

Nonsurgical Prosthetic Management of Mandibular Fracture Associated with Dental Implant Therapy: A Case Report

George E. Romanos, DDS, Dr Med Dent, PhD^{1,2}

Mandibular fractures in association with the insertion of endosseous dental implants have been reported in the literature. In this clinical case report, the nonsurgical management of a mandibular fracture with the use of a bar restoration is described and a 3-year follow-up is presented. The options for nonsurgical treatment are discussed. INT J ORAL MAXILLOFAC IMPLANTS 2009;24:143-146

Key words: complications, fracture, mandible

Surgical complications in implant dentistry have been previously reported. In addition to the classical postoperative problems of infection, hematoma, bleeding, and pain, other surgical complications include different problems with interest to the implant surgeon. When bone thickness is compromised, the long-term prognosis of implants may be questionable. If this problem is localized in the alveolar ridge, different surgical options may be used, including ridge splinting, spreading, and guided bone regeneration (GBR). More severe surgical complications, such as fractures of the mandible, have also been reported in association with implant therapy.¹⁻⁶

This case report presents the fracture of a mandible in association with implant therapy. The fracture was managed with a nonsurgical approach.

CASE REPORT

A 65-year-old edentulous woman came to the Department of Oral Surgery and Implant Dentistry at the University of Frankfurt, Frankfurt, Germany, for consultation and implant therapy. The patient had been edentulous for 20 years and complained about insufficient retention of her complete denture in the mandible. The patient was on medication for high blood pressure and was a heavy smoker (20 cigarettes per day for more than 10 years). Extensive resorption of the anterior mandible (Fig 1) was diagnosed based on the clinical and radiologic examinations. Panoramic radiography as well as occlusal and lateral radiography were performed (Figs 2 and 3).

Surgical Technique

After local anesthesia was induced with articain 4% (Ultracain DS Forte; Aventis, Bad Soden, Germany), a mucoperiosteal flap was elevated in the anterior part of the mandible. The foramen mentale (left and right) were identified and the mental nerves were prepared carefully. According to the surgical protocol, four Ankylos dental implants (8 mm in length and 4.5 mm in diameter; B8, Friudent GmbH, Mannheim, Germany) were placed at the sites of the lateral incisors and canines. Because of the hard bone quality, careful osteotomies with tapping were prepared. The implants were placed with excellent primary stability and the flap was closed with 4-0 silk interproximal sutures. The implants were placed for submerged healing.

¹Professor, Division of Periodontology, Eastman Dental Center, University of Rochester, Rochester, New York.

²Associate Professor of Oral Surgery and Implant Dentistry, University of Frankfurt, Carolinum, Frankfurt, Germany.

Correspondence to: Dr George Romanos, 620 Elmwood Ave, Rochester, NY 14620. Fax: +585-473-5254.
Email: Georgios_Romanos@urmc.rochester.edu



Fig 1 Presurgical clinical situation.

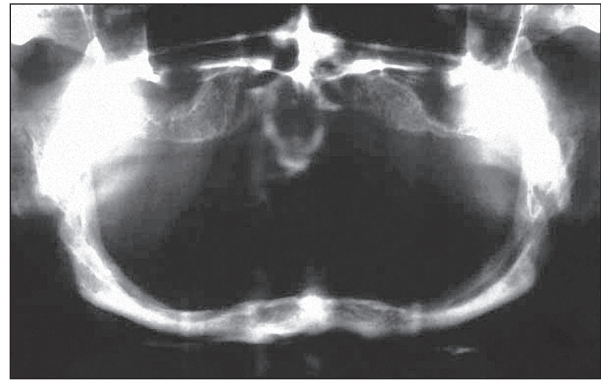


Fig 2 Presurgical panoramic radiograph.



Fig 3 Lateral cephalogram demonstrating the extensive bone resorption in the jaws.

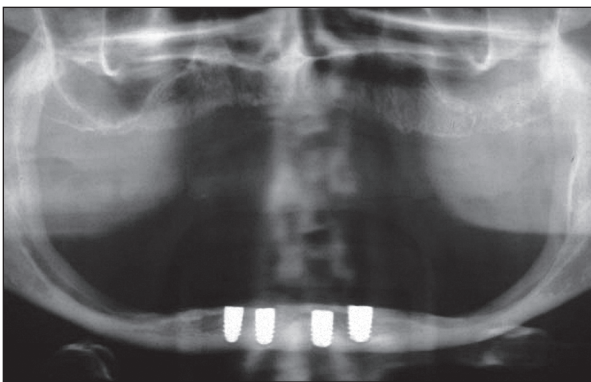


Fig 4 Postoperative panoramic radiograph demonstrating the implant positions.

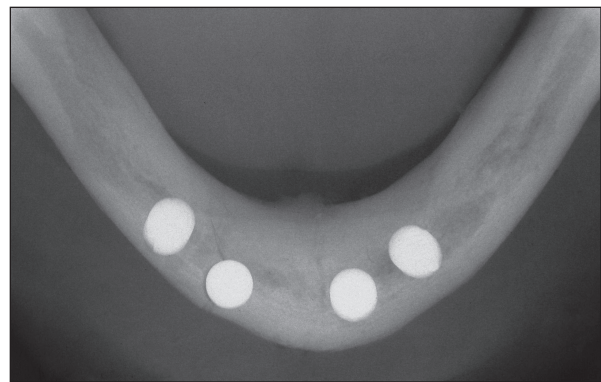


Fig 5 Postoperative occlusal radiograph showing the implant positions; note the lack of mandibular fracture.

Immediately after surgery a conventional panoramic radiograph was obtained to confirm the correct positioning of the implants with regard to the foramen mentale (left and right) as well as to document the bone level (Fig 4). In addition, an occlusal radiograph confirmed the optimal positions of the implants and the absence of mandibular fracture (Fig 5).

The healing was uneventful, and approximately 3 months after surgery the patient complained of pain in the peri-implant region. The clinical examination showed minor local swelling and pain at the mandibular right lateral incisor. After local anesthesia was induced with articain 4% (Ultracain DS Forte; Aventis), second-stage implant surgery was performed. The right lateral incisor was mobile and was



Fig 6 Occlusal radiograph 3 months after surgery showing the mandibular fracture in close association with the failed implant.

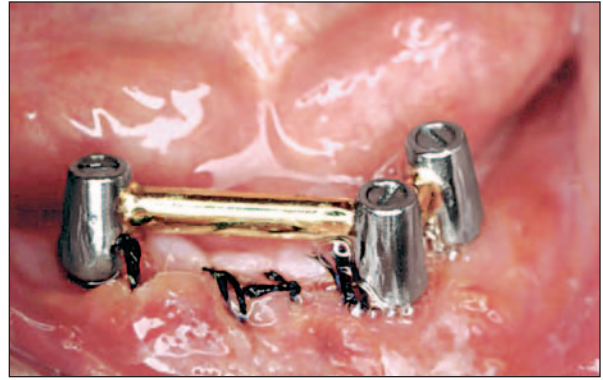


Fig 7 Placement of the Dolder bar splint together the three remaining implants after the implant close to the fracture line was removed.



Fig 8 Clinical situation showing excellent soft tissue healing 3 years after prosthesis placement.

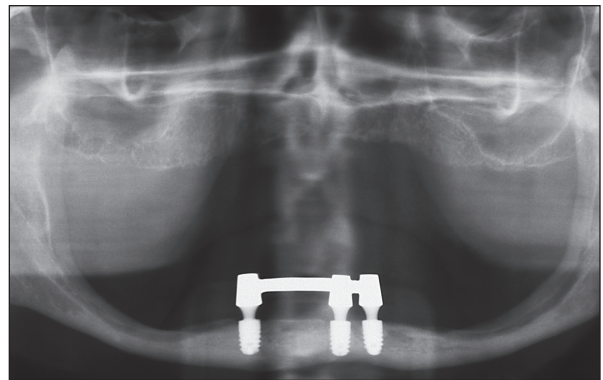


Fig 9 Radiologic appearance at 3 years after loading.

removed (unscrewed). The socket was débrided carefully and sutured with 4-0 silk. No suppuration was observed. Abutments were placed on the remaining three implants according to the protocol of this implant system and connected with a final torque of 25 Ncm.

Because of the continuous pain experienced during the second-stage surgery, a radiologic examination was performed. A mandibular fracture in close contact with the failed implant with radiolucency was demonstrated on an occlusal radiograph (Fig 6).

Therapeutic Procedure

The patient was advised to use a soft and/or liquid diet for the next 2 to 3 months. An antibiotic (clindamycin 300 mg, 4 times per day) was prescribed. A conventional abutment-level impression using impression caps was made immediately and a Dolder bar was fabricated as soon as possible. No irregular, abnormal movement was detected at the fracture site. One day later, the bar was delivered and the three remaining implants were connected

together with the bar using occlusal screws (Fig 7). The patient was enrolled in a strict recall program. Four months later, clinical and radiographic examinations demonstrated excellent bone healing. Periotest values of the three implants after removal of the bar showed acceptable values (-5, -5, and -4). One year later the implants were examined clinically as well as radiologically. No pathologic findings were present. The final clinical and radiographic examinations after the removal of the bar reconstruction were performed at 73 months after surgery. The Periotest values were acceptable (-4, -7, and -5). No bone loss was demonstrated around any of the implants (Figs 8 and 9).

DISCUSSION

Mandibular fracture in association with implant therapy has been reported previously. Surgical intervention using modern osteosynthesis with plates is the usual treatment. In a case report, Laskin⁶ presented

nonsurgical management of a fracture associated with implant treatment. Specifically, the fracture was managed through the use of a soft diet, antibiotic therapy, and the application of moist heat bilaterally. In this case report, a manipulation of the mandible did not reveal any abnormal movement at the fracture site, and the occlusion was unaltered and repeatable.

In an earlier study published by Tolman and Keller,⁷ seven patients who received mandibular implants sustained mandibular fractures (via trauma after implant placement or because of advanced bone resorption). A conservative treatment approach was advised when the fracture passed through a stable or a recently failed implant site.

In the present clinical case report, the fracture could be treated with immobilization of the fragmented bones via a bar restoration. The bar was screwed onto the abutments, resulting in rigid immobilization and thus promoting the healing of the bone in the fractured area. A soft diet has been advised to avoid micromovement or macromovement in the mandible. This treatment option using only a prosthetic device (bar) may be an alternative for the implant patient when a fracture of the mandible has occurred and four implants have been placed. There is no doubt that if more implants had been placed, a fixed implant-supported restoration might have been the nonsurgical choice of therapy.

Nine of the 11 reported fractures of the mandible occurred in postmenopausal women.^{1-4,6-9} In patients with osteoporosis, as well as when the inferior cortex is penetrated because of extreme mandibular atrophy, the bone may be weakened. For these reasons, any kind of nonsurgical therapy is of great importance for patients with extreme mandibular atrophy.

This case report demonstrated the successful healing of a fractured mandible using a bar that splinted together three remaining implants, along with a soft diet and antibiotics. This type of splint should be considered as an alternative to open-flap splint surgery.

ACKNOWLEDGMENTS

The author would like to thank Prof Dr Med Dent G.-H. Nentwig, Frankfurt, Germany, for his support in this case report as well as Dr D. Tarnow, New York, for his suggestions regarding preparation of the manuscript.

REFERENCES

1. Mason ME, Triplett RG, Van Sickels JE, Parel SM. Mandibular fracture through endosseous cylinder implants: Report of cases and review. *J Oral Maxillofac Surg* 1990;48:311-317.
2. Shonberg DC, Stith HD, Jameson LM, Choi JY. Mandibular fracture through an endosseous implant. *Int J Oral Maxillofac Implants* 1992;7:401-404.
3. Kan JKY, Lozada JL, Boyne PJ, Goodacre CJ, Rungcharassaeng K. Mandibular fracture after endosseous implant placement in conjunction with inferior alveolar nerve transposition: A patient treatment report. *Int J Oral Maxillofac Implants* 1997;12:655-659.
4. Raghoebar GM, Stellingsma K, Batenburg RHK, Vissink A. Etiology and management of mandibular fractures associated with endosteal implants in the atrophic mandible. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2000;89:553-558.
5. Karlis V, Bae RD, Glickman RS. Mandibular fracture as a complication of inferior alveolar nerve transposition and placement of endosseous implants: A case report. *Implant Dent* 2003; 12:211-214.
6. Laskin DM. Nonsurgical management of bilateral mandibular fractures associated with dental implants: Report of a case. *Int J Oral Maxillofac Implants* 2003;18:739-744.
7. Tolman DE, Keller EE. Management of mandibular fractures in patients with endosseous implants. *Int J Oral Maxillofac Implants* 1991;6:427-436.
8. Albrektsson T. A multicenter report on osseointegrated oral implants. *J Prosthet Dent* 1988;60:75-89.
9. Rothman LG, Schwarz MS, Chafetz NI. High-resolution computerized tomography and nuclear bone scanning in the diagnosis of postoperative stress fractures of the mandible: A clinical report. *Int J Oral Maxillofac Implants* 1995;10:765-768.

Copyright of *International Journal of Oral & Maxillofacial Implants* is the property of Quintessence Publishing Company Inc. and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.