

# Severe Osteomyelitis Following Immediate Placement of a Dental Implant

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*Risk factors and complications in immediate implant placement are widely discussed. The present report describes a case of severe osteomyelitis as a serious complication after the immediate placement of a dental implant into an extraction socket of a 61-year-old woman. The course leads from initial treatment of recurrent perimandibular abscesses with surgical drainage and high-dose intravenous antibiotics to a refractory osteomyelitis. Hemimandibulectomy and partial mandibular reconstruction with a free fibular flap followed. INT J ORAL MAXILLOFAC IMPLANTS 2008;23:137–142*

**Key words:** free fibular flap, immediate dental implantation, infection, osteomyelitis

Immediate placement of a dental implant after tooth extraction has become a routine procedure. In comparison with conventional endosseous implant protocols, postextraction bone loss is minimized, and the overall treatment period is shortened. The outcome is estimated to be comparable to that of conventional placement, with long-term success rates of approximately 95%.<sup>1–4</sup> Implant failure seems to correlate with periodontitis as the reason for tooth extraction. Periodontitis and periapical abscesses, especially when acute, are considered contraindications for immediate implantation.<sup>5,6</sup> However, recent studies indicate that successful immediate implant placement is possible even in infected sites if certain surgical protocols are fulfilled.<sup>7–9</sup> Villa and Rangert described a 100% survival rate in early-loaded implants placed immediately after extraction of teeth with endodontic and periodontal lesions.<sup>10</sup>

The following case report describes a patient in whom severe osteomyelitis developed after immediate placement of an implant in an extraction socket. Over a 6-month period, the patient had to be treated for several perimandibular abscesses with incision and drainage as well as high-dose intravenous antibiotics. According to a MEDLINE search, this is the first case of dental implant placement leading to the loss of a portion of the mandible and reconstruction with a free fibular flap (FFF).

## CASE REPORT

A 61-year-old Turkish woman presented to the Department of Oral and Maxillofacial Surgery of Bochum University Hospital with a large swelling of the left perimandibular region. Her medical history was unremarkable and included neither drug therapy nor atopic symptoms. Two weeks earlier, both mandibular canine teeth had been extracted for periodontal reasons. There was no acute infection at that time. Immediate implant placement into the fresh extraction sites had been performed. One week after placement, a buccal abscess in the region of the left implant developed. Incision and drainage were performed by the clinician, but signs of inflammation increased after this treatment. Upon presentation to the Department of Oral and Maxillofacial Plastic Surgery, the patient exhibited signs of a severe infection with systemic involvement. After clinical examination, panoramic radio-

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**Fig 1** Panoramic radiograph obtained 2 weeks after immediate implant placement. A peri-mandibular abscess had developed in the left mandible.

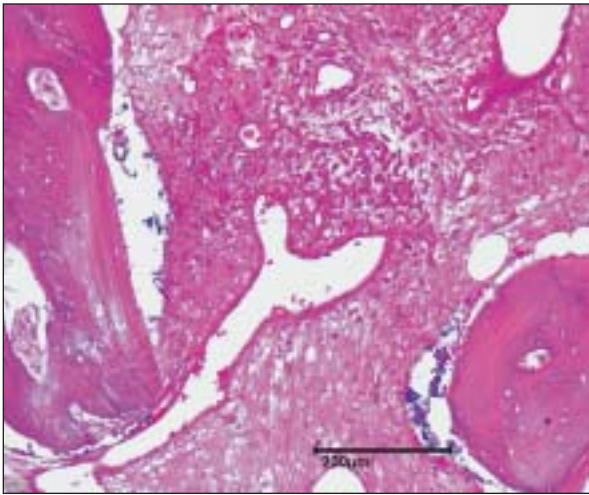


**Fig 2** Panoramic radiograph demonstrating initial signs of osteomyelitis of the mandibular left canine region 2 months after implantation.

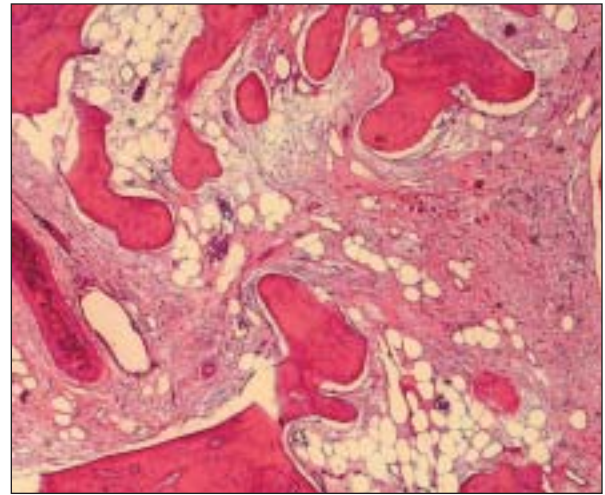
graphy, and hospitalization, extraoral incision and drainage of the abscess cavity were carried out immediately (Fig 1). Two rubber drains were placed. The dental implants were immobile at this time, and no radiolucency or significant pocket depth was noted. Since the patient had a history of penicillin allergy, 600 mg clindamycin were administered intravenously 3 times a day for 7 days. Within a week, the infection resolved and, in consultation with the implant surgeon, the implant was removed.

One month later, after visiting a Turkish steam-bath, the patient presented again to the department with recurrence of the perimandibular abscess. The patient was rehospitalized, intravenous clindamycin therapy (600 mg) 3 times a day was reinstated, and surgical drainage was repeated. A culture was performed. *Streptococcus*, *Peptococcus*, and *Peptostreptococcus* species were identified. Thus, metronidazole (500 mg twice a day) was added to the therapy. Infectious-disease specialists were consulted. No evidence of an immunological defect could be identified. The swelling diminished slowly, but the patient complained of pain that failed to respond to first-line analgesic agents. Analgesics had to be switched to morphine derivatives. After discharge from hospital, the patient was re-examined in clinic on a weekly basis. Three weeks later examination of the patient

revealed a dehiscence in the region of the intraoral drainage site accompanied by increasing swelling and pain. A panoramic radiograph revealed a "moth-eaten" appearance in the left canine region of the mandible (Fig 2). The patient was once more hospitalized and treated with intravenous clindamycin (600 mg 3 times a day) and metronidazole (500 mg twice a day). Subsequently, all nonvital bone was debrided and removed. Histopathologic analysis of the bone demonstrated chronic osteomyelitis (Figs 3 and 4). Two weeks later, the patient was discharged from hospital with ongoing oral antibiotic and analgesic administration. The patient was seen in clinic for aftercare examinations on a monthly basis. A bone scan was scheduled for 6 months after debridement. Three and a half months after the third hospitalization, the patient presented again to the department with intractable pain, trismus, and diffuse swelling of the left mandibular region. A new panoramic radiograph and scintigraphy with  $^{99m}\text{Tc}$ -MIBI were carried out. The bone scan revealed a strong uptake in the left mandibular corpus and ramus (Figs 5 and 6). Blood cultures were performed and *Streptococcus*, *Peptococcus*, and *Peptostreptococcus* species were identified again. Two weeks after beginning a new round of high-dose intravenous antibiotic therapy, the patient underwent hemi-



**Fig 3** Accumulation of inflammatory cells forming an area of granulation and scar tissue surrounded by spongiform bone trabeculae (hematoxylin-eosin; original magnification  $\times 100$ ).

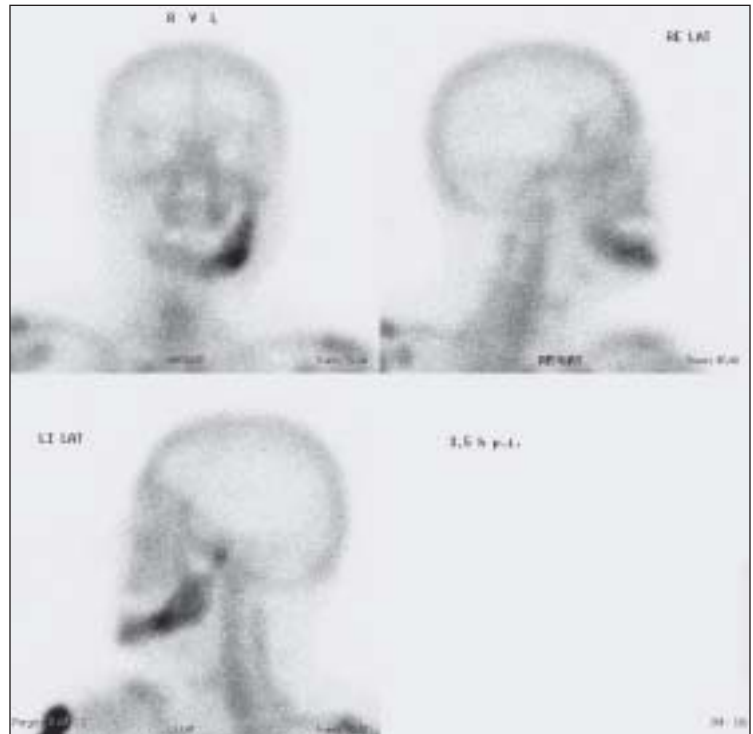


**Fig 4** Several bone trabeculae of different widths. Some were undergoing reactive resorption surrounded by granulation tissue and fat cells (hematoxylin-eosin; original magnification  $\times 40$ ).

**Fig 5** Panoramic radiography showing moth-eaten, stippled appearance of the bone in the left mandibular region 6 months postimplantation.



**Fig 6**  $^{99}\text{Tc}^{\text{m}}$ -MIBI scintigraphy showing strong uptake in the left mandibular corpus and ramus.





**Fig 7** Panoramic radiograph 3 weeks after mandibular reconstruction with an FFF.



**Figs 8a to 8c** Intra- and extraoral appearance 3 weeks after mandibular reconstruction with an FFF.



mandibulectomy. Using a 2-team approach, an early reconstruction with a vascularized fibular bone graft based on the peroneal vessels was carried out (Figs 7 and 8a to 8c). Dissection of the microvascular transplant was performed by a lateral access incision along the peroneus muscle 2 cm from the intermuscular septum. After sharp incision of the posterior intermuscular septum, the lateral margin of the fibula was detected. After opening the deep flexor space, the peroneal vessels were located, and osteotomies were carried out. The anterior intermuscular septum, extensor muscles, and interosseous membrane had to be separated from the fibula. The tibialis posterior muscle had to be divided prior to microvascular transfer. Before osteosynthesis, microsurgical anastomosis with the superior thyroid artery and the jugular vein was performed.

Since the patient requested masticatory rehabilitation, an implant-retained prosthesis is planned, with implant placement at the time of plate removal 6 months postoperatively.

## DISCUSSION

Immediate placement of implants into extraction sockets is described as a safe procedure. Nevertheless, infection and implant loss are well documented sequelae in several case reports. Sussman and Moss reported failure of an immediate implant due to spread of infection from an adjacent tooth to the site of an implant and causing an extensive localized osteomyelitis.<sup>11</sup> Takeshita et al described a case of immediate implantation into the extraction socket of a periodontally diseased tooth followed by abscess formation, purulent discharge, and implant loss.<sup>12</sup>

Periodontal disease, including the presence of plaque in the gingival sulci of the extracted teeth, is considered a risk factor for infection and failure of immediate implants.<sup>11,13</sup> Especially in patients with previous periodontal disease, peri-implant microbiota have been found to be similar to that found in periodontally diseased sites. Despite persistence of these

organisms in patients with a history of periodontal disease, Lee et al demonstrated successful osseointegration of implants.<sup>14</sup> Sussman pointed to a history of periodontal disease as a possible factor in implant failure.<sup>11</sup> Listgarten and Lai<sup>15</sup> showed similarities between the microbiological characteristics of the tissue around failing dental implants and periodontally diseased tissue. In this case report, microbiological examination revealed *Peptostreptococcus* and *Peptococcus* spp, which are commonly occurring micro-organisms in periodontal disease.<sup>15</sup>  $\beta$ -lactam antibiotics is the therapy of first choice against these bacteria. For patients with allergy to penicillin, as in the present case, clindamycin and metronidazole seem to be effective alternatives. The recurrence of abscesses in spite of an adequate antibiotic regime raises questions regarding the severe course of the presented case.<sup>16</sup>

In histomorphologic examinations of cases of implant failure, osteomyelitis, not periodontitis, has been observed in the peri-implant tissue.<sup>17</sup> In contrast to periapical lesions around natural teeth, Lindhe et al characterized peri-implant infections extending to the bone marrow and described those lesions as osteomyelitis instead of periodontitis.<sup>18</sup> Despite this histomorphologic distinction, a case of postimplantation osteomyelitis of the severity of the present case, with eventual loss of the mandible as observed in this case, has yet to be reported in the literature.

After hemimandibulectomy, the osseous defect was reconstructed with an FFF. Because of the chronicity of infection in recipient site, to prevent any recurrence, reconstruction of the condylar region was not performed. In the author's experience, a satisfactory functional outcome can be achieved with this type of reconstruction. The FFF is the method of first choice in mandibular reconstruction after segmental mandibular resection.<sup>19</sup> In contrast to the iliac crest bone flap, which matches the properties of the dentate mandible best, the FFF has been suggested as the best replacement for atrophied mandibles. Although the vertical dimension is limited to half that of a dentate mandible, endosseous implants can be regularly inserted because of the high amount of cortical bone. The ample bone length allows reconstruction after extended resections, and the length of the vascular paddle is superior to that of iliac crest bone flap. The scapular flap is sometimes used for mandibular reconstruction as well. Its main disadvantage is the fact that the 2-team approach is impossible when resections in the head and neck area have to be carried out.<sup>20–23</sup> Long-term follow-up studies of the FFF have demonstrated satisfactory facial appearance, speech, food tolerance, and deglutition.<sup>20,24</sup> Donor site morbidity has been described as mild.<sup>20,25</sup>

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