Treatment of a Patient with Severe Osteoporosis and Chronic Polyarthritis with Fixed Implant-Supported Prosthesis: A Case Report

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This article reports the treatment and 5-year follow-up of an 80-year-old female with a history of severe osteoporosis and chronic polyarthritis. Treatment included methotrixate disodium and acemetacin. After the last tooth was removed from the mandible, the patient was successfully treated with a fixed mandibular prosthesis supported by 6 implants placed between the mental foramina. The implants have remained osseointegrated, and peri-implant smears have been negative for bacterial colonization. Radiographic follow-up examination has revealed bone loss that is slightly greater than expected. This article focuses on the placement of implants in a patient receiving medication for chronic polyarthritis and osteoporosis.
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Key words: dental implants, osseointegration, osteoporosis, rheumatoid arthritis

Increased general life expectancy and resulting greater percentage of older persons in the population have also led to a rise in the incidence of osteoporotic bone changes, which affect 85% of all women.[1] Osteoporosis is characterized by a loss of bone mass, bone structure, and function, which increases susceptibility to fractures. Conventional estrogen substitution therapy is only successful when it is started early and applied over a long period of time.[2] Diminished portions of the skeleton cannot regrow. An important factor for a positive prognosis in osteoporosis is increased physical activity.[3] Compared to subjects of the same age who do not suffer from osteoporosis, osteoporosis patients run a higher risk of early tooth loss.[4] Because of this risk and related severe atrophy of the alveolar process,[5] patients with osteoporosis would be candidates for treatment with implant-supported prostheses, since adequate rehabilitation with conventional removable dentures is often not feasible. However, because of the diminished bone structure[6–8] and more rapid resorption of the alveolar process,[9] such patients do not fulfill optimum conditions for implant placement and osseointegration.

Studies investigating whether osteoporosis is a risk factor for existing implants have revealed no correlation between possible implant failure and the severity of osteoporosis.[10] Some authors have described implant failures in patients with osteoporosis,[11] while others have reported success in individual cases.[12–14]

Chronic polyarthritis is a chronic inflammatory disease that leads to arthritis, bursitis, and tendovaginitis as a result of synovialitis. The progressive, intermittent course of the disease can lead to destruction of the joints and disability. The systematic destruction of joints not only limits the patient in everyday life, but also makes proper oral hygiene more difficult, especially in advanced stages of the disease. Clinically, the hemogram shows a marked increase in nonspecific inflammatory parameters. If rheumatoid factors are positive as well (which is typical in 75% of all patients), the disorder is referred to as seropositive arthritis. For unknown reasons, chronic polyarthritis is frequently associated with osteoporosis.[15]

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Basic therapies for chronic polyarthritis include sulphasalzine, chloroquine, gold compounds, D-penicillamine, immunosuppressive agents, and, as in the patient under consideration, cytostatic agents. As has been demonstrated for juvenile types of rheumatoid disorders,[16] implant-supported prostheses constitute a viable treatment modality, provided they are planned with special care. It is still unclear whether long-term treatment with cytostatic agents impairs osseointegration of implants.[17]

Generally, more than 95% of mandibular implants can be expected to remain in situ and in function after 100 months, provided that both implant surgery and recall are carried out under optimum conditions.[18,19] In the context of the patient discussed in this article, the survival probability of implants was influenced by the length of the implant[20] and that, according to Albrektsson et al,[21] peri-implant bone resorption should not exceed 1 mm during the first year postplacement and 0.1 mm thereafter.

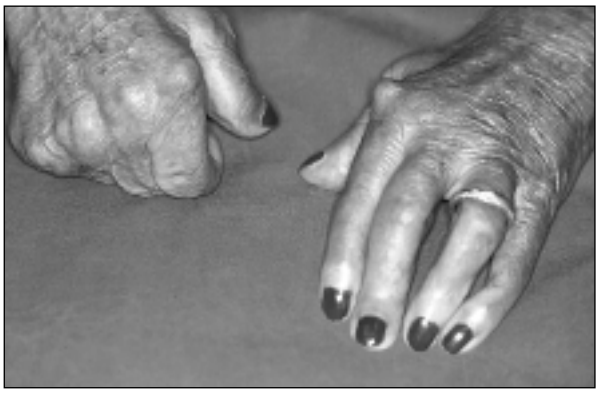

Fig 1 The patient's hands. Signs of chronic polyarthritis are clearly discernible.

Patient Report

This white female patient, who was born in 1918, has suffered from severe Type I osteoporosis and chronic polyarthritis since the early 1960s (Fig 1). The patient's family history revealed a predisposing factor for osteoporosis. The clinical condition persisted during the following decades. In 1980, the patient underwent bilateral hip replacement surgery and has been immobile since 1991 and using a wheelchair. Since this time, she has been receiving methotrexate disodium (Lederle methotrexate tablets; 1 tablet contains 2.5 mg methotrexate) 3 tablets once weekly and acemetacine daily (Rheutrop retard capsules; 1 capsule contains 90 mg acemetacine). This medication has resulted in a relief of the symptoms during the last 6 years. The patient takes no other drugs or hormones and undergoes regular examinations.

The remaining tooth in the mandible was lost in the summer of 1993. Because of compromised alveolar ridge condition, an implant-supported prosthesis was planned (Fig 2). In October 1993, 6 interforaminal implants were placed in the anterior mandible. Titanium plasma-coated cylindric implants (Frialoc, Friatec, Mannheim, Germany), 3.75 mm in diameter and 14 mm in length, were used (Fig 3). After 3 months of complication-free

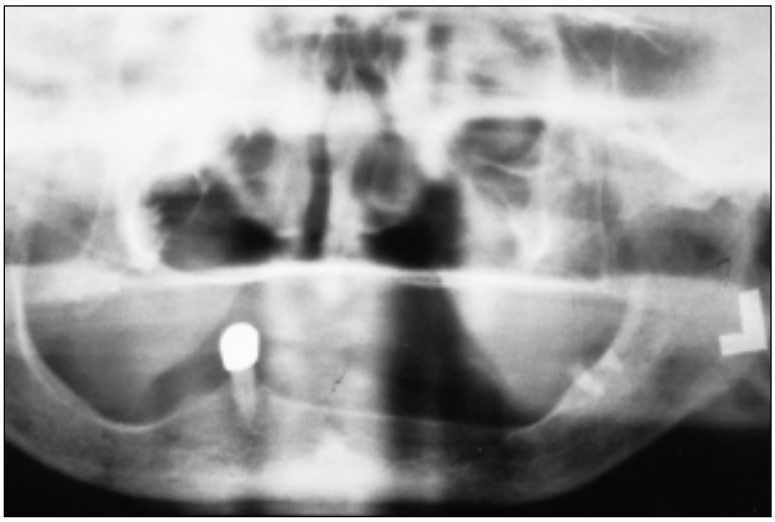

Fig 2 Initial conditions on panoramic radiograph. It proved to be impossible to obtain any microradiograms.

healing, the implants were surgically exposed. A completely implant-supported prosthesis was fabricated for the mandible and a conventional complete denture was fabricated for the maxilla. The jaw resorption patterns necessitated a crossbite situation on the left side.

Because of the patient's severely limited movement and inability to maintain adequate oral hygiene, mild peri-implantitis was observed after 12 weeks. Therefore, it was decided to schedule oral hygiene recalls at short intervals of 4 to 6 weeks. The peri-implant mucous membrane has shown no signs of irritation since, and the patient has been free from clinical symptoms for an observation period of 4 years. These findings have also been confirmed by a recent peri-implant smear, which indicated no peri-implant bacterial colonization, except for physiologic oral bacteria. The mean peri-implant bone resorption was 1.38 mm (SD 0.8) after 4 years (Fig 4). An evaluation of pocket depths after 42 months revealed a mean depth of 2.87 mm (SD 0.53). None of the values exceeded 4 mm. The patient's subjective satisfaction with the treatment correlates with the clinical findings.

Discussion

The patient's severe osteoporotic symptoms and pronounced chronic polyarthritis seem to have had no effect or only a mild effect on the prognosis of the interforaminal implants. Furthermore, treatment with low doses of methotrexate disodium, whose effect can be intensified by supplementary administration of acetamine, has not adversely affected the healing of the implants, despite the antimetabolic and cytotoxic action of this medication. The resulting minimal peri-implant bone resorption demonstrates that prognosis of the implants can be only slightly diminished, despite the 2 severe primary diseases and their treatment. Peri-implant bone resorption was only slightly greater than could be expected prognostically.[21]

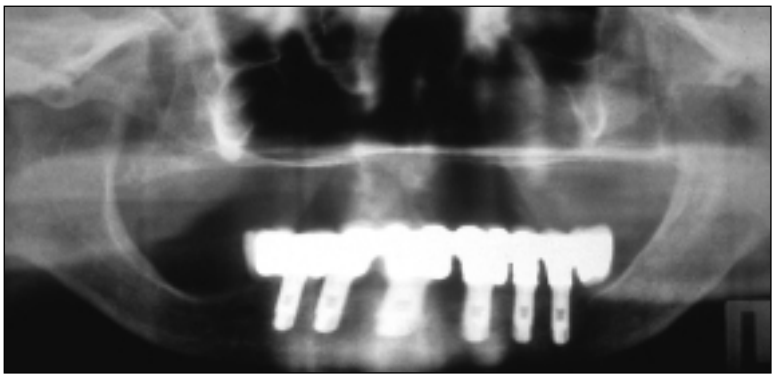

Fig 3 Panoramic radiograph following implant placement.

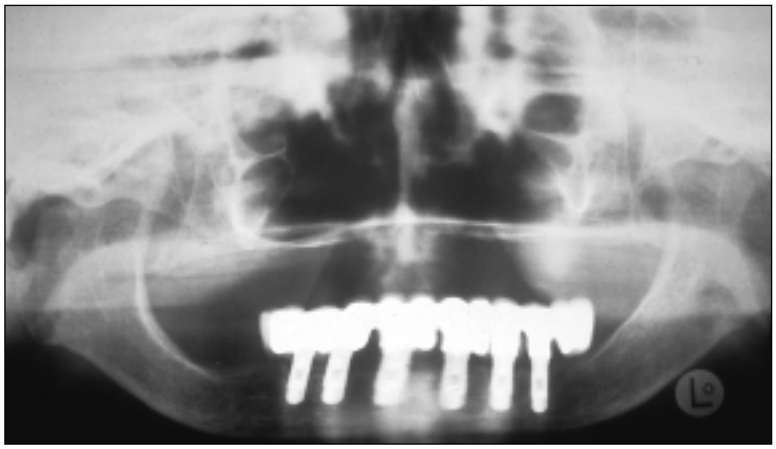

Fig 4 Panoramic radiograph 4 years after implant placement.

Summary

Although the continuous success of the patient's current prosthetic rehabilitation and function of the prostheses, which have been achieved despite a combination of aggravating factors, do not permit general conclusions, it appears that a medical history of this kind does not constitute an absolute contraindication for treatment with oral implants.

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