Esthetic and Functional Rehabilitation of a Patient with Nonsyndromic Oligodontia: A Case Report from China

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ABSTRACT

Statement of the Problem: Oligodontia (severe partial anodontia) is a developmental dental anomaly. It is either an isolated trait or part of a syndrome. Oligodontia is characterized by the congenital absence of more than six permanent teeth except the third molars. Treatment often calls for facilitated surgical techniques, but less severe cases can be treated conventionally in a normally equipped dental office.

Case Presentation: A case of oligodontia treated with prosthetic rehabilitation is presented in this article to remind clinicians of the anomaly. A medical history was taken and clinical and radiographic examinations were made. It is emphasized that conventional prosthetic treatment can lead to a satisfactory result. The patient was treated with fully extending denture prostheses. An overdenture was designed in the maxillary arch, while a removable partial denture was made in the mandibular arch.

Results: The patient's speech and masticatory function improved greatly. He was also pleased with better facial esthetics. Observed temporomandibular joint dysfunction also ameliorated after the treatment.

Conclusion: Dental clinicians should keep in mind that there are good possibilities with conventional prosthodontic techniques to help patients with dental anomalies. Treatment not only improves speech and masticatory function but also has psychological implications that may greatly help in regaining self-confidence.

CLINICAL SIGNIFICANCE

Patients suffering from oligodontia may have severe psychological, esthetic, and functional problems. Thus, early diagnosis and treatment of these patients are necessary.

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INTRODUCTION

dvanced oral and maxillofacial A surgical techniques such as bone augmentation, orthognathic surgery, and implant technology have revolutionized the treatment of facial and orodental deformities and developmental anomalies. These techniques, however, call for modern hospital facilities with postsurgical intensive care units. They are demanding and expensive. In most countries, such facilities and surgical skills are not available and/or most patients are unable to meet the costs of treatment. Therefore, in the majority of the world, patients with orodental anomalies must be helped using conventional prosthodontics. We report here a case from China treated successfully by prosthetic rehabilitation.

Clinically, anodontia is defined by the congenital absence of all teeth; hypodontia and oligodontia are, respectively, characterized by missing tooth or diminished tooth size and by the congenital lack of more than six permanent teeth excluding the third molars, of which hypodontia is the mildest and the most common phenotype without any systemic disorder.¹ Oligodontia, like hypodontia, but more severe in phenotype, is seen as an isolated trait or as a part of a syndrome. Hence, an alternative name "severe partial anodontia" has been mentioned.^{2,3} In the majority of cases, isolated oligodontia and

hypodontia are genetic and these anomalies may arise as hereditary conditions that may appear in two or three generations with autosomal dominant incomplete penetrance,⁴⁻⁶ of which the X-linked hypohydrotic ectodermal dysplasia is the most common form.^{7,8} Both oligodontia and hypodontia may result in several anomalies such as delayed tooth formation, reduced size of teeth, and taurodontism. A Dutch study showed taurodontism in 28.9% of one or two mandibular first molars in patients with oligodontia, in comparison to 9.9% in control subjects.⁹ Tooth agenesis may also be caused by environmental factors.³

Oligodontia has a prevalence of 0.08% in a Dutch study⁹ and 0.16% in a Danish study,¹⁰ while hypodontia, congenital agenesis of one or a few teeth, has an occurrence of 3.5 to 6.5% in the majority of the population,¹¹⁻¹³ 6.3% in Australia,¹⁴ and 6.6% in Japan.¹⁵ There is no difference in the frequency of oligodontia between males and females, nor is there a difference in the distribution of missing teeth in the upper or lower jaws and on the left or right.9,10 However, when data from six studies were combined, females showed higher frequency than males.¹⁰ Excluding third molars, two of every three congenitally missing teeth in oligodontia cases are second premolars or upper lateral

incisors.^{10,16} Compared with the prevalence of hypodontia in clinical surveys, however, the occurrence of oligodontia is rare.

Patients suffering from oligodontia may have psychological, esthetic, and functional problems.¹⁷ Thus, early diagnosis and treatment of these patients is important. Prosthetic treatment has been proved effective in the management of these patients.¹⁸ The prosthetic treatments include implants, removable prostheses, fixed dentures, and adhesive techniques.19,20 Removable partial denture (RPD) and overdenture are relatively simple and rapid methods and can also be used in severe cases where oral and maxillofacial surgery is not feasible.^{21–23} An overdenture that covers the alveolar ridges and is partly supported by natural teeth, roots, or implants is a satisfactory method in treating patients with oligodontia.13,23

CASE REPORT

The Ethical Committee of the Lanzhou University has approved the research protocol, and an informed consent was obtained from the patient.

The patient was a 25-year-old male referred for treatment to the Department of Restorative Dentistry, School of Stomatology, Lanzhou University in 1994. The patient complained of poor masticatory

function and esthetic and psychological distress. He was in healthy condition, with a normal physical body appearance, normal hair, eyebrows, fingers, nails, skin, and sweat glands, ruling out ectodermic dysplasia as the etiology. He had no history of trauma and tooth extractions, and his parents and siblings were dentally and medically normal. His cheeks on both sides were flat (leptoprosopy) for his age. He had an evident nasal-lip groove and prominent nasal bridge without reduced vertical dimension in the lower two-thirds of the face but had

maxillary hypotrophy and retrusion (Figures 1A and B). Mandibular protrusion was also obvious. In the orodental examination, only two second molars and two residual roots of central incisors in the upper dentition were seen. Crowns of the incisors were destroyed by caries. In the lower dentition, first and second molars were seen on the right and left sides. All other teeth in the maxilla and mandible were congenitally missing. The residual ridges in the edentulous spaces were thin and underdeveloped (Figures 2 and 3). Occlusion of the maxilla and

mandible showed infraocclusion, especially marked in the anterior region. Mesio-occlusion was recorded. Panoramic radiograph of the jaws and periapical X-ray of upper central incisors were taken. No root tips, unerupted teeth, or impacted third molars were detected. A moderate clicking in the temporomandibular joint (TMJ) was observed. Study casts were taken for further analysis of the occlusion.

The patient was diagnosed to have nonsyndromic oligodontia (severe



Figure 1. The appearance of the patient before treatment is seen in parts A and B, and the improved facial appearance after inserting the new dentures is shown in parts C and D.



Figure 2. The residual teeth and alveolar crest abnormality seen in the casts of the upper and lower jaws.



Figure 3. The intraoral photos before and after placement of prostheses.

partial anodontia). A treatment plan was made to prosthetically restore the dentition defect and malformation of the upper and lower jaws. An overdenture was designed for the upper jaw and a common RPD for the lower jaw to obtain a better alveolar height compensation and musculocutaneous profile. After the roots of the maxillary central incisors were treated with endodontic therapy and appropriate fillings with fluoridereleasing composite resin, acrylic temporary prostheses were made to evaluate the possibility of stabilizing the patient's occlusion. Once the stabilized occlusion was established and controlled, the final overdenture and partial denture were made. The normal vertical dimension of occlusion and centric relationship between the maxilla and the mandibule were assessed and transferred to an articulator. The arrangement of artificial teeth in the maxilla was in the front of the alveolar crest in order to attain a normal overbite and overiet, and to support the shape of the upper lip. Hence, there was a protuberance in the anterior area of the palate that could be seen clearly when the denture was put in place (Figure 3). Any major discrepancies were adjusted at the try-in. Natural teeth ensured the retention and stability of the prostheses. Several days later, after making the prostheses, the final occlusal adjustments were made. The patient was instructed to

regularly clean the prostheses. Follow-up examinations were scheduled every 2 months if necessary.

The facial photos with dentures in place showed improved harmony of facial appearance (Figures 1C and D). Speech and masticatory functions of the patient were also improved (Figure 4). The clicking of the TMJ disappeared after 6 months. The patient expressed his happiness in particular on his new facial appearance.

DISCUSSION

This case presentation showed how important it is to treat patients with

developmental anomalies not only from the functional point of view but also with regard to the patient's appearance and the effect of the treatment on the psyche. Conventional prosthodontic rehabilitation is well suited in cases not too severe and in places where advanced oral and maxillofacial deformity surgery is not available.

Anodontia is one of the most frequent phenotypes of congenital ectodermal dysplasia, often associated with manifestations such as sparse hair and eyebrows, nasal bridge depression, and protuberant lips. Some of the patients may have



Figure 4. The gypsum models made with prostheses in place.

deficient sweat glands.²⁴ Other syndromes, eg, Down syndrome, facial clefting, etc., can also be associated with missing teeth. Patients with no hereditary history have been described,¹⁸ and this is demonstrated by the case report presented here. Anodontia is a multifactorial result of genetic inheritance and environmental factors.³ The environmental factors are, for instance, trauma, surgical procedures on the jaws, multiagent chemotherapy/ radiation therapy, infection during early childhood, and the use of thalidomide during pregnancy. Although little is known about the genetic defects responsible for this condition, researchers have found that the specific genes associated with hypodontia are MSX1, PAX9,^{3,25} and AXIN2,²⁶ which encode transcription factors that play an important role during tooth development.³

Lack of teeth, conical teeth, and underdeveloped alveolar ridges are the common findings in oligodontia. This may result in dental malpositioning, periodontal damage, and lack of development in maxillary and mandibular bone height. The condition may also have significant psychological, esthetic, and functional consequences. The patient reported here had a strong wish of improving his physical and mental discomfort and, subsequently, had high expectations for the prosthetic rehabilitation. Earlier studies have shown that oligodontia could cause difficulties to the clinical prosthetic treatment.^{18,27,28} Treatment of patients with oligodontia may be more difficult than that of those with hypodontia. Early prosthetic treatment is encouraged to improve appearance, masticatory function, speech, and psychosocial impact.^{6,29}

In spite of good results with traditional dentures, dental implants may be chosen for cases with oligodontia. However, uncertainties about osseous quality or technical difficulties in case of crest atrophy lead us to be cautious in this respect with our patient. Furthermore, the use of dental implants was not possible because of the poor economic situation. In this case, the patient unfortunately had not received treatment until he was 25 years old and was first then able to afford the treatment. Earlier treatment might have given a better result but, as noted, the patient seemed happy with his improved masticatory function and appearance, which seemingly improved his self-confidence.

In conclusion, dental practitioners should keep in mind that conventional prosthetic treatment may often be all that is needed for cases with oligodontia or other dental developmental anomalies. Such treatment can easily be given in a normally equipped dental office.

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