Implant-Supported Rehabilitation of Severe Malocclusion Due to Unilateral Condylar Hypoplasia: Case Report

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Unilateral condylar hypoplasia results in facial, skeletal, and dental deformity and is a condition that is often treated with surgery and orthodontics. This report describes implant-supported prosthodontic rehabilitation in a 70-year-old patient who chose not to undergo orthognathic surgery. The patient underwent full-mouth dental extraction and placement of 9 maxillary and 5 mandibular implants. She received implant-supported cantilevered fixed prostheses in both arches to improve and minimize her skeletal and dental crossbite.

Key Words: dental implants, prosthodontic reconstruction, condylar hypoplasia

INTRODUCTION

Unilateral condylar hypoplasia results in facial, skeletal, and dental deformity caused by a short mandibular ramus. The cause of the underdeveloped condyle can be either congenital or acquired. Congenital condylar hypoplasia is associated with a number of syndromes, including Goldenhar's and hemifacial microsomia. Acquired condylar hypoplasia can be caused by trauma, infection, or degenerative joint disease. When diagnosed in a young patient, early surgical and dentofacial orthopedic therapy may be indicated. Treatment of adult patients usually involves orthognathic surgery to correct the skeletal deformity.

Adult patients may present for treatment with undiagnosed and untreated developmental, skeletal, and dental deformities. Mature patients may not be candidates for orthognathic surgery for health reasons or may refuse surgery. Treatment of these patients may require a prosthetic solution to improve a skeletal deficiency. Although this may be a compromise of ideal treatment, it provides optimal treatment by meeting the patient’s goals of function, comfort, and esthetics.

CASE REPORT

A 70-year-old female patient presented to the University of Florida College of Dentistry Jacksonville Clinic (UFCD-J) with a complaint of masticatory insufficiency and the desire for improved esthetics. Eight advanced-education-in-general-dentistry residents were assigned to provide comprehensive evaluation and treatment in consultation with UFCD-J faculty. The patient’s medical history included hypertension and hypercholesteremia, and her dental history included extractions, operative, single crowns, and removable partial dentures. Extraoral examination revealed marked facial asymmetry with a deviation of the patient’s chin to the right (Figure 1). The deviation increased on opening. There had been no history of trauma to the right temporomandibular joint area. The patient reported that her jaw was straight until age 8 or 9 years and then started to deviate. She was unaware of a diagnosis for this condition.

Intraoral examination revealed multiple missing teeth and complete palatal dental crossbite on the right side from the maxillary second bicuspid to the central incisor (Figure 2). Radiographic examination revealed an underdeveloped right condyle. The right
ramus and body also appeared smaller than the contralateral side (Figure 3).

The patient was presented with the option of referral to oral maxillofacial surgery for evaluation for orthognathic surgery to correct the skeletal defect. The patient refused surgery. It was determined that the patient’s remaining dentition was insufficient to retain tooth-supported cantilevered prostheses due to recession and periodontal disease. Conventional complete dentures would not be able to withstand the forces generated by the patient’s skeletal cross-bite. An optimal treatment plan was developed that
would improve the dental crossbite with implant-supported fixed prostheses that would be able to withstand the lateral forces from the patient’s crossbite.9–13

**MATERIALS AND METHODS**

The patient underwent full-mouth dental extraction and placement of 9 maxillary implants and 5 mandibular implants in 2 appointments. At the first
appointment, all 9 residual maxillary teeth were extracted under local anesthesia. Nine implants (Replace Select, NobelBiocare, Yorba Linda, Calif) were placed in consecutive adjacent sites (Figure 4). The implant diameters were 3.5 mm (2 × 10 mm, 3 × 13 mm) and 4.3 mm (3 × 13 mm, 1 × 16 mm). All implants achieved insertion torque ranging from 35 to 45 Ncm. A conservative sinus lift was performed at the location of the maxillary right first molar using the osteotome technique.  

Implants placed in the maxillary first bicuspid regions were augmented with autogenous bone, particulate hydroxyapatite (Osteograf N-300, Dentsply Ceramed, Lakewood, Colo), and freeze-dried demineralized bone allograft (Community Tissue Services, Indianapolis, Ind). 17 Resorbable collagen membranes (Biomend Extend, Zimmer Dental, Carlsbad, Calif) were used where necessary to achieve primary closure over the grafts (Figure 5). 18

During the course of treatment, providing esthetic, comfortable, and stable provisional restorations presented several challenges. After removal of the maxillary teeth, the patient was provided with an interim maxillary complete denture that occluded against natural teeth (Figure 6). This was necessary because the mandibular teeth were planned for extraction 3 weeks later. The natural teeth were adjusted minimally, and acceptable function and stability were obtained.

Three weeks later, all 7 residual mandibular teeth were extracted under local anesthesia. A flap was raised, and mental foramena were identified. Five implants (Replace Select) were placed (all 3.5 × 10 mm; Figures 7 and 8). Each achieved 45 Ncm of insertion torque to reach proper positioning, indicating good initial implant stability. Bone grafts consisting of autogenous bone harvested from ridge preparation, particulate hydroxyapatite (Osteograf N-300), and freeze-dried demineralized bone allograft (Community Tissue Services) were placed on the facial aspect of all implants and covered with a resorbable collagen membrane (Biomend Extend). The patient was provided with an interim complete denture as temporization (Figure 9). The implants were not immediately loaded.

After the mandibular teeth were removed, provisionalization proved to be a bigger challenge. The skeletal discrepancy required the interim dentures to
be in crossbite with a cantilevered occlusion. Not surprisingly, the patient had difficulty adapting to this unstable malocclusion. The mandibular complete denture was converted to a screw-retained fixed denture by attaching the denture to the implants with titanium cylinders and denture repair acrylic (Figures 10–12).19–22 This temporary solution provided more retention and stability for the patient. She was able to function better with the converted fixed provisional.

The patient presented for second-stage surgery 6 months after implant placement. The implant in the maxillary right first molar position failed to osseointegrate and was removed at this time. The implant extraction site was probed for sinus perforation. No perforation was found. The site was debrided, filled with collagen (CollaPlug, Zimmer Dental), and sutured with 4.0 chromic gut. It was decided that the remaining 8 implants would be sufficient to restore the maxilla with a full-arch cemented prosthesis.

After final impressions with open tray impression copings (Figure 13), the final prostheses were fabricated.23,24 The maxilla was restored with a cemented restoration to correct for the implant angulations and to prevent screw access through the facial surface of the prosthesis25 (Figure 14). The mandible was restored with a screw-retained restoration to compensate for the lingualized placement of the prosthetic teeth and allow access to the implants (Figure 15).11,12,26,27

The maxillary restoration (Figures 16–18) was cemented with resin cement (Rel—X Luting Cement, 3M ESPE, St Paul, Minn), and the mandibular restoration was screwed into place and tightened to 15 Ncm according to the manufacturer’s protocol (Figures 19–21).

The patient has been followed for 22 months since delivery of the prostheses. In that time, the patient has undergone occlusal adjustments, alteration to the tissue surface of the mandibular prosthesis, and routine prophylaxis. There has been no detectable bone loss, soft tissue changes, or other adverse events. The patient is very pleased with the results and is able to function comfortably. Although the prostheses did not correct the skeletal deformity, they did improve her function and esthetics (Figures 19 and 20).

REFERENCES


