

CASE REPORT

One-piece implant-supported overdenture in fully edentulous patients: Report of two cases

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ABSTRACT

Dental implants with a reduced diameter can be placed in regions that lack adequate bone volume enabling functional and aesthetic oral rehabilitation without the complicated bone augmentation procedures.

This article describes surgical and prosthetic procedures used in oral rehabilitation using Straumann® one-piece Mini Implants (2.4-mm diameter with Optiloc® prosthetic connection system) in two fully edentulous women aged 57 and 74. Both patients presented with severe ridge resorption. Ten one-piece mini dental implants (six on maxillary arch and four on mandibular arch) were placed in each patient to support new complete overdentures. Both patients were delighted with the results and regained their social lives. In addition, stabilized dentures allowed the patients to regain fundamental functions of the mouth: chewing and verbal (speech) and non-verbal (smiling) communication without the fear or difficulty experienced while wearing dentures that can move.

In conclusion, mini implants offer an efficient, economical, and less invasive solution, especially for edentulous patients with atrophic bone structure or who cannot undergo complex surgical procedures.

Key Words: One-piece implants, Complete denture, Atrophic ridges, Sjögren syndrome

1. INTRODUCTION

One-piece reduced-diameter dental implants have been designed to enable placement via minimally invasive surgery and to simplify the preparation of the implant recipient site. In addition, their use decreases post-operative morbidity and offers a low-cost alternative to conventional implants.^[1,2]

Numerous studies have shown that oral rehabilitation of fully edentulous patients using hybrid prostheses stabilized by mini implants improves masticatory efficiency and high patient satisfaction.^[3,4] But only one study described rehabilitation of both maxillary and mandibular edentulous arches using Straumann® one-piece Mini Implants without any

post-operative follow-up.^[5]

We report two cases of fully edentulous patients treated with Straumann® one-piece Mini Implants retaining removable overdenture. An early loading was performed at eight weeks post-implantation. 18-month survival and success rates were 100%.

2. CASE PRESENTATION

2.1 Case 1

A 57-year-old non-smoking woman suffering from moderate mitral insufficiency, hypercholesterolemia, asthma and Sjögren's syndrome consulted the Unit of oral surgery and im-

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plantology of the Geneva University Hospitals for a mandibular pain in the area of teeth 31 and 41 resulting from acute apical periodontitis. She also complained of discomfort caused by her unstable complete upper and partial lower removable dentures. The premature loss of patients' teeth occurred about 15 years earlier due to dental caries in the context of severe xerostomia caused by Sjögren's syndrome.

Clinical examination showed that residual ridges were highly resorbed and had reduced height and width. In addition, OPT X-ray examination confirmed reduced vertical dimension, especially in the posterior maxillary and mandibular areas (see Figure 1).

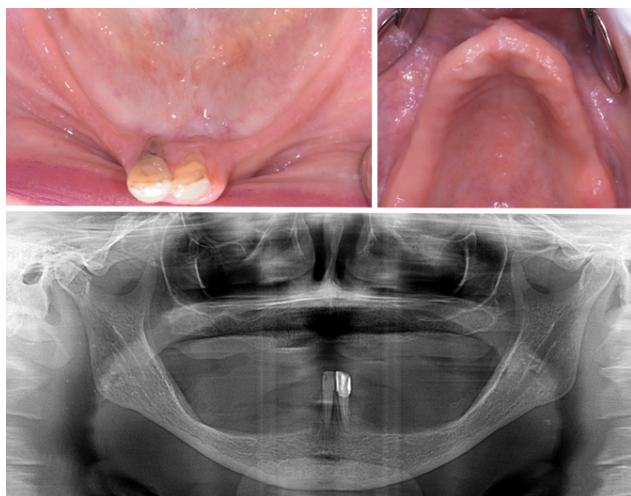


Figure 1. Clinical view and panoramic X-ray at first examination

Removal of the remaining teeth 31 and 41 and the conversion of the existing lower partial denture to the temporary complete prosthesis were performed.

Given the anatomical limitation in bone thickness, removable overdentures supported by six and four Straumann® Mini Implants on maxillary and mandibular arches, respectively, were used to treat the patient. This allowed meeting functional and aesthetic demands while using a less complex surgical procedure and avoiding bone augmentation.

2.1.1 Surgical procedure

A preoperative prophylactic antibiotic (2 g amoxicillin) was administrated to the patient one hour before surgery. In the mandibular arch, after induction of Ubisthesin® local anesthesia by buccal and lingual infiltration, buccal and palatal full-thickness flaps were raised to expose the underlying bone crest, which was then regularized using a bone bur.

Implant beds preparation was carried out using a 1.6-mm needle drill and a 2.2-mm diameter drill at the four interforaminal sites. The most distal sites were drilled at a 5-mm

safety distance from the mental foramina, while the two proximal sites were positioned in the remaining space. Drills were used to gauge preparation depth and implant axis orientation. Four Straumann® one-piece implants with a diameter of 2.4 mm and a length of 10 mm were manually placed at the desired sites corresponding to positions 44, 42, 34, and 32 (see Figure 2). Good primary stability was achieved.

In the maxillary arch, after buccal and palatal local infiltration with Ubisthesin® anesthetic, a crestal incision along the edentulous positions 17 to 27 was made, and two mucoperiosteal vestibular and palatal flaps were raised.

The same drilling sequence as used for the mandible was performed, and the Schneiderian membrane elevation was used in position 26. Six Straumann® one-piece Mini Implants with a diameter of 2.4 mm and a length of 10 mm were placed in positions 12, 14, 16, 22, 24, and 26 with good primary stability (see Figure 2). Flaps were replaced and sutured using simple 4-0 Supramid sutures. Control intraoral radiographs were taken, and post-operative advice was given to the patient along with a prescription for acetaminophen 1 g and ibuprofen 600 mg.

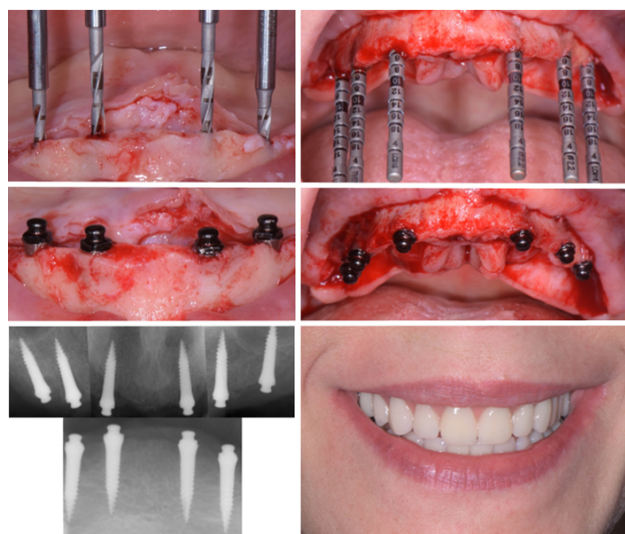


Figure 2. Placement of four one-piece mini implants in the mandibular arch and six in the maxillary arch, post-operative X-rays and complete overdentures

2.1.2 Prosthetic procedure

Space was created inside the overdentures to fit the corresponding Optiloc® implant abutments. Proper healing was achieved at the 10-day post-operative check-up, and the sutures were removed.

Six weeks later, primary alginate impressions were made, and custom impression trays were designed. Finally, the dynamic definitive impression using polyvinyl siloxane (ImprintTM

4, 3M ESPE®) was taken after copying the positioning of the Optiloc® image.

The bite registration was carried out using a laboratory-made resin occlusion base. After teeth and frame try-in, the overdentures were finished and placed in the mouth. Yellow retention inserts were placed into each Optiloc® Matrix Housing located on the underside of the overdentures.

2.2 Case 2

A 74-year-old fully edentulous woman in good general health consulted our Unit with a chief complaint of discomfort caused by her removable dentures and a desire to have more comfortable ones. Intraoral examination revealed dental wear of both the upper and lower complete dentures reducing their retention and stability. We also observed severe horizontal bone atrophy of the edentulous maxillary ridge and pronounced vertical reduction of the residual mandibular arch, which was confirmed by OPT radiological examination (see Figure 3). As a result, the patient refused bone augmentation treatment and opted for a hybrid solution. Two complete overdentures were created and loaded onto six one-piece Straumann® Mini Implants in the maxilla and four in the mandible to meet the patients' demands. The surgical and prosthetic procedures were carried out as in the first case (see Figure 4).

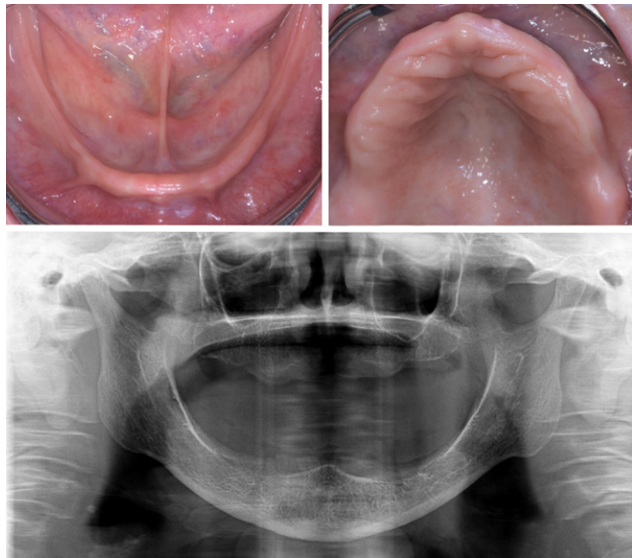


Figure 3. Clinical view and a panoramic radiograph showing the initial clinical situation of the edentulous maxillary and mandibular ridges

2.3 Follow-up and results

Both patients were satisfied with their new prostheses at 3-, 6-, 12- and 18-month follow-up examinations and reported that their quality of life had improved markedly and that they

had gained social confidence.

From a clinical and radiological point of view, the prostheses were stable over time with good osseointegration of the implants and good condition of the peri-implant soft tissues.

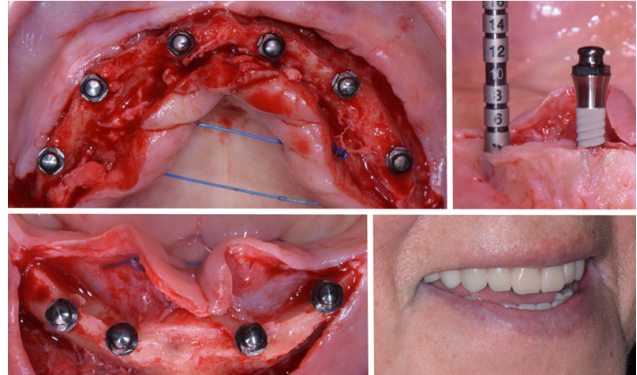


Figure 4. Clinical view showing flaps, control of the drilling axes and placement of six one-piece maxillary and four mandibular mini implants

3. DISCUSSION

In the presented cases, Straumann® Mini Implants (2.4-mm diameter with Optiloc® prosthetic connection system) were placed in the bone using a minimally invasive surgical protocol, avoiding bone grafting and reducing post-operative morbidities. In addition, the implants integrated well with the bone and provided stability to removable overdentures, which were maintained over an 18-month follow-up period.

In cases of edentulism, complete removable dentures are often used for rehabilitation.^[6] These prostheses, especially in the mandible, can sometimes become unstable due to anatomical reasons such as mouth floor enlargements and destabilizing movements of the muscles of the tongue.^[7] To overcome these problems, the complete hybrid prostheses stabilized by two inter-foraminal implants are considered the gold standard in such cases.^[8] Such prostheses are considered mixed because they are removable but stabilized on implants in the mouth. Even though the anatomy of the maxilla often supports correct retention and stability of a complete denture, placement of four implants in the canine and second premolar positions enables loading of a palateless denture, which improves patients' quality of life.^[9] Thus, hybrid prostheses are aesthetic and hygienic (Hybrid prostheses are hygienic because they can be removed from the mouth for cleaning. This is not possible for fixed prostheses which can only be cleaned inside the mouth.) therapeutic solution that compensates for bone defects and restores lip support,^[10,11] improves the chewing capacity, and the comfort of fully edentulous patients.^[12] However, in cases of

low bone volume due to horizontal alveolar ridge defect and vertical alveolar ridge atrophy and sinus pneumatization in the posterior area, placement of standard diameter implants is not always possible or may require bone augmentation. This procedure increases the duration and cost of treatment and can even compromise the outcome in elderly or medically-compromised patients.^[13] The use of four and six mini dental implants supporting mandibular and maxillary overdentures improves patients' quality of life and satisfaction.^[14] Although recent studies have shown a good implant survival rate for a different mini implant system for overden-

ture support,^[15] only one report described the rehabilitation of a fully edentulous patient using Straumann® Mini Implants but lacked post-operative follow-up. This study is the first to report two cases of fully edentulous patients treated with Straumann® one-piece Mini Implants using an early eight-week post-implantation loading technique resulting in 100% implant survival and success rates over an 18-month follow-up period.

CONFLICTS OF INTEREST DISCLOSURE

The authors declare they have no conflicts of interest.

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