Case Report

ITI implants and Dolder bars in the treatment of large traumatic defect of mandible: a clinical report

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Abstract – The development of more sophisticated implant techniques to produce satisfying results improves the precise planning of both the surgical phase of the implantation and the following prosthetic rehabilitation. Ball and bar attachments are the main retainer systems for implant-bearing overdentures to achieve a successful treatment in the partial or full edentulism. In this clinical report, a 23-year-old male patient, presented with a large traumatic defect in the anterior mandible, was treated with ITI[®] implant and ITI[®] Dolder bar combinations. The reason to prefer this kind of treatment depends on the highest retention capacity and cleaning facilities of the system.

The main reason for the bone loss, especially in the mandible, is generally the resorption depending on aging or because of unfavorably balanced prosthesis, but tumours and traumatic injuries are also among the reasons of severe mandibular bone loss (1-3). Especially, the severe postoperative tissue loss by the total or partial resection of the mandible, owing to the malign and benign tumors, leads to some difficulties in prosthodontic process, both for the patient, such as reduced stability, insufficient retention, impaired load bearing capacity, and for the clinician, such as establishment difficulties (3, 4). The progression of the use of implant-supported overdenture in the mandibles, which have advanced degree of bone loss, has become a frequent treatment option as stabilizing the denture improves the patient satisfaction (3, 5-7). The rehabilitation of the patients with large bone defects may favor a connector that offers a considerable amount of stability as given by bar constructions. In many studies, bar constructions may provide sufficient stability if the bar is long enough when atrophic or defected cases are pronounced (1, 2, 8-11). As far

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as the oral hygiene is concerned, in patients with intraoral bone defects, bar attachments are also reported to be satisfactory (1, 2, 12).

This clinical report describes the prosthetic treatment procedures of a severely damaged mandible and also the establishment of Dolder bars (ITI[®], Straumann, Waldenburg, Switzerland), which were preferred because of their retentive features, alloy qualities, and handling facilities.

Clinical report

A 23-year-old male patient, who had been shot by a gun during his military service, causing the total bone loss of the mental region and severe deformation both in the maxilla and in the mandible, was presented in this case report. The reconstruction of the mental region had been accomplished formerly via bone grafting with autogenous iliac bone (Figs. 1–3). Following some additional esthetic surgical treatments of the hard and soft tissues, the patient was referred to our clinic for his prosthetic procedure.

Prosthetic rehabilitation of the traumatic defect of mandible



Fig. 1. 3D CT scan of the patient after the reconstruction of the mental region.



Fig. 2. Panoramic radiography of the patient.

Four solid screw implants (ITI[®] Implant, Straumann) were inserted in the mandible, which were 4.1 mm in diameter and 12 mm in length (Figs. 4 and 5). While the osseointegration process was proceeding, the upper jaw was decided to be restored with metal-ceramic fixed partial dentures (FPD) (Wiron[®] 99, Bego, Bremen, Germany). Considering the esthetic and functional benefits, a temporary removable partial prosthesis was constructed, and under the guidance of this prosthesis, the metal– ceramic FPD was restored, extending from the right upper first premolar to the left upper second molar, by



Fig. 3. Intraoral appearance before the prosthetic treatment.



Fig. 4. Four implants were inserted in the lower jaw.



Fig. 5. Radiographic view of the implants.



Fig. 6. The upper jaw was decided to be restored with metal–ceramic fixed partial dentures.

completing the bone defects by using gingival porcelain (VITA Zahnfabrik, Bad Säckingen, Germany; Fig. 6).

Following the healing process of the implants (Fig. 7), the lower jaw was decided to be reconstructed with a removable partial prosthesis attached to Dolder bars (ITT[®], Straumann). The synOcta 20°-and 15°-angled type-B abutments (ITT[®], Straumann) were used to achieve the parallel alignment so that the passive fit of the superstructure could be achieved.

Dental casting gold alloy (Type IV, Degussa, Dusseldorf, Germany) primer copings were casted fitting the abutments, and were machined in the laboratory to achieve the parallel alignment (Fig. 8). Three of the four primers on the right side were soldered to prefabricated ITI[®] Dolder bars (Straumann Fig. 9). The removable prosthesis was finished by mounting the female bar retainers of the Dolder System in the base of the prosthesis. The soldered bar construction was secured to the implants with the



Fig. 7. Screwed implant abutments.



Fig. 8. The casted primer copings.

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Fig. 9. The soldered egg-shaped Dolder bars.



Fig. 10. The intraoral view of the construction.



Fig. 11. The try-in of the metallic scaffold of the removable prosthesis that was soldered to the guide primer.

titanium screws. The remaining last primer, which would be the orientation guide, was also mounted in the base of the prosthesis (Figs. 10 and 11).

During the periodic controls within the past 3 years, the patient had no complaints with his prosthesis. After the additional esthetic surgical operations in order to improve the facial esthetics



Fig. 12. The final view of the prosthodontic rehabilitation.

were completed, the restoration of the upper jaw was esthetically developed according to the patients' desire (Fig. 12).

Discussion

The main goal in the prosthetic rehabilitation of the mandible with severe atrophy or large bone defect is to establish such a prosthesis that ensures full patient satisfaction, as well as ease of cleaning ability (12). In this case, an alternative treatment to the removable mandibular prosthesis might be a fixed bridge over the implant abutments, but this treatment approach depends on various factors. Maintenance of the prosthesis to be constructed was the most important factor for selecting the type of treatment and governing the decision toward the removable partial prosthesis. Feine et al. (13) and Kapur (14) stated that in terms of patient satisfaction, removable partial prosthesis showed superiority in ease of cleaning. Walton & MacEntee (15) noted that the patients with fixed implant-supported partial dentures complained difficulty in cleaning their prosthesis. Also, Chan et al. (16) stated that implant-retained overdentures offer an effective means of oral rehabilitation for the atrophic mandible by restoring both oral function and facial form. Although Naert et al. (9) reported the bar attachments to be prone to mucositis and gingival hyperplasia, many studies showed that overdentures with bar attachments are easy to clean and there is no difference in presence of plaque and peri-implant bleeding between the ball and bar attachments (12, 17, 18). In this case, to establish a good oral hygiene on the soft tissue, grafts around the implants would be limited because of the scar tissue around the mouth if a fixed construction was preferred. Although it was difficult for the patient to maintain an excellent oral hygiene because of the scar tissue around the mouth, mucositis and gingival hyperplasia had not been observed during the recalls.

The retention capacity was also an important factor for selecting the type of the connector. Naert

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et al. (9) found that the bar systems presented the highest retention capacity, when compared with the magnets or ball attachments. Also Heckmann et al.'s (8) report was in the same direction. During the recalls, no retention problem was observed. However, it is stated that although they have better axial load sharing (8, 10), the bar type connectors generate moment loading, so it should be kept in mind to check the peri-implant tissue regularly for the early detection of any probable tissue loss.

Feine et al. (13) noted that patients' attitudes should be considered when the design of a prosthesis was being planned for an individual patient; so in the upper jaw, as the patient refused further surgical operations, it was chosen to construct a conventional bridge restoration. This was the reason for the difference in the treatment approach between the upper and the lower jaws.

Summary

In the cases with large intraoral bone defects, implant bar retained superstructure combination ensures full patient satisfaction, as well as ease of cleaning ability, because of the highest retention capacity and cleaning facilities.

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