



Bar-clip Overdenture – an Alternative Clinical Protocol for Restoring Completely Edentulous Patients

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Authors' contributions

This study was carried out in collaboration among all authors. Authors PLS, LRP and MSSL designed the study and wrote the protocol and the first draft of the manuscript. Authors IR, JPDC and MST performed surgical and prosthetic procedures, followed-up the patient and managed the study analyses. Authors IR and MSSL managed the literature searches. All authors read and approved the final manuscript.

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Case Study

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ABSTRACT

Over dentures are removable prostheses with additional retention mechanisms on either the roots of remaining teeth or implants and provide improved stability and retention. This study the paper is not a study but a case report on the use of bar-clip overdentures.

Aimed: The purpose of this paper is to describe a prosthetic clinical protocol for treating the edentulous with a mandibular mucosal-supported and implant-retained bar-clip overdenture. In the presented case, the patient had functional and aesthetic problems with her current conventional dentures. Three osseointegrated implants were first successfully placed in the anterior mandible between the mental foramina. After the osseointegration period, customized molding procedures

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were utilized to make the overdenture prosthesis. Post-treatment clinical and radiographic examination revealed no painful symptomatology, infection, implant mobility, or acute peri-implant bone loss. The patient was satisfied with the aesthetics and prosthetic function. Thus, it could be concluded that overdentures are viable rehabilitation alternatives that promote satisfactory functional and aesthetic results in properly selected cases.

Keywords: Dental implants; bar-clip overdentures; dental prosthesis.

1. INTRODUCTION

The mandibular rehabilitation of edentulous patients with a lower complete denture is often not effective because of the instability of such a prosthesis. An option to overcome the instability is the use of an implant-supported prostheses with the ball/O-ring and bar-clip attachment system. The satisfaction of patients rehabilitated with implant-supported overdentures is due to improved aesthetics, speech, mastication ability, better denture stability, and improved oral hygiene [1-3].

Denture retention is highly dependent on the location and direction of implant placement, the adaptation of the prosthesis' base to the edentulous ridge, and the proper use of specific attachment systems [4-7]. There is a consensus in the literature that ball/O-ring and bar-clip attachments provide a higher degree of retention and, therefore, are indicated for cases with bone atrophy [8]. We report a clinical case of lower prosthetic rehabilitation of an elderly edentulous patient utilizing dental implants and a bar-clip overdenture.

2. PRESENTATION OF CASE

The patient was a 70-year-old edentulous female who presented to the School of Dentistry of the University of Passo Fundo, RS, Brazil, with a chief-complaint aesthetic and masticatory deficiencies with her conventional dentures.

Her past medical history was negative for serious systemic disease. Physical intraoral and radiograph examinations revealed bimaxillary edentulism and bone resorption of the lower alveolar ridge that was covered by a thin layer fibromucosa (Fig. 1). The soft tissues of the oral cavity were healthy and the panoramic radiograph showed no abnormalities.

After analyzing the case and treatment and considering treatment alternatives, we decided that an implant-supported bar overdenture was best suited for treating her case. The prosthetic treatment planning was designed to satisfy the patient's wishes as well as to consider the forces of occlusion that would be generated by functioning with the opposing maxillary complete denture.

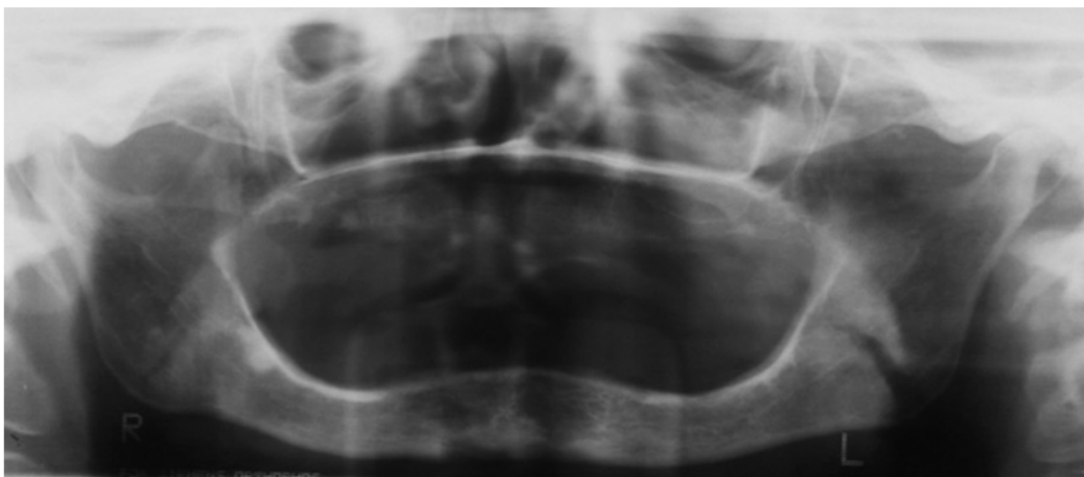


Fig. 1. Initial panoramic radiograph

The treatment was planned to be carried out in two stages: the surgery for placement of three intraosseous implants followed by fabrication of a mandibular bar-clip overdenture and conventional maxillary denture. We explained treatment alternatives to the patient and the reasons for our selected approach to manage her case. She then signed our Informed Consent Form and scheduled her appointment for implant placement.

After the patient rinsed with an antiseptic solution, 4% articaine with 1:200.00 adrenaline was used to block the inferior alveolar and lingual nerves followed by infiltration of local anesthetic in the anterior mandible. Then, an incision was made over the bony crest and a mucoperiosteal flap was elevated to expose the underlying alveolar bone. The surgical bed for implant placement was prepared following the manufacturer's protocol and three implants were placed between the mental foramina, in the region of 43 (External hexagon of 4.0x10 mm), 31 (Internal hexagon of 3.75x10 mm), and 33

(Internal hexagon of 3.75x10 mm) (Conexão Sistema de Prótese Arujá, São Paulo, Brazil).

After the osseointegration period, the implants were exposed for placing the healing abutments. Subsequently, a conventional complete denture was made for the maxilla and an overdenture was made for the mandible in order to establish a correct maxillomandibular relationship and occlusal stability (the maxillary prosthesis was remade simultaneously because it did not meet functional requirements and it did not establish a proper support for the perioral muscles). Concomitantly, a nickel-chromium bar was inserted to join the three implants. This bar was placed over the implants to ensure the proper seating and resistance to movement of the lower prosthesis. The bar-clip system was selected in this case, considering the three implants did not present a perfect parallelism in alignment considered to be a *sine qua non* condition for using the O-ring attachments (ball-type) (Figs. 2 and 3).

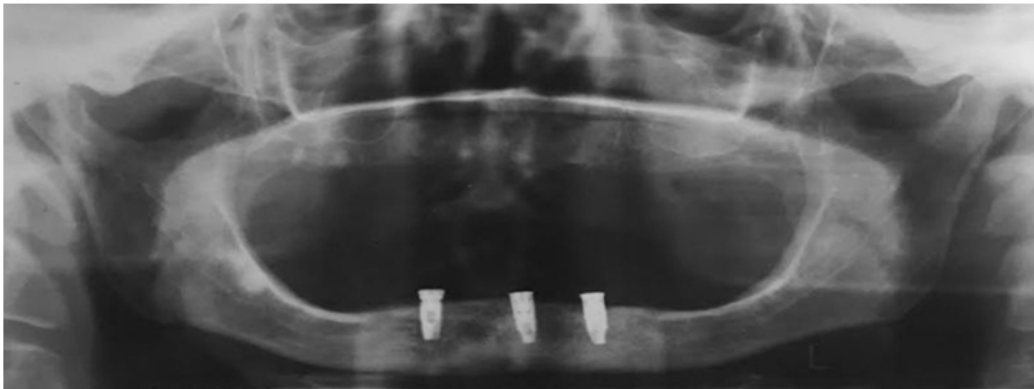


Fig. 2. Panoramic radiograph taken after implant installations



Fig. 3. Nickel-chromium bar establishing a rigid joint among the three units implanted

In the first session, the clips were not attached to the mandibular overdenture when installing the prostheses. At the time of denture delivery clips were not attached to the overdenture. The patient used the prostheses for one week without relying on the additional retention of the clips, so the mucosa could accommodate to the prosthetic device. Denture adjustments were made with a straight handpiece and spherical carbide bur #6.

After one week of using the new prostheses, small occlusal adjustments were performed. Two Teflon clips were attached to the base of the mandibular complete denture directly in the mouth of the patient, placing them over the metal bar. To facilitate prosthesis perforation before clip attachments, an internal tagging system was used to record the points on the denture where the clips were to be placed. Perforation was performed with spherical carbide burs #6 and #8 in a straight handpiece.

Next, the clips were bonded to the lower prosthesis with a pink acrylic resin (Clássico Jet, São Paulo, SP, Brazil). After polymerizing of the acrylic resin, the region of prosthesis attachment was finished and polished revealing a passive seating of the prosthesis over the attachments and its correct seating over the residual ridge. Finishing and polishing were performed with #600 sandpaper strips, abrasive rubber cones, and felt wheels.

After completion of these final procedures, proper bilateral balanced occlusion was verified and the prosthetic device had satisfactory retention and stability. The patient reported complete satisfaction with the new prostheses, both at the time of appliance delivery and at the one week follow-up appointment. (Figs. 4 and 5).

3. DISCUSSION

When rehabilitating edentulous patients with conventional complete dentures, there is great concern related to the mandibular arch poor denture stability and lack of retention. This is because the mandibular arch usually has a smaller support area restricted to the residual ridge which is different from the maxilla, where the added denture bearing area of the palate provides for a higher stability and retention for a maxillary complete denture [3,9]. That problem was found in our reported case.

The overdenture treatment presents advantages over the conventional complete denture such as alveolar bone preservation, improved prosthesis retention, and better stability. There is also an increased masticatory strength and efficiency resulting in a feeling of greater security and also improves the quality of life for the patient [10-11]. Similarly, our patient reported improvement in the feeling of security using her dentures and in her own self-esteem when relating to the people with whom she lives.



Fig. 4. Clinical aspect of maxillary and mandibular prostheses installed in the mouth



Fig. 5. Final panoramic radiograph

One of the advantages of the bar-overdenture compared to the implant-only supported prosthesis is the cost and time for the procedure because the number of implants are fewer and the time for producing the definitive prosthesis is less [12]. Thus, using two or three implants in either canine or premolar regions instead of four implants is beneficial for the patient [13]. Considering the patient preferred a removable prosthesis and our goal to provide better retention and stability for the mandibular appliance, we placed three implants – two in the canine region and one at the midline.

According to Fernandes et al. [14], there are three main attachment systems for implant-supported overdentures: ball, bar-clip, and magnet attachments. The selection of the attachment system is related to the quality of bone support, ease of hygiene, adaptation to and removal of the prosthesis by the patient, and maxillary arch shape. Authors report that magnets provide the lowest retention strength when compared to other attachment systems [15]. Moreover, the magnet system requires ongoing maintenance visits and may possibly interfere with the use of vital devices such as a cardiac pacemaker. The ball (O-ring) and bar-clip attachments provide for a higher degree of retention and they are recommended in cases of advanced atrophy of the alveolar ridge and in cases requiring higher retention and stabilization. In the case reported, the three implants did not present a perfect parallelism, which contraindicated using the ball O-ring system. In addition, considering the weaknesses of the magnet system reported in the literature, we chose to use the bar-clip system.

The bar-clip system presents better retention and lower need for repair visits. Biomechanically, the freedom of overdenture rotation and the axial direction of loads applied to implants are considered to be advantages of the bar-clip system. Moreover, a rigid connection between the implants allows spreading the forces, evenly creating a stable and functional system that results in less stress to implants [16].

It is important to note that the effectiveness of the bar-clip system depends on the proper placement of the implants on the alveolar ridge. The bar may be made not to curve so the implants must be placed so not to invade the tongue space of the of the lower overdenture prosthesis. Similarly, if the implants are placed too far to the buccal, there may be problems in placing the denture teeth. Another point to be considered is bar length, which should be no longer than 20 mm with a distance of 1 to 2 mm from the underlying mucosa thereby allowing for patient hygiene [16]. In the present case report, the placement of three implants facilitated bar production in straight sections thereby avoiding invasion of the tongue space by the prosthesis. Issues regarding bar length and distance from the lower alveolar ridge were also considered which resulted in a successful rehabilitation.

4. CONCLUSION

In the treatment plan proposed, the clinical case presented was managed by addressing the initial complaints of the patient. The new set of prostheses, even with a reduced number of implants, presented satisfactory retention and stability, as well as favorable aesthetics. All of

this resulted in a lower cost when compared to a rehabilitation with fixed implant-supported prostheses.

CONSENT

As per international standard or university standard, patient's written consent has been collected and preserved by the authors.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Naert I, Gizani S, Vuylsteke M, Van Steenberghe D. A 5-year prospective randomized clinical trial on the influence of splinted and unsplinted oral implants retaining a mandibular overdenture: Prosthetic aspects and patient satisfaction. *Clin Oral Implants Research*. 1999;9:195-202.
2. Frossard W, Ferreira HMB, Balassiano DF, Groisman M. Grau de satisfação do paciente à terapia de sobredentadura inferior implanto-retida. *Revista Brasileira de Odontologia*. 2002;59:50-3.
3. Fragozo WS, Tróia Junior MG, Bozzo RO, Vedovello SAS, Filho MV. Overdenture implanto-retida. *RGO Porto Alegre*. 2005; 53(4):325-8.
4. Burns DR, et al. Prospective clinical evaluation of mandibular implant overdentures. Part I-retention stability and tissue response. *J Prosthet Dent*. 1995; 73(4):354-63.
5. Geertman ME. Denture satisfaction in a comparative study of implant retained mandibular overdentures: A randomized clinical trial. *Int J Oral Maxillofac Implants*. 1996;11(1):194-200.
6. Mericske-stern RD, et al. Management of the edentulous patient. *Clin Oral Implants Res*. 2000;11(1):108-25.
7. Cune M, Kampen FV, Bilt AV, Bosman F. Patients satisfaction and preference with magnet, bar-clip, and ball-socket retained mandibular implant overdenture: A cross-over clinical trial. *Int J Prosthodont*. 2005; 18(2):99-105.
8. Kampen FCV, Bilt AV, Cune MS. Retention and postinsertion maintenance of bar-clip, ball and magnet attachments in mandibular implant overdenture treatment: An in vivo comparison after 3 months of function. *Clin Oral Implants Res*. 2003;14:720-6.
9. Fajardo RS, Zingaro RL, Monti LM. Sistemas de retenção o'ring e barra-clipe em overdenture mandibular. *Arch Health Investig*. 2014;3(1):77-86.
10. Kenney R, Richards MW. Photoelastic stress patterns produced by implant-retained overdentures. *J Prosthet Dent*. 1998;80:559-64.
11. Sadowsky S. Mandibular implant-retained overdentures: A literature review. *J Prosthet Dent*. 2001;86(5):468-73.
12. Assad AS, Abd El-Dayem MA, Badawy MM. Comparison between mainly mucosa-supported and combined mucosa-implant-supported mandibular overdentures. *Implant Dent*. 2004;13(4):386-94.
13. Scherer MD, McGlumphy EA, Seghi RR, Campagni WV. Comparison of retention and stability of two implant-retained overdentures based on implant location. *J Prosthet Dent*. 2014;112(3):515-21.
14. Fernandes EC, Campos Junior LC, Trauth KGS. *Rev Odontol Univ Cid São Paulo*. 2016;28(1):43-9.
15. Sousa SA, Germano AR, Anselmo SM, de Medeiros Bezerra LA, de Almeida Santos AN. Sobredentadura retida por implantes e encaixes tipo bola-relato de caso. *RFO*. 2007;12(3):69-73.
16. Misch CE. Prótese sobre implantes. In: Misch CE, Judy KWM. *Desenho e confecção da overdenture sobre implantes na mandíbula*. São Paulo:Santos. 2005;228-51.

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