Retrieval Technique for Full-Arch Implant-Supported Fixed Prosthesis: A Clinical Report

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Abstract
In the event of the loss of an implant and to take advantage of the preexisting structures, a rescue procedure that allows continuous use of the original fixed restoration during the restoration of the tripod support at the implant level can be used. When non-physiological occlusion forces are avoided, the success rate of this rescue procedure is very similar to any other rehabilitation made following a conventional protocol. Furthermore, the fact that the patient has already adapted to the prosthesis position and its vertical dimension results in easier functional adaptation in the postoperative period and, consequently, greater comfort.

According to Rosenberg et al1 the overall first-year failure rate for dental implants may reach 3% to 8%, with an additional annual loss of function of 1% after the first year as a result of various complications.2 Other studies have concluded that the estimated annual failure rate of conventionally loaded implants is lower than for immediately loaded (0.75% vs. 0.89%);3,4 however, the difference did not reach statistical significance.3,5,6 Also, dental implants placed in previously failed implant sites have a lower survival rate compared with earlier reports for implants in pristine sites.7-10 In this context, for the vast majority of patients with failed implants, reimplantation is often the only alternative treatment that allows a fixed prosthetic reconstruction; however, several implications must be considered when dealing with a multiple implant-supported prosthesis and implant loss; usually, it requires a more complex approach compared to single-unit prosthesis replacement. Otherwise, reimplantation now accounts for an ever-growing portion of clinical procedures.7

When dealing with implant failures and when the situation allows it, immediate loading procedures can be an optimal approach. The patient benefits from using the immediate loading protocol include reduced time from edentulism to function and avoiding the uncomfortable period with removable dentures after implant placement.11 Improved self-esteem and improved nutrition from the reestablishment of a normal diet soon after implant placement surgery are also advantages of immediate loading.12

The purpose of the current clinical report was to present an alternative technique to be performed in sites where failed implants were previously removed. The procedure describes a practical solution to an adverse situation compared to other rescue and replacement alternatives. It does not require the removal of all other implants or time expended due to osseointegration or new prosthesis construction. A wider diameter implant was placed in the same site, and the preexisting fixed prosthesis was delivered. Furthermore, the retrieval procedure was done on the same day, so no interim prosthesis was used.

Clinical report
A 65-year-old Caucasian woman, totally edentulous in the mandibular arch with a partial removable prosthesis in the maxillary arch and an unremarkable medical history, was rehabilitated with immediate loading of a definitive prosthesis using five external-hex implants and a cast metal bar (Conexão, São Paulo, Brazil), all 3.75 mm wide. Three months later, she
returned with localized pain and prosthesis instability. Periapical radiographic investigation showed no radiolucency or other abnormalities around the implants. Thus, in an oral investigation, the prosthesis was removed, and two implant failures were detected. Since the patient had received a new prosthesis recently, and the removal of the other three implants was not desirable, a new and alternative treatment was proposed instead of removing all implants and beginning a new protocol.

After the two failed implants were identified, they were easily and carefully removed with counterclockwise torque. The socket was cleaned by means of mechanical curettage and then irrigated with saline to remove debris remnants. The failed implants were replaced with two implants (Conexão) of larger diameter, both 4.00 mm wide, following the criteria established in 1986 by Albrektsson et al.\textsuperscript{13} (Fig 1). Then, the abutments were replaced using the recommended screw torque. All transfers were positioned and then connected with metallic cylinders and low-shrinkage acrylic resin (Pattern Resin LS; GC, Leuven, Belgium), aiming to minimize the risk of inaccuracy (Fig 2). This unit was later removed, and the maxillary study cast was placed in an ArCon articulator (BioArt, São Carlos, Brazil). The patient’s prosthesis was fixed to this model with a thin film of sticky wax (Asfer, São Caetano do Sul, Brazil) after the interocclusal record was made in the mouth, and the implant analogs were placed with the failed area covered with wax (Figs 3 and 4). They were then fixed with gypsum in the articulator base, and a c-silicone barrier (Zetalabor; Zhermack, Rome, Italy) was made to record the interocclusal relation and maintain the occlusal vertical dimension (Fig 5). The implant analogs were covered with wax, and the mandibular prosthesis was removed. The transfer unit was secured with dental stone (Asfer) in the region of the failed implants (Fig 6).
acrylic part was separated from the preexisting cast bar with a carborundum disk and with copious irrigation, considering that the prosthesis was cemented on prefabricated cylinders (Dentorium, New York, NY). The cast bar was sectioned at the points where the new implants were placed and laser welded (Fig 7). After the bar was placed in the mandibular cast, the acrylic part was positioned in the silicone barrier connected to the new metal bar using acrylic resin (Reliance Dental Mfg Co Worth, IL; Fig 8). The final polishing was done, the need for an occlusal adjustment was verified, and radiographs of the new implant after the surgery and at appropriate follow-up visits were made (Figs 9 and 10). It is important to note that Figure 10 shows a radiolucency related to the cemented cylinder used in this case. The patient was pleased with the esthetics and function of the prosthesis, and the overall prognosis is good. Follow-up appointments to monitor the prostheses' function and esthetics will continue.

Discussion

When an osseointegrated implant is lost, it is generally necessary to replace the failed implant. Sometimes the implant can be removed without making an incision, using only the torque driver in a counterclockwise direction. However, before the new implants have been placed, the soft tissue and inflammatory debris should be removed from the failed implant site until all the bony walls feel solid. Replacement after removal can be performed in cases with definite implant failure, but other therapeutic methods should be attempted in cases without definite failure. If there is infection in the implant site, the lost implant must be removed, and a systemic antibiotic must be prescribed. The placement of the new implant should then be postponed until the bone has healed. In the event of an infection, the removal of the implant prior to the replacement procedure will delay
the process, and interim prosthetic solutions must be used.\textsuperscript{14} Regardless of whether there is immediate or later replacement, the management of implant-supported fixed prosthodontics in an implant failure situation usually increases the complexity of the solution to the clinical problem; however, rescue procedures using the same prostheses frequently decrease the cost and time required.

Outcomes derived from alternative rescue clinical reports are important for clinical knowledge that constitutes a reference point for professionals in planning, performing, and subsequently evaluating dental implant failures in adverse situations. In the case of a failed implant, the techniques described here present several advantages, including a relatively simple technique and a low-cost solution. The placement of wider implants in an ideal position maintained the tripod support at the implant level, by not being in line, improving the load distribution on these implants, especially in excursive movements.\textsuperscript{14,15} It also made possible the use of preexisting prostheses and, thus, efficiently solved the problem. Other advantages include no need for an interim prosthesis, as the retrieval procedure can be done on the same day. On the other hand, a conventional procedure would require removal of all healed implants or, at least, maintaining them and adding some to establish a favorable distribution in this situation, waiting time for osseointegration, and consequently necessity for an interim prosthesis and a new definitive prosthetic addition, which would increase the cost and time of the treatment. In this case an ideal situation made the rescue procedure possible. A minimum presence of infection could avoid the procedure, and a conventional protocol should be used.

Implant failure is multifactorial. Many factors, for example, the technique used, the patient care after the implant placement, the correct occlusal adjustment, a favorable antagonist, bone quality, overheating during surgery, and the implant material used, may exist.\textsuperscript{15,16} Prospective case-control evaluations may be more appropriate and are needed to assess the risk of implant failure in conjunction with the proposed technique; however, the authors believe that, if there is an ideal occlusion situation with forces directed to the long axis of the implants in functional cusps, with canine guidance, and without premature contacts, the rescue procedure will probably present a success rate similar to any other rehabilitation made conventionally. Furthermore, the patient would easily adapt functionally to the prosthesis position, and its vertical dimension results in easier functional adaptation in the postoperative period and, consequently, greater comfort.

Conclusions

The technique presented for the replacement of a lost implant allowed the immediate use of the original fixed implant-supported prosthesis. Although this procedure was initially successful, continuous follow-up is necessary to ensure the longevity of the implants.

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