Tissue support and Implant retention Overdenture in mandible: a simply, smart and predictable treatment.

A case report.

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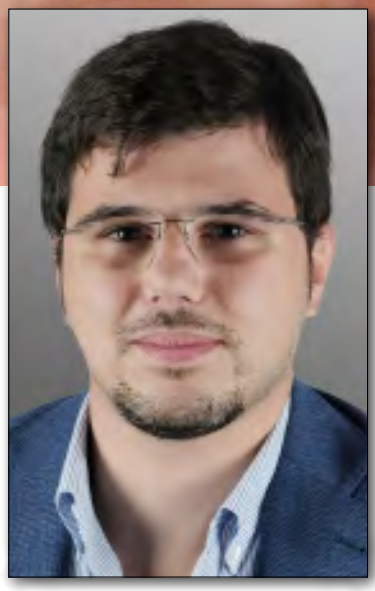
Keywords: ***Overdenture, Dental Implants, Dental Prosthesis, low profile attachments***



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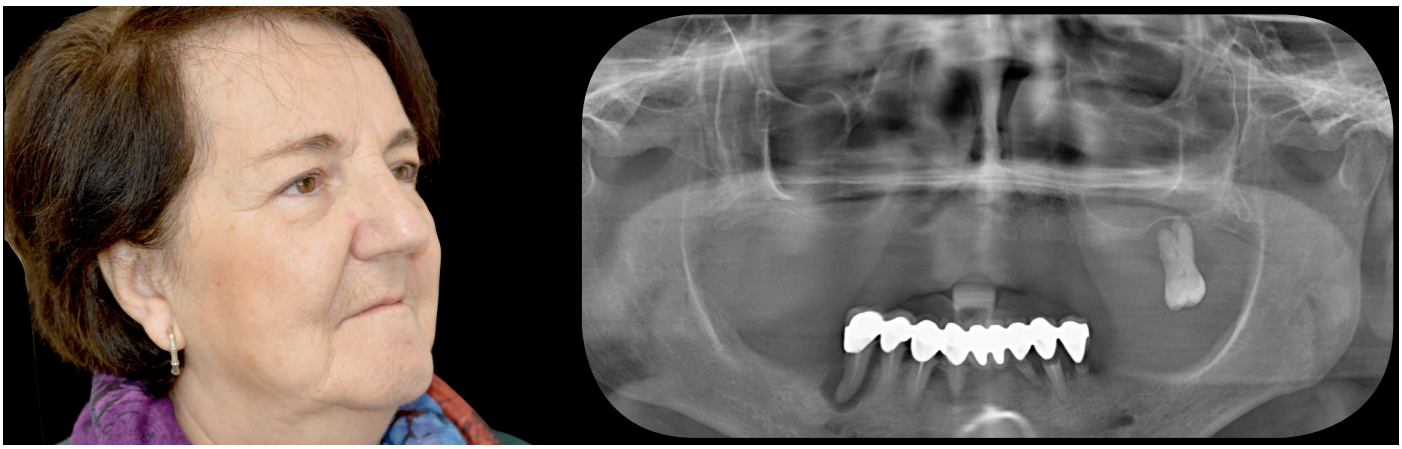
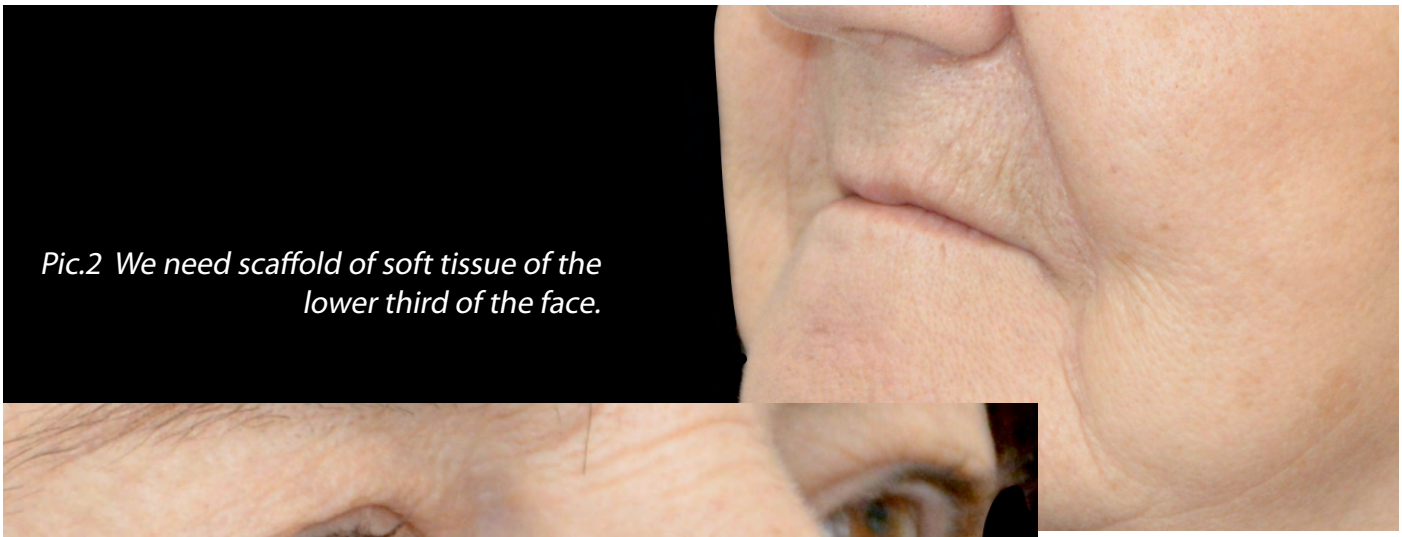
Introduction

Edentulism can lead to significant functional impairment as well as unfavorable aesthetic and psychological changes in patients. Problems include restrictions in diet, speech impairment, loss of soft tissues support and decreased vertical dimension. The conventional method for treating edentulism is to provide complete dentures. However, progressive and irreversible loss of basal bone may lead to incrementally increasing difficulties for the denture patient, especially in relation to the mandible, creating problems like loss of retention and stability, hyperplasia and ulceration of the underlying mucosa, soreness and pain, and impaired psychosocial functioning. Removable designs of implant-supported prostheses offers a better retention and improves oral function and patient satisfaction, compared with conventional complete dentures. Rehabilitative treatments based on dental implants can improve the retention and stability of complete dentures in edentulous patients. In this way, two dental implants with two attachments create a tissue support and implant retention overdenture, the new "state of art" in edentulous mandible. The edentulism is related with several phenomena such as bone remodelling and soft tissues inflammation. The smoking habits can be a disadvantageous factor in edentulous patients as well as all the stress related conditions. The total upper and lower edentulism represents a clinical challenge for every dentist; it must be properly approached, taking in mind the aesthetic requests of patients and their economic availability. The quality of life of edentulous patients subjected to implantology can be improved with the right prosthetic treatment; nowadays, the good treatment is both fixed and removable, depending from clinical and economic reasons. Scientific literature demonstrated that patients wearing a removable upper denture can quickly tolerate their new rehabilitative solution, mainly because it typically shows a good stability and makes patients feeling good; conversely, poor stability and masticatory problems are often reported in the lower removable prostheses, because of the complex anatomy of such site that favors a condition of instability. The overdenture mandibular prostheses on implants allow you to get many clinical benefits, such as good aesthetic, correct phonetic and speech, good prosthesis stability and correct masticatory movements. The implant surgery is commonly performed in "safe" areas, such as the symphysis of the jaw, included into the two mental foramens; in such zone, the bone remodeling usually preserves enough amount of bone tissue, allowing to surgeons the correct positioning of 2 to 4 implants. The overdenture (OVD) is an excellent dental prosthesis and its use is growing in the last years. The implant survival rate (ISR) ranges from 92% to 100%, regardless of the type of attachment used or the age of the patients. The surgical protocol to be preferred is the one-stage technique, especially in elderly patients or in patients affected from systemic diseases. The bone healing outcomes are similar to those reported after the two-stage technique, however, the one-stage technique needs only one surgery time, thus reducing the patients stress and allowing an overall costs and time reduction. The modern implant-supported overdentures have been classified into two sub-categories: 1) implant-retained tissue-supported overdenture, retained by different abutment or bar designs, and 2) overdenture implant supported and implant retained, fully supported by implants. The following article aims to show how a minimally invasive work can significantly improve the quality of life of our patients.



Pic.1 Tipical facial edentulous in female patient.

Pic.1a Rx OPT at the beginning.

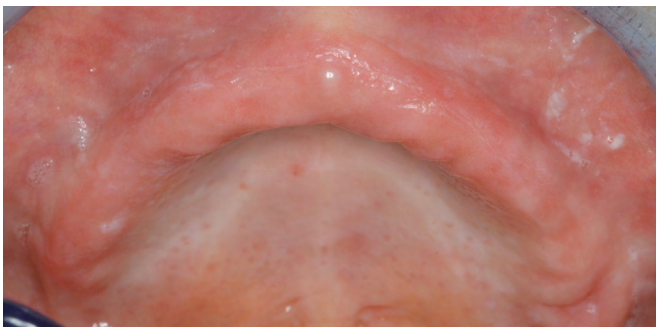


Pic.2 We need scaffold of soft tissue of the lower third of the face.

Pic.3 Patient is sad because she doesn't eat, she doesn't smile.

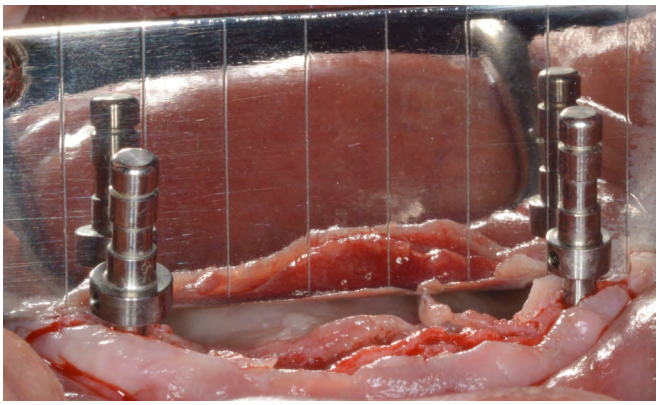
Case Report

We treated a 65yo patient reporting a teeth loss due to a severe periodontitis. She was totally edentulous for a long time and the radiological examinations revealed a strong resorption of the bony crest. Our patients showed the typical facial morphology commonly characterizing the edentulous patients: we found that the lips vermilion was almost completely unseen and nasolabial folds were deeper than other folds in different facial zones. Such a dramatic loss of vertical dimension was depending from the resorption of bony crest .After a shared brainstorming with the patient, where we discussed about the clinical case and the therapeutic options, we decided to proceed with a full denture in maxilla and removable prosthesis rehabilitation in mandible, thus stabilizing the lower prosthesis with two interforaminal dental implants. Patient need prosthetic flanges to give scaffold to soft tissue of the face but she need more stability to her lower denture. Implant surgery was performed with one-stage surgery, with a simultaneous screwing of the healing abutments, in order to shorten the treatment duration. The lower denture was customized in order to fit with the implants position: we used a direct technique, properly perfectioned by using F.I.T.T. (Functional Impression Tissue Toner) gel to get a lower trauma to soft tissues. When we choose to use this technique, it is preferable to check our patient within 48 hours after the application of F.I.T.T., in order to soften any roughnedges created by the progressive hardening of this material. According to the international guidelines, the sutures were removed after 7 to 10 days from the surgery: it's important to plan a follow-up every 2 weeks with the aim to modify the prosthesis, so to ensure an optimal healing of gingival tissues after the surgery. An import event must to be underline, the hygienic aspect of the treatment. Our patient lose all her teeth because she isn't the best cleaner ever, and in this way we need to have a prosthetic treatment that is so simply to clean. With two low profile attachments the cleaning steps are so simply to do. 3 months after the implant-surgery we are quite sure that the bone healing process is completed: we are thus ready to load dental implants with two low-profile attachments; in our case-report, we used OT Equator (Rhein83, Bologna, Italy) to stabilize the lower denture with a size measuring 2mm in the 4.3 position and 1mm in the 3.3 position. The steps were the following ones: first panoramic impression, then precision impression with personalized spoon and through the use of the transfers of the Equator. This is an important and raccomanded step, because through an functionalized impression we can build the denture but through the transfers we have the possibility to have the three dimension position of the implant and in this way we can build the metal reinforcement of the denture to give more strength to the final work. All the steps of the classical denture were used to go to the final work but we use the direct technique to load the Equator. With the precision impression we have the possibility to load the Equator in the indirect way, to put the retention caps and steel housing at the laboratory but we prefer to build the metal reinforcement e to leave a free space under the denture to fill in the direct way in the mouth of the patient because in this way we can have the possibility to handle the resilience of the soft tissue of the oral cavity. 2 weeks after the positioning of the prosthesis,

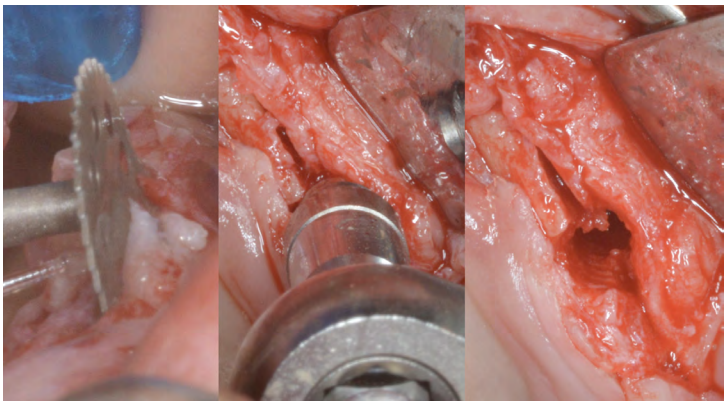


Pic.4 Picture of the maxilla.

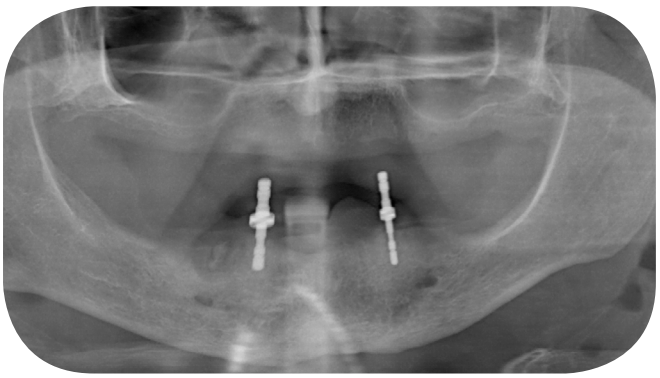
Pic.5 A resorbed mandible. We need more retention for us denture.



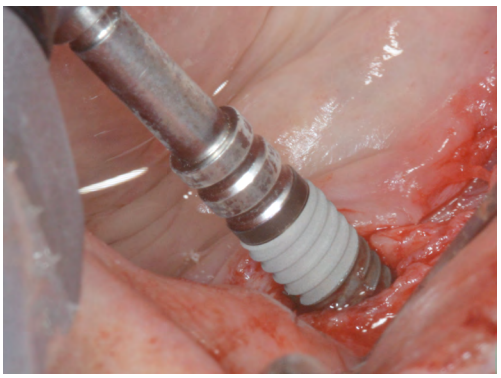
Pic.6 Parallelized mirror to put implant parallel.



Pic.7 Split crest of a small bone in intraforaminal space.

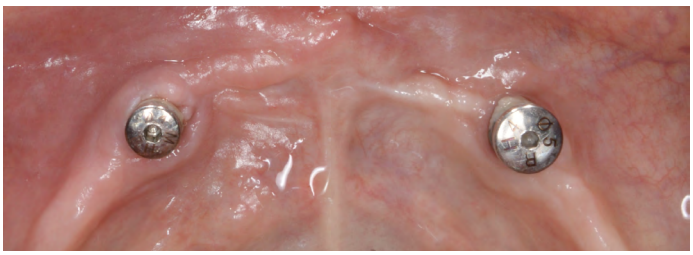


Pic.7a Rx OPT with pin of parallelism.



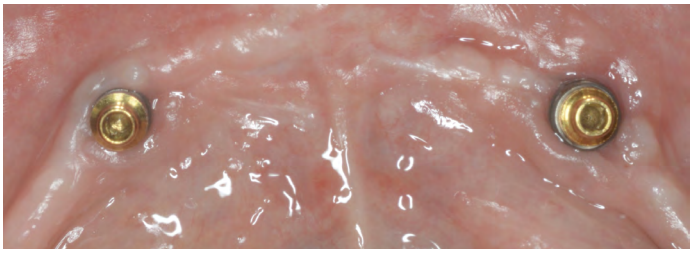
Pic.8 Osstem TSIII in action.

we performed an accurate follow-up to evaluate the aesthetic and function of the prosthetic rehabilitation. At the time of loading of the low profile attachments we have been used the yellow (extra-soft) elastic matrices, the less retentive of the system. One mouth after prosthesis delivery yellow retentive caps were replaced with other type. We have various retentive powers. from yellow, which corresponds to 600g until the purple that releases 2.7 kg. In the middle we are pink 1.2 kg and white 1.8 kg. Clinical experience shows that not always the most retentive matrix is the best. We must proceed step by step to assess the situation that works best, in equilibrium between mucous support and implant retention. We recorded an excellent patient's satisfaction about her new denture, in fact, the good aesthetic and the restored chewing function led great benefit from a clinical and psychological point of view. Instructions were given to the patients, recall visits were scheduled for occlusal adjustments and oral hygiene quality control every 6 months, and for retentive caps replacement every one year. Prostheses were built carefully about occlusal schemes, the rule that was followed sees driving the occlusion from the prosthesis "weaker". For example in a mouth with lower overdentures and dentures in the maxilla, guide the occlusal scheme of the total prosthesis. Overjet was left purposely broad, from 2 mm to 5 mm in order to avoid interferences during the function. To load the Equator directly in the mouth the steps are the following ones: separator disks on the attachments to take away undercuts stell housing over the attachments acrylic resin under the denture.A successful prosthetic treatment is measured in the follow-up: compared to complex structures such as the implant bars, when we plan an overdenture supported by implants and mucosa, it is crucial to check whether the internal prosthesis profile is congruent with the profile of the edentulous ridge. In our case, follow-ups have been performed up to 4 years, showing an overdenture prosthesis stable and clinically performing. The bone around the implants remained quite stable, without signs of resorption, and the mucosal tissues around the implants remained in excellent health. In this clinical case we had used OT Equator attachment. It is stable retention, resilient and self-aligning attachment system. OT Equator attachments allow to angle compensation up to 30 degrees that may be helpful in severe atrophic patients with different degree of mandibular atrophy and lingual concavities that may compromise the ability to place axial implants with bone reconstruction. The 30 degrees are guaranteed with the standard steel cages, with the new metallic cages called SmartBox, thanks to a patented internal system, we can compensate for up to 50 degrees the dental implants.The findings of this study support the established evidence base for an improvement in edentulous patients' satisfaction with their prostheses when two implants are used to retain their mandibular complete denture, even in severe atrophic patients. Two implants in the lower jaw, to retain a full denture is the new standard of treatment for edentulous, in a historical moment where the average age of patients has increased, and also increased their demands, it is important to have in our hands a streamlined treatment, safe and predictable. Treatment that can greatly improve performance of quality in life of patients, above all in those patients where there is a strong bone atrophy and thus the classic denture may not be sufficient to ensure function and aesthetics, so a good quality of life.

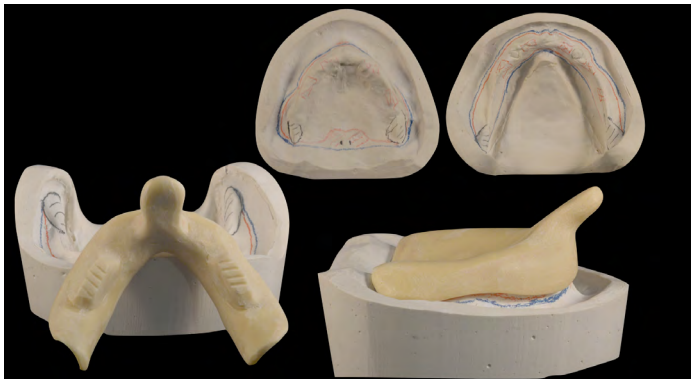


Pic.9 Healing abutment after 2 months. Patient doesn't clean well.

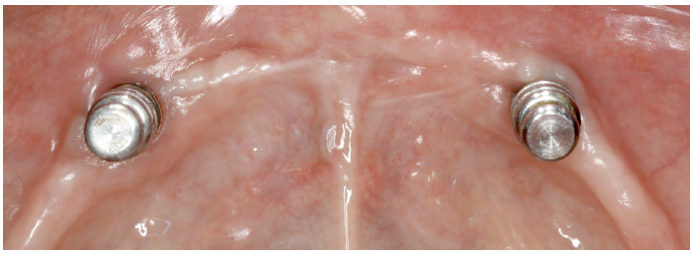
Pic.9a OT Equator.



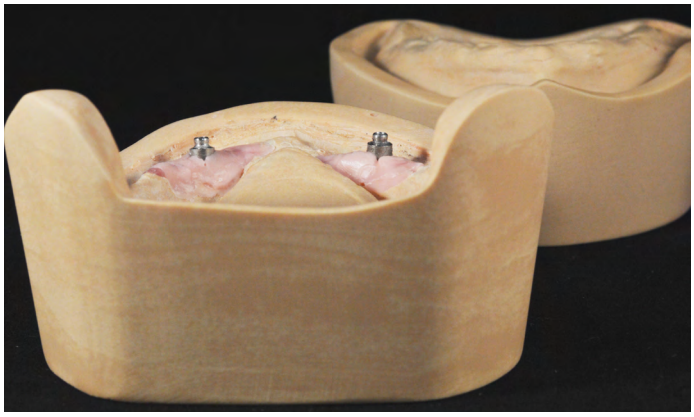
Pic.10 OT Equator mounted in oral cavity.



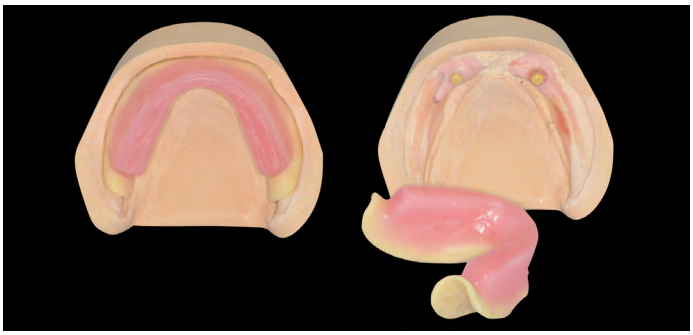
Pic.11 Model study and personalized trays.



Pic.12 OT Equator tranfers.



Pic.13 Master models.



Pic.14 Occlusion trays.

Discussion

Patients' life is rapidly increasing in expectations and duration; their requirements related to a prosthetic treatment are clear and peremptory: they need to have a fast, safe, practical, valuable treatment and, more than everything all, they require aesthetics at low cost. The literature analysis reports that a mandibular overdenture supported by 2 or more implants has a high implant and prosthetic success rate, moreover, the one-stage surgery and the modern materials allow to achieve good aesthetics in a short-time treatment; all such characteristics make the overdenture a highly valuable prosthetic treatment. The positive feedback of the patient reported in our case is paradigmatic of the great versatility of overdenture, without renouncing to comfort and aesthetics, at cheap costs comparing to other kinds of prostheses. The change in aesthetics and function leads towards a complete amelioration of the overall quality of life of patients rehabilitated with a dental prosthesis. We strongly think that patient demands and needs are the principal reading key of our treatment, and everything must be built around such requests. For example, in this clinical case, only two dental implants and a very good upper full denture have been charged on the treatment plan, offering to patient a low-expensive treatment with a high rate of success and an amazing increasing in the quality of life.A spontaneous question could be: why, thus, we propose a prosthetic treatment supported by more than 2 dental implants? This is a question that would require a deep and complex discussion, and the reply is a sum of anatomic, functional and aesthetic factors. In this reported case, if we had opted for upper and lower fixed prostheses, we would have ensured function, of course, but not the aesthetics and the predictability of the long-time outcomes. In fact, a fixed prosthesis needs specific requirements related to the maintenance of a proper hygiene, consequently, the perioral tissues would not have the right support. Only the prosthesis with flanges can ensure the correct scaffold of soft tissue, and in this way on full denture and overdenture have this propriety, This last aspect is particularly important in the upper prostheses, because of their need to concretely support the upper lips. In our clinical case here reported we had choice full denture in upper jaw for economic reasons. The lower jaw would have been rehabilitated by a fixed prosthesis or not less than four implants, but it would not have been the best treatment for our patient, because she required an aesthetically guided work and a rehabilitative solution easy to clean. Single attachments are instead the gold standard in our reported case, because they allow an easy hygiene without complex cleaning maneuvers.

Conclusions

In our case report, the "take-home-message" is that the mandibular implant-supported overdentures can be a reliable and predictable prosthetic choice, in such edentulous patients with low economic budget and high aesthetic expectations. The treatment must be carefully planned and shared with patients and dental technicians. Our main goal is to provide an adequate support to the perioral soft tissues, in fact, the loss of hard and soft tissues in edentulous patients can be severe.

Conflict of interest

Authors disclose no conflicts of interest and no financial interest.

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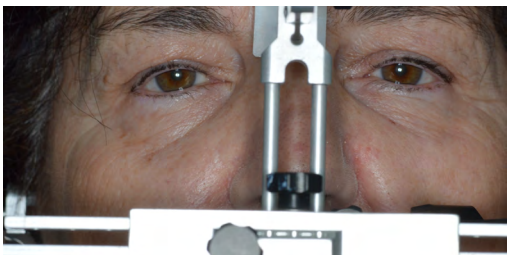
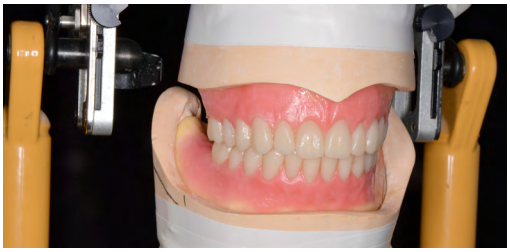
Pic.15 Phonetics tests.

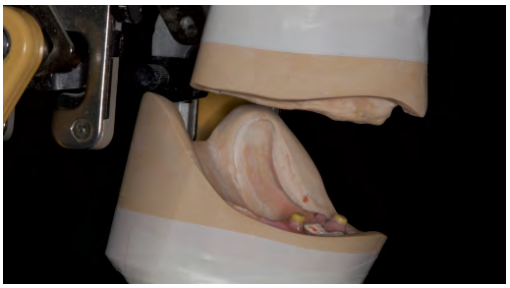


Pic.17 Facial arch.

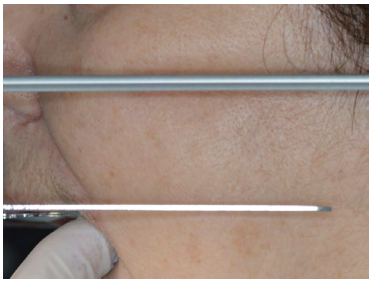
Pic.19 Aesthetics tray in.



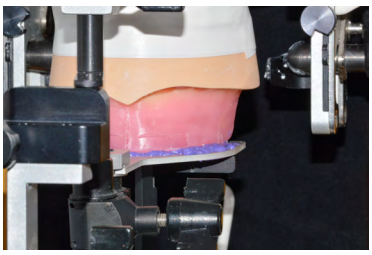
Pic. 21 Full teeth set up.



Pic. 23 Prosthetics space and bone resorption.



Pic.16 Camper plane.



Pic.18 Laboratory step of maxilla prosthetic space.

Pic. 20 Aesthetics tray in mouth.

Pic. 22 Occlusion.

Pic. 24 Occlusal view.

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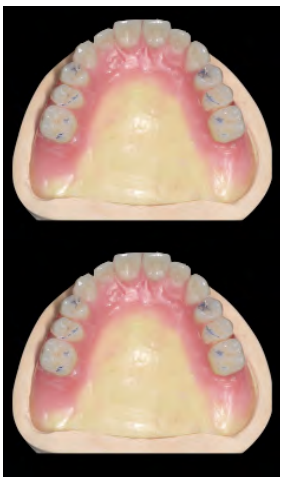
Pic. 28 OT Equator after polishing.



Pic. 25 Occlusion tests.

Pic. 25a Aestethics full denture and overdenture.

Pic. 26 Mandible prosthetics with free space for direct loading of the low profile attachments.

Pic. 27 Acrylic resin to load the attachments.

Pic. 29 Satisfy

Pic. 30 Happiness