Implant-supported Prostheses in Patient with Sjögren’s Syndrome: Clinical Report with 3-year Follow-up

Gentaro Mori, Takafumi Kobayashi, Taichi Ito and Yasutomo Yajima

Department of Oral and Maxillofacial Implantology, Tokyo Dental College, 2-9-18 Kanda-Misakicho, Chiyoda-ku, Tokyo 101-0061, Japan

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Abstract

Sjögren’s syndrome (SS), an autoimmune disorder, affects the exocrine glands, including the lacrimal and salivary glands. It is characterized by symptoms of dry eye and dry mouth. As secretion of saliva decreases, patients with SS experience rampant caries, pain in the oral mucosa, inflammation and hardening of the salivary glands, abnormal taste, dysphagia, and loss of teeth earlier than healthy individuals. A removable partial denture is often used as a prosthesis after tooth loss. Compromised salivary lubrication, however, can produce traumatic ulceration of the mucosa, making use of a removable prosthesis in SS patients painful. In such cases, a dental implant is likely to be requested as an alternative. This report describes dental implant treatment in an SS patient, a 50-year-old woman who presented with the chief complaint of masticatory dysfunction and pain due to a removable partial denture. Eight implants were placed in the maxillary and mandibular first molar tooth and second molar tooth regions. Following a 4-month non-loading period, second-stage surgery and provisional restoration with a screw-retained implant temporary crown were performed. Screw-retained superstructures were fitted by means of a customized titanium abutment and zirconia crown as the final restoration. No complications, including inflammation of peri-implant soft tissue or resorption of peri-implant bone, were observed at 3 years following placement of the superstructures.

Key words: Implant treatment — Sjögren’s syndrome

Introduction

Sjögren’s syndrome (SS) is a chronic autoimmune disorder of the exocrine glands associated with lymphocytic infiltrates of the affected glands. The mucous membranes and moisture-secreting glands of the eyes and mouth are usually affected first, resulting in decreased production of tears and saliva. Sjögren’s syndrome is a systemic autoimmune disorder with a population prevalence of approximately 0.5% and a female preponderance (female to male ratio of 9:1). As the condition worsens, patients experience symptoms such as pain in the oral mucosa, abnormal taste, rampant caries, atrophy of the lin-
gual papillae, smooth or fissured tongue, refractory stomatitis, and dysphagia\textsuperscript{5,14}. A decrease in secretion of saliva in patients with SS is associated with a higher score on the decayed, missing, and filled teeth index, even though they have been shown to undergo oral health care more regularly than the general population, and there is also a tendency for teeth to be lost earlier\textsuperscript{2,7}. Removable partial dentures are widely used as a prosthesis in cases of tooth loss. Due to xerostomia and burning of the oral mucosa, however, patients with SS experience great pain and discomfort when wearing removable partial dentures\textsuperscript{15}. In such cases, implant treatment can offer an alternative. Guidelines for implant treatment in patients with SS remain to be established, however, and few studies have investigated the clinical long-term follow-up of implant treatment in such patients\textsuperscript{12}. This report describes the placing of an implant-supported fixed prosthesis in an SS patient with no saliva secretion (saliva secretion measurement test with gum result of 0 ml/10 min).

Case

The patient was a 50-year-old woman referred to Tokyo Dental College Suidobashi Hospital by her primary care dentist in April 2013 with the chief complaint of masticatory dysfunction and pain. In February 2012, tooth #36 had been extracted due to root fracture and a removable partial denture placed in the region of #36, 37, 46, and 47 following healing of the mucosa. Despite repeated adjustment, however, the patient still found the prosthesis painful to use. Therefore, dental implant treatment was proposed, for which she was referred to the Department of Oral and Maxillofacial Implantology at our hospital for a preliminary examination. Her medical history revealed an earlier diagnosis of SS at the Department of Connective Tissue Disorders at another university hospital in July 2006, for which she was prescribed artificial saliva (Saliveht aerosol 50 g, Teijin Pharma, Tokyo, Japan) once every 3 months. The patient also reported a drug allergy to a new quinolone antibiotic, which caused nausea. There was no history of smoking or oral use of steroids or psychoactive drugs, which might have induced dry mouth. All the remaining teeth were nonvital and showed root canal fillings (Fig. 1). Thickening of the maxillary sinus mucosa was observed (Fig. 1). Swelling was observed in the right parotid gland, and symptoms of dry eye were noted. The mandibular oral mucosa in the molar region was dry, had poor elasticity, and was fairly reddened (Fig. 2). Moreover, the tongue was red, dry, and fissured (Fig. 3). She showed a score of 10% on her plaque control record, and the width of the keratinized mucosa in the mandibular molar region was 6 mm. The results of a blood/urine test revealed an anti-SSA antibody titer of $\geq 1,200$ U/ml and MCH level of 32.9 pg, both of which represented abnormal values (normal value: anti-SSA antibody $< 10$ U/ml; MCH 27–32 pg). A saliva secretion measurement test with gum was performed and the results showed 0 ml/10 min.

Treatment Process

In June 2013, we performed oral hygiene guidance, basic periodontal treatment, and scaling and root planing of teeth #14, 15, and 25. Teeth #16, 17, 26, and 27 were extracted as they could not be preserved. In January 2014, after 5 months of bone healing, implant surgery was performed by a two-stage procedure. After applying local anesthesia, the mucoperi-
The osteal flap was opened and drilling and the osteotome technique for implant bed preparation performed according to the manufacturer’s protocol. The implant bodies used were as follows: \( \varphi 4.1 \times 8 \) mm (Straumann Bone Level, Institut Straumann AG, Basel, Switzerland) for the #36, 37, 46, and 47 regions; and \( \varphi 5.0 \times 8 \) mm (Spline MP-1, Zimmer Biomet Dental, Carlsbad, CA, USA) for the #16, 17, 26, and 27 regions. Primary stability was recognized at 35 N in the #36, 37, 46, and 47 regions and 40 N in the #16, 17, 26, and 27 regions. Bone density in the #36, 37, 46, and 47 regions was type 3 and that in the #16, 17, 26, and 27 regions was type 2. For the two-stage procedure, cover screws were inserted into both implant fixtures and the mucoperiosteal flap sutured for wound closure. Postoperatively, amoxicillin (250 mg, 3 times a day for 5 days) and loxoprofen (60 mg) were prescribed. The patient was also advised to use an antimicrobial mouth rinse containing benzethonium chloride (Neostelin Green 0.2% mouthwash solution; Nippon Shika Yakuhin, Yamaguchi, Japan) 4–5 times a day. Sutures were removed after 10 days. No postoperative infection or mucosal necrosis was observed, and the postoperative course was favorable. No temporary dentures were used during the non-loading period. After a 3-month non-loading period, second-stage surgery was performed. After mucosal healing, a provisional restoration with a screw-
retained implant temporary crown was put in place. The provisional restoration was used for 3 weeks and no problems with mastication or pronunciation were noted. In order to give priority to cleanability, screw-retained superstructures via a custom titan abutment were selected for the final restoration and zirconia chosen as the crown material. After completion of implant treatment, dental implant maintenance was performed by a dental hygienist every 1–2 months. In addition to routine professional mechanical implant cleaning, maintenance comprised application of a high concentration (9,000 ppm) fluoride foam (Butler Fluodent Foam N, Sunstar Inc., Osaka, Japan) to the remaining teeth and protection of the implant by covering it with Vaseline. No complications, including inflammation of peri-implant soft tissue or resorption of peri-implant bone (Figs. 4 and 5), were observed at 3 years after fitting of the superstructures. No change was observed in the degree of dry mouth. Acute apical suppurative periodontitis developed in tooth #42 during maintenance, however, and treatment for an infected root canal was performed. A favorable postoperative course was noted, with no loss of the remaining teeth.

Discussion

Implant therapy in patients with SS showing a decrease in secretion of saliva carries
potential risks: failure of mucosal healing; early failure before osseointegration; and the development of peri-implantitis after osseointegration. In the present case, implant treatment was performed in an SS patient with no saliva secretion (saliva secretion measurement test with gum result of 0 ml/10 min), and good results obtained over the 3-year follow-up period. The diagnostic criterion of SS is a saliva secretion measurement test with gum result of <10 ml/10 min, indicating that the degree of dry mouth in the present case was remarkably high. Saliva contains mucin, lysozyme, histatin, and secretory IgA, molecules which protect mucous membrane, inhibit bacterial adhesion, proliferation and motility, and exert biological defense capabilities. It is unknown, however, whether these salivary molecules are an essential factor in maintaining an implant over a long period. Previous studies have reported that cancer patients who underwent radiotherapy to the head and neck and developed xerostomia had a tendency to develop peri-implantitis. It is also reported that SS patients exhibited significantly elevated the serum IgG antibody levels to Actinobacillus actinomycetemcomitans and Porphyromonas gingivalis compared to controls. This suggests that implant treatment in the present case carried a high risk of the development of peri-implantitis. It is also reported that SS patients exhibited significantly elevated the serum IgG antibody levels to Actinobacillus actinomycetemcomitans and Porphyromonas gingivalis compared to controls. This suggests that implant treatment in the present case carried a high risk of the development of peri-implantitis. It is also reported that SS patients exhibited significantly elevated the serum IgG antibody levels to Actinobacillus actinomycetemcomitans and Porphyromonas gingivalis compared to controls. 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Additionally, a systematic review concluded that while a recall interval of 5–6 months should be recommended, it should be adjusted according to the patient’s risk profile. Therefore, in the present case, the recall interval was set at 1–2 months due to the high level of risk. Cumulative interceptive supportive therapy was developed on the basis of certain clinical and radiographic parameters to monitor, detect, and arrest inflammation involving peri-implant tissues in the treatment of peri-implantitis. To our knowledge, however, no evidence-based protocol for peri-implantitis treatment yet exists. Therefore, with high-risk patients such those with SS, it is important to shorten the recall interval in order to detect initial signs of peri-implantitis if further progression is to be prevented.

In the present case, implant treatment was performed in #16, 17, 26, 27, 36, 37, 46, and 47. Implant treatment involves no application of mechanical force to the residual teeth compared to that with removable dentures, which allows tooth loss to be reduced. According to the Eichner classification, loss of more than 2 out of 4 occlusal supports (B2) leads to further destruction of occlusion. Therefore, implant treatment in the molar tooth region was selected in the present case. By replacing a fixed prosthesis in the molar region with an implant, it was possible to achieve stability of occlusion. Prosthetic treatment is not frequently performed in patients with SS, with only symptomatic treatment being the norm. Many such patients tend to lose teeth early due to persistent hyposalivation, resulting in an edentulous jaw. In order to prevent the spread of tooth loss, it is important to achieve stability of occlusion by implant therapy. There are potential risks associated with implant treatment in SS patients, though. The present results indicate, however, that
successful long-term maintenance can still be achieved as long as the implant treatment is carefully planned and adequate checks on oral hygiene performed at short-interval recall appointments.

**Conclusion**

No complications, including inflammation of peri-implant soft tissue or resorption of peri-implant bone, were observed at 3 years following placement of superstructures. Treatment with implant-retained prostheses substantially increased prosthetic comfort and function. These findings suggest that implant treatment in patients with SS offers a viable alternative to removable partial dentures.

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**Correspondence:**

Dr. Gentaro Mori,
Department of Oral and Maxillofacial Implantology,
Tokyo Dental College,
2-9-18 Kanda-Misakicho, Chiyoda-ku,
Tokyo 101-0061, Japan
E-mail: morigentarou@tdc.ac.jp