biofilm and the products of its catabolism represent the extrinsic etiologic factors that, interacting with the immune system of the host organism, which in turn is influenced by genetic, environmental, and acquired risk factors, are involved in the onset and maintenance of inflammation of periodontal tissues .[2-4]

This results in the formation of periodontal pockets and subsequent damage to the alveolar bone, a condition that, if not properly treated, can lead to irreversible damage, up to the loss of the affected tooth elements[5].

Treatment by non-surgical periodontal therapy to eliminate bacteria and plaque is considered the gold standard in cases of periodontitis[6]. Indeed, such a procedure can prevent and stop the progression of periodontal disease, and likely promote pocket healing. To increase the success of such a procedure, the patient should be continually remotivated to congruous oral hygiene[4] and undergo a possible smoking cessation course, also suggesting appropriate lifestyles that can limit the spread of periodontal disease[7].

Following the above described nonsurgical treatment, and after a periodontal reassessment[8], sites with residual probing, associated with signs of inflammation, should be managed with a surgical approach[9]. In addition, periodontal disease can recur, so continuous updating of the diagnosis by circumferential probing of all sites in the oral cavity at each treatment or follow-up appointment is essential[4].

If recurrence of infection is observed, with increased pocket depth, the surgical approach is indicated, particularly in the presence of periodontal pockets ≥6 mm[9]. This has led research toward the development of adjuvant products, to be applied subsequent to mechanical debridement, such as antibiotics and bactericidal substances, aimed at avoiding surgical management of the infection. Although such procedures have been shown to be superior to mechanical treatment alone, the administration of antibiotics triggers an increase in antibiotic-resistant bacteria and possible side effects. Bactericidal substances, such as chlorhexidine, when used in the form of mouthwashes or gels, can have adverse effects not only on tooth discoloration but also on the oral bacterial flora and create dysbiosis that can promote the onset of dental disease[7]. Conversely, chlorhexidine 0.12% soaked wipes (Digital Brush Baby, Enacare, Micerium, Avegno, Genoa, Italy), patented by the author in 2013, are associated with proven benefits[11-13]. The subject of this article is to show the clinical and radiographic results following the use of a new collagen hydrogel as an adjuvant to the mechanical treatment of periodontal pockets in order to prevent bacterial recolonization and promote tissue healing.


**Figure 3.** The H42® collagen hydrogel is presented inside syringes provided with male luer-lock attachments to match the most appropriate needle.

## CLINICAL CASE

The present case report concerns the nonsurgical treatment of periodontal pockets in a 60-year-old, nonsmoking patient with stage 3 grade B generalized periodontitis, who had been treated in the author's office for 18 years and who, during her periodic oral hygiene sessions, scheduled every four months, identified periodontal pockets 6 mm deep at the level of element 26. The non-surgical approach involved the use of ultrasound and hand instruments, combined with the additional use of an Er: YAG laser (Pluser, Doctor Smile, Lambda S.p.A., Vicenza, Italy) and the subsequent use of the hydrogel. In order to identify areas of higher bacterial biofilm density, a dental detector solution was used (Fig. 1). After congruous nonsurgical laser-assisted periodontal instrumentation, the sites selected for product application were dried with compressed air and using microbrush (Fig. 2). In the following moments, the pocket was filled by means of the hydrogel H42 (Bioteck S.p.A., Vicenza, Italy) (Fig. 3) consisting of type I collagen, resorbable polymers and ancillary amounts of vitamin C for the optimization of rheology i.e., visco-modulation of the hydrogel. The product was extruded by using 25-gauge cannula needles, starting from the bottom of the periodontal pocket until it was completely filled (Fig. 4). During the extrusion of the product and for the next 5 minutes ("setting" time), the site was kept dry by applying cotton rolls, a mouth opener, and by the use of surgical aspirator. This period of time allows optimal adhesion of H42 to the connective tissues. At the end of the session, all instructions for proper home hygiene management were given to the patient in order to achieve ideal plaque control.

Home therapy included the use of interdental brushes (Interdental Brush, Enacare, Micerium, Genoa Italy), electric toothbrush (CS SURGICAL mega soft toothbrush,CURAPROX, Switzerland) and saline-soaked wipes (Digital Brush Baby, Enacare, Micerium, Genoa, Italy).

Clinical images 5-8 illustrate the clinical evolution of the treatment performed on


Fig. 4

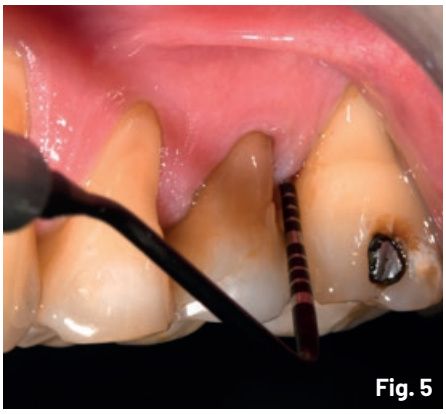


Fig. 5

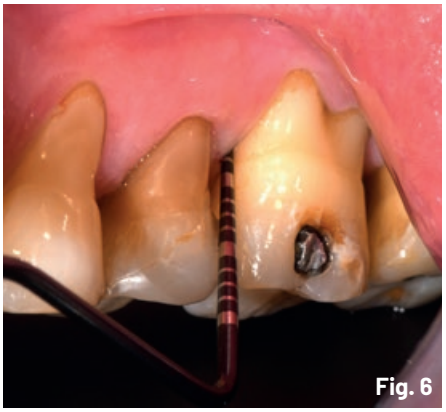


Fig. 6


Fig. 7

**Figure 4.** Periodontal pocket treatment with H42® of element 26. Collagen hydrogel is extruded from the bottom of the pocket until it is filled. Any excess product will then be removed with salivary aspirator. **Figure 5**. Initial periodontal probing detecting a pocket depth of 6 mm, associated with bleeding (BoP+) in the absence of recession, at this specific site, with a CAL value of 6 mm. Significant recession is present on the buccal aspect of the same element. **Figure 6.** Periodontal probing at 1 month detecting a pocket depth reduced to 3 mm, in the absence of bleeding and with a CAL of 4 mm. The quality of the mucosal seal certainly appears much improved. **Figure 7.** Periodontal survey at 2 months detecting a pocket depth of 2 mm, in the absence of bleeding and with a CAL of 3 mm.

element 26. At baseline, the periodontal probe had detected 6 mm of initial probing depth (PD), associated with bleeding (BoP+) in the absence of recession, with a CAL value of 6 mm (Fig. 5). Periodontal probing, at one month follow-up, was performed very gently/superficial (Fig. 6), so as not to risk detachment of the neoformation junction epithelium[4], and detected a pocket depth reduced to 3 mm, in the absence of bleeding and with a CAL of 4 mm. The quality of the mucosal seal certainly appears much improved. Periodontal probing with a pressure in the normal range is indicated only after the second month of follow-up (Fig. 7), respecting the healing time of the connective tissue[8].

At two months of follow-up, the periodontal probe detects 3 mm probing depth (PD) and 1 mm recession with an overall CAL of 4 mm (Fig. 7), while at three months of follow-up the probing has further reduced to 2 mm (PD) again in the absence of bleeding, a recession of 2 mm and an overall CAL of 4 mm (Fig. 8). Mostly appreciated is an improvement in the muco-gingival seal and the quality of the periodontal phenotype now present (Fig. 8). Significantly to find, in such a short time[14], in the comparative periapical radiographs at study baseline and at three months follow-up, a slight improvement in the bone mineralization of the treated site (Fig. 9).

Currently, the patient regularly presents to professional oral hygiene sessions every 4 months and continues to demonstrate ideal home control of biofilm, a factor that has certainly impacted the clinical outcome of nonsurgical case management.

## CONCLUSIONS

This clinical case shows that the use of the new collagen hydrogel (H42, Bioteck S.p.A., Vicenza, Italy) consisting of type I collagen, high molecular weight polymers and ancillary amounts of vitamin C, is effective in promoting periodontal pocket healing. A reduction in pocket depth from 6 to 3 mm was observed at 1 month, while the control radiograph at 3 months showed a slight improvement in hard tissue mineralization of the treated

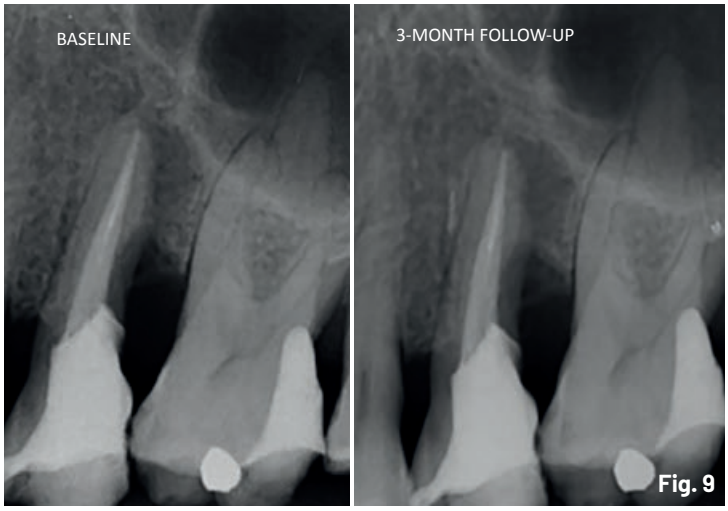




**Figure 8.** Periodontal survey at 3 months noting further reduction in pocket depth from initial 6 mm (see figure 5) to 2 mm, again in the absence of bleeding and with a CAL of 4 mm. Mostly appreciated is an improvement in the muco-gingival seal and the quality of the periodontal phenotype now present. **Figure 9.** Comparative periapical radiographs between baseline and 3-month follow-up. A slight improvement in bone mineralization can be seen where H42 was placed. In the RX at 3-month follow-up, a much better-defined bone profile is observed compared with the radiogram at the beginning of the study (baseline). The cortical bone is more satisfactorily represented. Certainly, it is quite unusual to notice radiographically changes before 6 months.

site, a significant result considering the short time in which it was observed[14]. Edema and hypertrophy had significantly improved already after 1 month. The H42 hydrogel exerted its occluding function, preventing bacterial recolonization and, at the same time, the collagen it contained provided the necessary scaffold for fibroblasts to colonize the defect and promote regeneration of the gingival epithelium around the tooth, thus closing the periodontal pockets. No side effects were observed in a nonsmoking subject with excellent plaque control.

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