Conservative approach in a patient with advanced periodontitis maintaining key teeth such as central incisors with poor prognosis at the beginning of the case

Clinical evolution over 25 years

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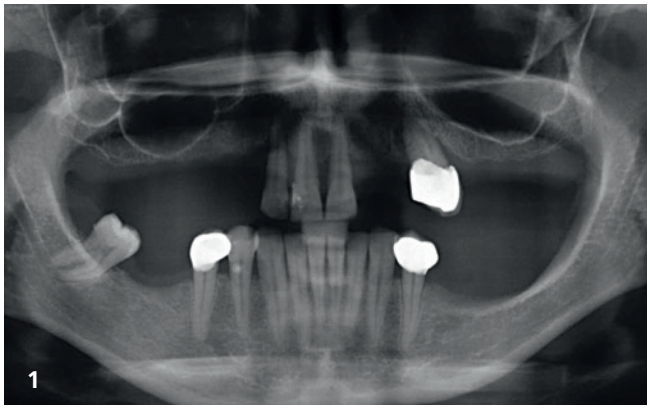
Introduction

The rehabilitation of periodontal patients with implants has been a topic of interest since the appearance of implants in dentistry.[1,2] Periodontal patients are by far the ones who most often require the replacement of missing teeth, and the hypothesis was put forward at the beginning about the behaviour that implants could have in them, as they have an underlying infectious pathology that could also affect the implants.[1–5] For this reason, for a long time the replacement of lost teeth in periodontal pathology was carried out by means of removable prostheses or fixed prostheses on natural teeth.[6,7]

Studies evaluating the evolution of peri-implant and periodontal pathology have been able to establish that in both pathologies (periodontitis and peri-implantitis) the biological niche plays a major role, but that there are differences in the composition of the flora of both pathologies. Thus, in healthy conditions, the peri-implant microflora consists mainly of Gram-positive cocci and non-motile bacilli, with only a small number of Gram-negative anaerobic species, which is similar to the microflora of healthy teeth. In contrast, peri-implant mucositis shows a higher number of cocci, motile bacilli and spirochetes, which is similar to gingivitis, while peri-implantitis shows a higher number of Gram-negative, motile and anaerobic species (*Porphyromonas gingivalis, Tannerella forsythia* and *Treponema denticola*), which is similar to periodontitis.

However, some microorganisms that do not usually occur in periodontitis, such as *Staphylococcus aureus, Staphylococcus epidermidis* and *Candida spp*, have been identified in areas of peri-implantitis.[7,8] There is therefore a discrepancy between the two pathologies in terms of the causal microorganisms, and it has also been found that the inflammatory response generated in both conditions is different, with advanced peri-implantitis lesions showing an inflammatory infiltrate rich in T and B cells, as well as neutrophils and macrophages with a greater number of all of them than in advanced periodontal lesions, which suggests that the inflammatory reaction in peri-implantitis is more aggressive.[7–12]



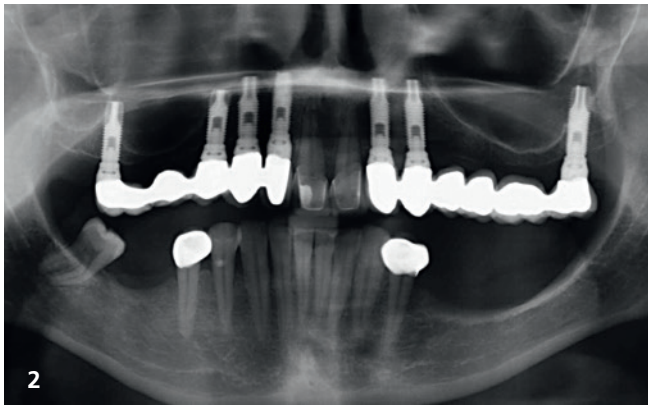


Fig. 1: Initial condition of the patient in 1998, showing the edentulous sections to be rehabilitated with implants and the bone loss of the teeth in the upper arch, as well as the lateral focus of the premolar in position 24. **Fig. 2:** X-ray one year after treatment where we can see the rehabilitation carried out with implants and the periodontal maintenance of teeth 11 and 21, which is giving good results. At this point, the patient decides not to rehabilitate the lower arch.

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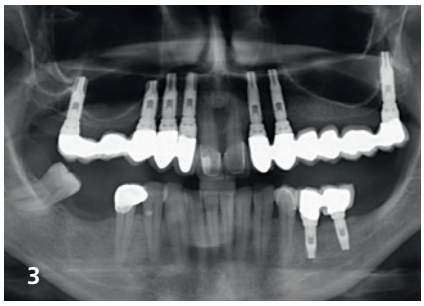
New advances in periodontal and peri-implant pathogen research have encouraged the use of implants in patients with periodontal pathology, and more and more people are benefiting from implants even with aggressive periodontitis. Today we have clear treatment protocols for both diseases and the approaches needed for long-term success, but 25 years ago, in the early days of implant dentistry, things were different. The main recommendation at that time was to remove all teeth affected by periodontal pathology, allow time for bacterial turnover (no teeth) and then place dental implants.[14,15] With this type of approach we were able to make many patients completely edentulous without the need for it, and as we have seen subsequently it was not necessary. In addition, the absence of teeth generates multiple alterations, even if they are replaced as implants, such as problems of proprioception and identity in the patient, who when they lose all their teeth can feel affected psychologically, especially the teeth in the upper anterior sector, which form the most important part of their smile.[15–17]

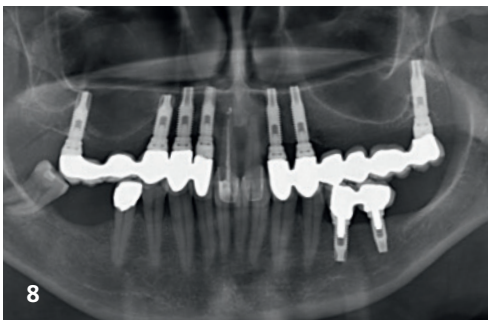
In the following clinical case we show a patient, treated 25 years ago and her follow-up, with advanced periodontal pathology and several teeth with a questionable prognosis, where we opted to keep the teeth as much as possible and rehabilitate the rest with dental implants, without carrying out unnecessary extractions, also conserving the aesthetic front that is part of the patient's identity.

Clinical case

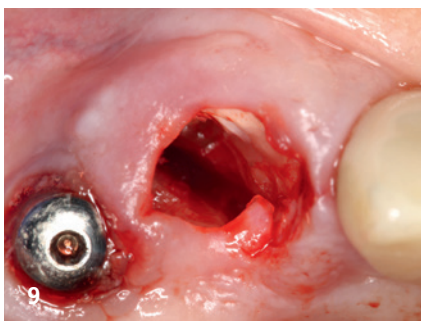
We present the case of a 56 year old female patient who came to the clinic in 1998 to replace missing teeth. In the initial X-ray we can see a large amount of bone loss in the upper anterior sector, mainly involving the upper right lateral incisor and the central incisors. In addition, the premolar in the second quadrant (24) has a lateral focus with a positive mesial punctate probing, indicating a vertical fracture, and it was therefore decided to extract it (Fig. 1).

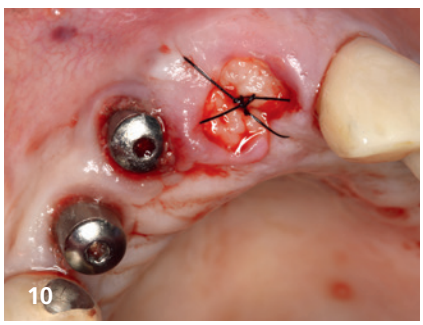


Figs. 3–5: Follow-up of the patient in the year 2000 (two years after the start of treatment) with the stability achieved both in the implants and in the preservation of 11 and 21.

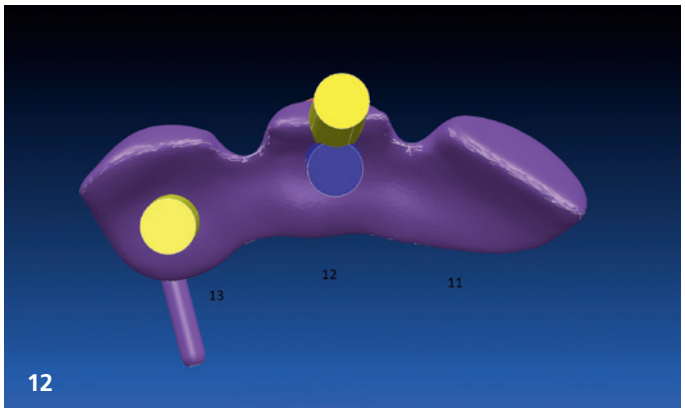


Figs. 6 & 7: Intra-oral images 18 years after the start of treatment. **Fig. 8:** X-ray showing the periodontal status of the remaining teeth and the endodontic treatment performed on tooth 11.





Figs. 9–11: Image of the extraction of the central incisor preserving the wall attached to the vestibular plate (11) and alveolar regeneration with PRGF-Endoret.



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A first phase of basic periodontal treatment was carried out and the planned exodontia and dental implants were placed, preserving two key teeth: 11 and 21, which despite having a questionable prognosis, are important teeth both for the patient's smile and identity, and for maintaining the proprioception of the upper arch through the incisor guides in which they participate. The patient underwent implant treatment and periodontal maintenance of the remaining teeth, and we found stability both in the implant treatment and in the maintenance of 11 and 21 the following year (Fig. 2).

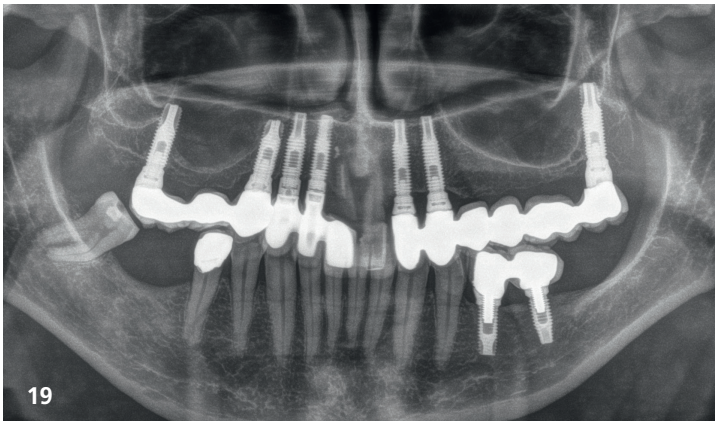
One year later, the patient continues with periodontal treatment and maintenance, with both central incisors remaining, although for aesthetic reasons it was decided to place ceramic facets to harmonise the smile and close the spaces caused by the bone loss due to periodontal pathology. In addition, the lower rehabilitation has already begun, placing the implants and crowns in the third quadrant (Figs. 3–5).

The patient follows a rigorous periodontal treatment protocol and regular check-ups where the health status of the remaining teeth and implants is monitored. In 2017, 18 years after treatment began, the periodontal condition has worsened slightly. A root canal treatment is carried out on tooth 11, due to occlusal overload and increased sensitivity due to root exposure, and the implants remain stable and show no significant bone loss, although the soft tissues have suffered slight retraction at some points, exposing both the margins of the facets and some of the abutments on the implants (Figs. 6–8).

Despite endodontic treatment, tooth 11 continued to cause discomfort and its mobility increased, fracturing a portion of the tooth, so it was decided to extract the fractured portion, regularise the rest and leave the root portion associated with the vestibular table in the alveolus to prevent resorption and conserve volume. To this end, it is filled with PRGF-Endoret as the only regenerative material, according to the protocol described by our study group for the post-extraction socket (Figs. 9 & 10).[18,19]

For the rehabilitation of tooth 11, a division of the bridge in the first quadrant was carried out, leaving sections 14–17 individually and rescuing the previous implants located in positions 13 and 12 to generate a bridge with tooth 11 in extension. The structure is made by CAD/CAM with subsequent addition of ceramic, correcting the emergence of the screw of piece 12 to achieve better aesthetics (Figs. 12–14).

Once the soft tissue has healed, a new prosthetic rehabilitation is carried out on tooth 21 to make it more similar to the new prosthesis. We also created a more favourable emergence profile in tooth 11, harmonising the aesthetic front completely (Figs. 15–18). The patient continues to be followed up and in 2019, 21 years after the start of treatment, we can see the stability of the implants placed in the first phase (Fig. 19).



Figs. 12–14: Creation and placement of the bridge screwed on transepithelial with tooth 11 in extension and adaptation of the gingival margin of tooth 12 (which previously showed the prosthetic component). We can also see how the vestibular contour of tooth 11 has been preserved by leaving the root portion buried. **Figs. 15 & 16:** New milling for crown in tooth 21 and the need to adapt the margin of tooth 11. **Figs. 17 & 18:** Adaptation of the emergence profile of tooth 11 and reconstruction of tooth 21. **Fig. 19:** The implants inserted in the first phase were further stable.

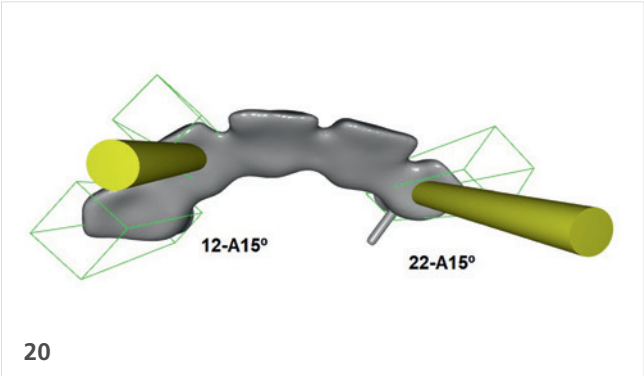
In 2022 (24 years later), there was an increase in the mobility of tooth 21, which had been preserved all this time, but which now had to be extracted. In this same approach, it is decided to remove the root fragment situated in the implant in tooth 11 and a new bridge is made from the implant in position 12 to the implant in position 22, which is detached from the bridge in which it was located, making a division of the bridge which is now made up of teeth 22–27. The new bridge is also made by CAD/CAM with subsequent ceramic addition and the prosthesis will be screwed on transepithelials. In this case we can see how implants placed 21 years ago have given us the versatility to adapt to new situations without the need to place new implants in the anterior sector, where the pontics for 11 and 21 give a better aesthetic result (Figs. 20–23). In addition, we have maintained the teeth in the anterior sector for a substantial time, even though they initially presented a poor prognosis, giving the patient adequate aesthetics and function and preserving her proprioception of the anterior guide for a long period of time (Figs. 20–23). In addition, we have maintained the anterior teeth for a substantial period of time, despite their initially poor prognosis, giving the patient adequate aesthetics and function and preserving her anterior guidance proprioception for many years.

Discussion

In the present clinical case, we have seen the evolution of a patient over time in the long term, where we have tried to preserve the life of the teeth as long as possible, seeking a minimally invasive approach, even when some of the teeth have failed during follow-up.[21,22] Even when one of the teeth had to be extracted (21), it was decided to keep the vestibular portion attached to the alveolar bone in order to maintain the gingival architecture for as long as possible.[21] We can also observe a change in the trend in terms of implant length.

Today, we opt for short, extra-short and reduced diameter implants in most of our restorations, but 30 years ago things were very different. In the early days of implant dentistry we worked with 2D imaging, so primary stability was sought with bicorticalisation with the length of the implant in the apex-coronal direction.[22] This search for stability required the insertion of long implants to reach the two anchorage points.

Nowadays, with 3D imaging and short and extra-short implants of different diameters, corticalisation is sought at four points: mesial, distal, lingual and vestibular, in the contour of the implant with the surrounding cortex, making it unnecessary to



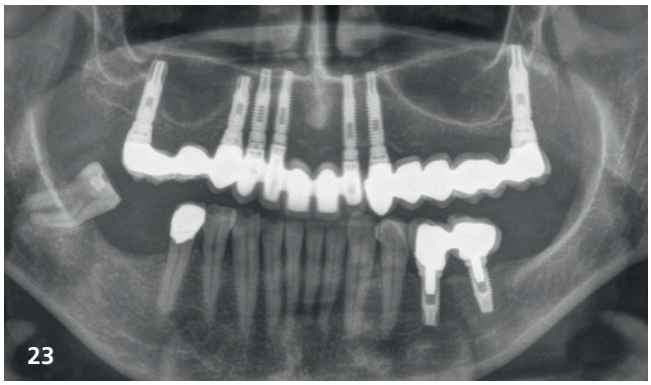


Fig. 20: CAD/CAM design of the new prosthetic structure for the replacement of the upper central incisors. **Figs. 21 & 22:** Intraoral aspect of the finished prosthesis. **Fig. 23:** Rehabilitation after 24 years of follow-up of the upper implants. Despite having undergone changes in the design, we can see how all the implants have remained stable. The two central incisors, with a doubtful prognosis in the first treatment plan, have been functional for 24 years, despite the patient's refusal to use an unloading splint to relieve the occlusal stress on them.

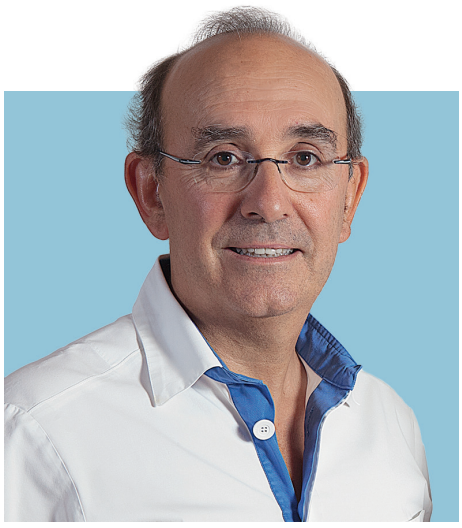
search for points involving longer implants.[24–27] Today, we would have treated this case differently in terms of the length and diameter of the implants, although not in terms of preserving the teeth until the last moment, which is still our thinking 30 years later. Therefore, the importance of correct periodontal treatment and maintenance of low levels of inflammation is crucial for the correct evolution and preservation of the affected teeth in the long term.[28–31]

In addition to what it means for a patient to become totally edentulous on a psychological level, managing to keep teeth, even if *a priori* they have a questionable prognosis in implant restorations, can be beneficial for maintaining the occlusal scheme, as well as proprioception, which with implant restorations is largely lost when there are no teeth present.[32–35] The occlusal scheme provided by the teeth is an advantage in terms of load distribution, and when it comes to key teeth such as the incisors, the advantage is multiplied as they form part of the incisor guides that actively participate in protrusion movements, giving the patient a completely different sensation and proprioception to that which he/she would have with dental implants alone.[36,37]

Control, adherence to treatment and behavioural habits are key to the long-term success of periodontal treatment.[37] In this case, the patient's maintenance and involvement as well as regular check-ups have been key to the result obtained.[38]

Author details

References



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