

# Thirteen-year follow-up of a mandibular implant-supported fixed complete denture in a patient with Sjogren's syndrome: A clinical report

Paul P. Binon, DDS, MSD<sup>a</sup>

School of Dentistry, Indiana University, Indianapolis, Ind, and University of California San Francisco, San Francisco, Calif

[Q1]

This clinical report describes the treatment and long-term follow-up of a patient with Sjogren's syndrome treated with osseointegrated implants and a mandibular fixed complete denture. The implants and prosthesis have remained stable and functional for 13 years. Implant treatment may, therefore, offer a viable long-term treatment alternative for patients with Sjogren's syndrome. (J Prosthet Dent 2005;■■■:■-■.)

Minimal long-term clinical documentation exists in the literature regarding the treatment of Sjogren's syndrome (SS) patients with osseointegrated implants.<sup>1,2</sup> The detailed course of treatment of a 64-year-old man with Sjogren's syndrome was documented in 1993.<sup>3</sup> The significant oral implications of SS include the following: xerostomia due to reduced salivary flow; rampant caries; chronically inflamed, irritated, and burning oral mucosa; inflamed, enlarged, and hardening salivary glands; and an increased incidence of chronic candidiasis.<sup>4-6</sup> Patients also experience dry eyes, angular cheilitis, increased plaque retention, changes in taste perception, and difficulty swallowing. Denture wear is a considerably difficult and unpleasant experience for most patients with SS.<sup>2</sup> The intent of this clinical report is to document the long-term beneficial aspects of treating an SS patient with an implant-supported mandibular fixed denture.

## CLINICAL REPORT

The patient, a 67-year-old white man, had extensive fixed prosthodontic treatment of the mandibular arch that failed within 5 years of placement due to cervical caries. In retrospect, this may have been the first indication of the effects of xerostomia. The previous treating dentist then recommended coronal reduction, endodontic treatment of the retained roots, silver amalgam coronal restorations, and 2 intraradicular attachments (Zest Anchors, Escondido, Calif) to retain an overdenture. This treatment plan was implemented, and 4 months following completion of treatment, the roots demonstrated recurrent caries and loss of the silver amalgam restorations and the attachments. The apparent intent of this treatment plan was to preserve the alveolar ridge and provide mechanical retention. Because the systemic condition was not diagnosed and the treating dentist failed to recognize the serious implications of

reduced salivary flow, no supportive or preventive measures were initiated, resulting in extensive root caries (Fig.1). The overdenture became progressively unstable [F1-4/C] and nonretentive, and the patient sought the services of a prosthodontic specialist. At the initial examination, the patient was wearing a complete maxillary denture and a mandibular overdenture; the roots of the mandibular incisors, canines, and right first and second premolars were intact. The patient's primary complaints were chronic tissue discomfort, recurrent denture sores, difficulty masticating, and mandibular denture instability. The patient also reported chronic dry mouth that had increased in severity over the previous 2 years. Several other clinical indicators suggested a systemic etiology, and a referral to his physician for further evaluation was made.

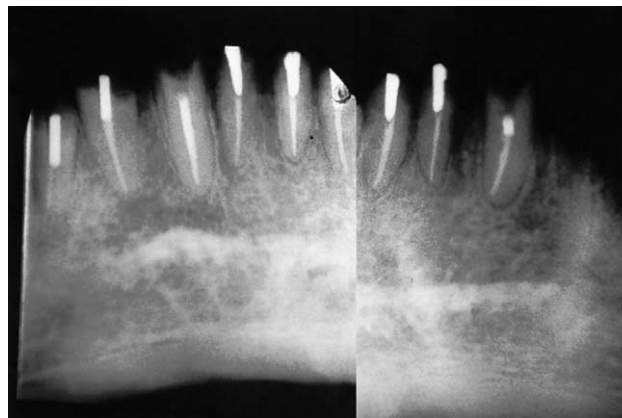
Following examination by his physician and a rheumatologist, he was diagnosed with SS. Sjogren's syndrome is a chronic inflammatory disorder of unknown etiology that is probably autoimmune in nature.<sup>7</sup> In the presence of other autoimmune disorders, such as rheumatoid arthritis, systemic lupus, sclerosis, or polymyositis, it is considered in its secondary form and has an occurrence of approximately 30% in these patients.<sup>4-6</sup> It is most common in middle-aged women, with a 9:1 predominance over males.

The most significant oral manifestation of SS is chronic xerostomia, as well as the dental implications previously described. Additional validation of this diagnosis is the presence of keratoconjunctivitis sicca (reduced tear flow) and salivary gland enlargement. The conclusive test for SS, however, is based on a salivary gland biopsy.<sup>4</sup> Typically, there is also an associated connective tissue or lymphoproliferative disorder present. Sjogren's syndrome is an incurable disease at the present time. The oral and ophthalmic manifestations are typically not progressive. Treatment is generally symptomatic and involves lubricants, artificial tears, salivary substitutes, increased water intake, salivary stimulation, and aggressive caries prevention. Severe extraglandular involvement typically results in treatment with systemic corticosteroids and immunosuppressive medications.<sup>5,6</sup>

<sup>a</sup>Adjunct Professor of Prosthodontics, Indiana University; Assistant Research Scientist, Restorative Department, University of California San Francisco; Private prosthodontic and implant practice, Roseville, Calif.



**Fig. 1.** Condition of remaining anterior teeth at time of initial examination. Note generalized erythematous glossy tissue and fissured cobblestone tongue, characteristic of severe xerostomia.



**Fig. 2.** Radiographs at time of initial examination were made approximately 4 months following restoration of roots with RCT, silver amalgam restorations, and 2 intraradicular attachments.



**Fig. 3.** Completed fixed mandibular complete denture.

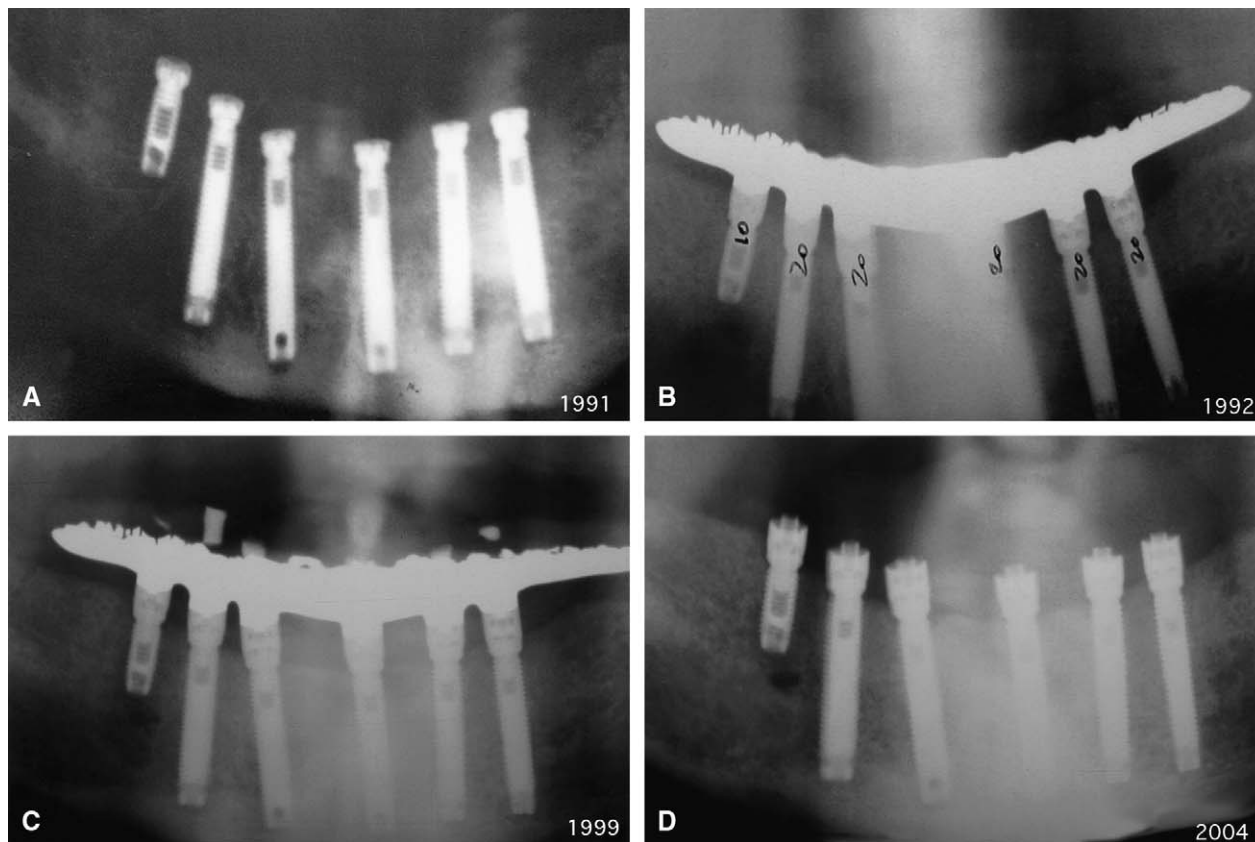
The results of the clinical examination and the treatment planning sequence were described in detail in the original clinical report.<sup>3</sup> Radiographically and clinically, the pretreatment condition is shown in **Figures 1** and **2**. Six implants (Nobelpharma AB, Gothenburg, Sweden) were placed immediately between the mental foramina following the extraction of the remaining carious teeth in April of 1991. Four months later, abutments (Nobelpharma AB) were connected to the implants, and a fixed supported prosthesis and new maxillary denture were constructed.

From a surgical perspective, there were some alterations of the classic Branemark protocol.<sup>8,9</sup> To reduce treatment and healing time, extractions and implant placement were concurrent. Immediate implant placement was a concept in its infancy at that time.<sup>10,11</sup>

In addition, previous authors advocated removing the entire superior cortical plate to a level well below the apices of the existing sockets prior to placement of the implants in medullary bone.<sup>12</sup> In contrast, the

surgeon's approach was a limited alveolectomy with the intent of preserving maximal bone height and dense cortical bone. If the conventional rationale advocated at that time had been used, only five 15-mm implants would have been placed. The limited alveolectomy and preservation of bone, however, resulted in placement of five 20-mm implants and one 10-mm implant. The net result was an increase of approximately 33% of implant surface available for integration. This also allowed the implants to have bicortical stabilization. In the author's judgment, there was little justification for removing healthy alveolar bone unless inadequate interarch space to accommodate the prosthesis was present.<sup>3</sup> In 1990, no documentation was reported in the literature regarding SS patients' responses to osseointegrated implants. It was, therefore, prudent to maximize the number and length of the implants used to treat this patient.

Initial postoperative healing was uneventful. The implants were exposed and standard abutments were placed in July of 1991. Temporary cylinders (3i Implant Innovations Inc, Palm Beach Gardens, Fla) were secured to the abutments, and the existing denture was converted to a fixed transitional prosthesis ad modum Balshi.<sup>13</sup> A mandibular transfer impression was completed at the same time to construct a cast gold (Sterngold Dental, Attleboro, Mass) substructure. The framework was evaluated intraorally for passive fit, and interocclusal records were obtained. Following a trial insertion of the denture tooth arrangement, the denture was processed and the completed prosthesis was inserted. Subsequent to insertion of the definitive mandibular prosthesis, the patient was seen on a regular recall basis for 13 years (**Fig. 3**). Initially, the recall was on an alternating 3-month basis with a periodontist. In 1995, the schedule changed to an alternating 6-month recall. During the course of approximately 28 recall appointments over a period of 13 years, the implants and the prosthesis have been



**Fig. 4.** **A**, Panoramic radiograph made immediately after insertion of implants in April, 1991. Implant necks are all located in apical part of residual sockets, and apical ends engage inferior cortical plate. **B**, Panoramic radiograph made 1 year after loading. No bone loss is noted in this or any subsequent radiographs. **C**, Radiograph made in 1999. **D**, Most recent radiograph with superstructure removed in 2004.

stable and without any complications. The mandibular prosthesis was removed and the abutments were evaluated in 1993, 1994, 1998, and 2002. The abutment screws were retightened to 20 N·cm with a mechanical torque driver (Nobelpharma AB). Typically, the abutment screws required a one quarter to one half turn to reach the appropriate torque value. The prosthesis remained clinically stable during the 13-year follow-up period. The gold prosthetic screws were resistant to removal with a hand driver, and none were considered “loose” during the entire follow-up period. No abutment screws or gold prosthetic screws fractured during the 13-year follow-up period. With few exceptions, implant probing depths were consistently 3 mm. This patient maintained above average home hygiene during the entire follow-up period.

Although no standardized technique was implemented and equipment changes occurred, sequential radiographs made during the follow-up period demonstrated no significant discernable bone loss around any of the dental implants (Fig. 4). The tissues show little change after 14 years of function (Fig. 5). The cantilever

distal extension areas of the fixed complete denture have been relieved on 2 occasions to reduce tissue contact due to bone proliferation and to increase hygiene access. Progressively, the maxillary and mandibular prostheses [Q4] have demonstrated considerable wear and attrition. There has also been a loss of the vertical dimension of occlusion and loss of peri-oral tissue support. The occlusal surfaces have been worn flat, and a slight open posterior articulation is now present (Fig. 6). A new maxillary den- [F6-4/C] ture and a mandibular rebase have been recommended to alleviate these problems and to improve masticatory function. The wear patterns exemplified in this patient are not different from those experienced by non-SS patients restored with fixed mandibular prostheses that have been followed clinically in the author’s practice for the past 22 years. The patient’s medical history during this time has remained generally benign, with periodic episodes of rheumatoid arthritis requiring prednisone treatment, gall bladder surgery, and an injury to the rib cage sustained in a fall. The use of prolonged corticosteroids has been documented to cause significant metabolic side effects that include hyperglycemia,

173  
174  
175  
176  
177  
178  
179  
180  
181  
182  
183  
184  
185  
186  
187  
188  
189  
190  
191  
192



**Fig. 5.** **A**, Tissues before attachment of definitive mandibular fixed/detachable prosthesis in 1991. **B**, Tissues in 2004. Reddened and atrophic appearance of tissue did not change due to chronic dry mouth condition. Some minor alterations in tissue texture were noted during recall appointments, depending on patient's prednisone level.

hypertension, osteoporosis, and myopathy.<sup>14</sup> To minimize steroid osteopenia, patients that take corticosteroids for more than a few days should receive supplemental calcium and vitamin D.<sup>14</sup> The direct effect of steroid-induced osteoporosis on osseointegrated dental implants has not been clearly demonstrated.<sup>15,16</sup> It appears that steroid administration may have less effect on bone density and the osseointegration of titanium implants in the mandible than in skeletal bone in general.

## SUMMARY

Over the course of 13 years, treatment of a man with SS has been documented. The treatment has been [Q5] successful and without untoward effects. The patient reported dramatic improvements in comfort, function, and esthetics immediately after treatment and continues to report satisfaction with the treatment received. Based on the long-term favorable results experienced by this patient, other patients with SS and severe dry mouth



**Fig. 6.** Posterior wear has resulted in loss of vertical dimension of occlusion and centric relation contact. Patient now has light (posterior) open articulation and functions in protrusive relationship.

may benefit from the placement of implant-supported prostheses. The merits of immediate placement of implants and the preservation of maximal vertical bone height have also been supported with this patient's treatment.

## REFERENCES

1. Payne AG, Lownie JF, Van Der Linden WJ. Implant-supported prostheses in patients with Sjogren's syndrome: a clinical report on three patients. *Int J Oral Maxillofac Implants* 1997;12:679-85.
2. Isidor F, Brondum K, Hansen HJ, Jemsen J, Sindet-Pedersen S. Outcome of treatment with implant-retained dental prostheses in patients with Sjogren Syndrome. *Int J Oral Maxillofac Implants* 1999;14:736-43.
3. Binon PP, Fowler CN. Implant-supported fixed prosthesis treatment of a patient with Sjogren's syndrome: a clinical report. *Int J Oral Maxillofac Implants* 1993;8:54-8.
4. Moutsopoulos HM, Tzioufas AG. Sjogren's syndrome. In: Klipple JH, Dieppe PA, editors. *Practical rheumatology*. London: Mosby; 1995. p. 394-6.
5. Moutsopoulos HM. Sjogren's syndrome. In: Isselbacher KJ, Braunwald E, Wilson JD, Martin JB, Fauci AS, editors. *Harrison's principles of internal medicine*, 13E. McGraw-Hill; 1994. p. 1662-4.
6. Hockberg MC. Sjogren's syndrome. In: Bennett JC, Plum F, editors. *Cecil textbook of medicine*, 20E. WB Saunders; 1996;1488-90.
7. Delaleu N, Jonsson R, Koller MM. Sjogren's syndrome. *Euro J Oral Sci* 2005;113:101-13.
8. Adell R, Lekholm U, Rockler B, Branemark PI. A 15-year study of osseointegrated implants in the treatment of the edentulous jaw. *Int J Oral Surg* 1981;10:387-416.
9. Branemark P-I, Zarb GA, Albrektson T, editors. *Tissue-integrated prostheses: osseointegration in clinical dentistry*. Chicago: Quintessence; 1985. p. 130-47.
10. Barzilay I. Immediate implants: their current status. *Int J Prosthodont* 1993;6:169-75.
11. Lazzara R. Immediate implant placement into extraction sites: surgical and restorative advantages. *Int J Periodont Rest Dent* 1989;9:333-43.
12. Parel SM, Triplett RG. Immediate fixture placement: a treatment planning alternative. *Int J Oral Maxillofac Implants* 1990;5:337-45.
13. Balshi TJ. The Biotes conversion prosthesis: a provisional fixed prosthesis supported by osseointegrated titanium fixtures for restoration of the edentulous jaw. *Quintessence Int* 1985;16:667-77.
14. van Vollenhoven RF. Corticosteroids in rheumatic disease: understanding their effects is key to their use. *Postgraduate Medicine* 1998;103:137-42.
15. Fujimoto T, Niimi A, Sawai T, Ueda M. Effects of steroid-induced osteoporosis on osseointegration of titanium implants. *Int J Oral Maxillofac Implants* 1998;13:183-9.

251 16. Keller JC, Stewart M, Roehm M, Scheider GB. Osteoporosis-like bone  
252 conditions affect osseointegration of implants. *Int J Oral Maxillofac*  
253 *Implants* 2004;19:687-94.

254 *Reprint requests to:*

255 DR PAUL BINON  
256 1158 CIRBY WAY, SUITE A  
257 ROSEVILLE, CA 95661  
258 FAX: 916-786-6820  
E-MAIL: [binondds@yahoo.com](mailto:binondds@yahoo.com)

0022-3913/\$30.00

Copyright © 2005 by The Editorial Council of *The Journal of Prosthetic Dentistry*.

doi:10.1016/j.prosdent.2005.09.010

259  
260  
261  
262  
263  
264  
265  
266

**TOC Summary:**

*This clinical report describes the treatment and follow-up of a patient with Sjogren's syndrome using osseointegrated implants and a mandibular fixed complete denture, and indicates that patients with SS and severe dry mouth may benefit from the placement of an implant-supported prosthesis.*

UNCORRECTED PROOF