

Prosthetic treatment of nonsyndromic oligodontia

Müjde Sevimay, Ceyda Akın

Department of Prosthodontics, Faculty of Dentistry, Selcuk University, Konya, Turkey

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ABSTRACT

Oligodontia is the agenesis of six or more teeth, excluding the third molars. Genetic factors play an important role in oligodontia, which can occur as an isolated finding or as part of a syndrome. The characteristic dental symptoms are reduced number of teeth, reduction in tooth size, anomalies of tooth form, and delayed eruption. The absence of teeth in patients can cause aesthetic, functional, and psychological problems, particularly if the anterior region is involved. This case report describes the prosthetic treatment approach to a 19-year-old patient with nonsyndromic oligodontia characterized by the absence of 10 permanent teeth. The objectives of the treatment were the prosthetic restoration of the missing teeth and the provision of occlusion with full-mouth zirconia restorations.

KEYWORDS: Hypodontia, oligodontia, prosthetic therapy

Introduction

Agenesis of permanent teeth is one of the most common human developmental anomalies.^[1-3] Hypodontia is the congenital agenesis of five or fewer permanent teeth, excluding third molars; oligodontia, which is also called severe hypodontia,^[1,4] is the congenital agenesis of six or more permanent teeth, excluding the third molars;^[1,5] and anodontia is the congenital agenesis of all deciduous and/or permanent teeth.

The prevalence values of oligodontia mentioned in the literature range from 0.08% to 1.1%.^[1,6] It affects females more often than males, with a gender ratio of 3:2.^[7] Oligodontia can be found as an isolated nonsyndromic trait or as part of a malformative syndrome,^[2,5,8-10] such as ectodermal dysplasia,^[2,3,5,10] Rieger's syndrome,^[11] Van Der Woude syndrome, Down syndrome, oto-palato-digital syndrome,^[10] Witkop syndrome (tooth and nail syndrome),^[12] oro-facial-digital syndrome,^[13] oculo-facial-cardio-dental syndrome,^[10,14] and incontinentia pigmenti.^[10,15] When part of a syndrome, oligodontia usually involves concomitant abnormalities in the skin, nails, ears, or skeleton.^[2,10,12-15] To date, mutations in the MSX1 or the PAX9 genes have

been identified as a possible cause of nonsyndromic oligodontia.^[16] In majority of the cases, it is transmitted as an autosomal dominant, autosomal recessive, or X-linked genetic condition.^[17-19] Congenitally, absent maxillary lateral incisors, maxillary second premolars, and mandibular central incisors are commonly seen in oligodontia cases,^[3] whereas the agenesis of maxillary central incisors, maxillary or mandibular canines, and first permanent molars are rare.^[1] Moreover, oligodontia may result in several dental and oral symptoms, such as reduction in size and form of teeth and alveolar processes, delayed eruption of teeth, persistent deciduous teeth, anomalies of the enamel, increased free-way space and cleft lip/palate, false diastema, and deep overbite.^[1,5,6,9] Residual teeth can vary in size, shape, and rate of development, and the permanent dentition is more affected than the primary dentition.^[20] Speech and masticatory functional disorders occur most frequently, but aesthetic, physiological, and psychological problems may also arise at an early age.^[18,21] Therefore, early diagnosis and treatment of these patients are important. Treatment options depend on the severity of the cases. Treatments can include orthodontic space opening or closure before prosthetic therapy; use of adhesive restorative techniques, removable or fixed partial dentures, and implant-supported restorations; or combinations of these approaches.^[1]

This case report describes the prosthetic treatment approach to a 19-year-old patient with nonsyndromic oligodontia characterized by the absence of 15 permanent teeth.

Address for correspondence:

Dr. Müjde Sevimay,
Department of Prosthodontics, Faculty of Dentistry,
Selcuk University, Konya, Turkey.
E-mail: msevimay@hotmail.com

Case Report

A 19-year-old female patient was referred to the Faculty of Dentistry, Department of Prosthodontics of Selcuk University for unpleasant smile and replacement of missing teeth.

Extra-orally, frontal and profile examination revealed a mild decrease in lower facial height and a flat profile. The nasolabial angle was within normal limits, and the lower lip was full and slightly protruded relative to the upper lip at closure.

Intraoral and radiographic examination revealed that 15 permanent teeth were developmentally missing: Maxillary first and third molars, mandibular incisors, mandibular right first and third molars, mandibular right second premolar, and mandibular left first and third molars. Maxillary deciduous lateral, premolar, canine, and mandibular deciduous premolars were present in the dental arches. The mandibular second premolar was impacted. The maxillary and mandibular first and second premolars had a marked conical shape, and the mesiodistal diameters of the teeth were reduced [Figure 1].

The treatment plan comprised two phases. Phase I consisted of the extraction of deciduous and impacted teeth. Phase II involved prosthetic therapy to provide function and aesthetics. After 2 weeks of extraction healing, the remaining teeth were prepared [Figures 2 and 3], and impressions were made. The impressions were poured using type II dental stone (Elite Model, Zhermack, Italy). Casts were mounted on the articulator with 2 mm increased occlusal vertical dimension (OVD). A 2 mm increase in OVD was determined to facilitate the placement of fixed prosthetic restoration and to improve facial aesthetics. Then, full-mouth porcelain fused to metal restorations (VITA VM 13; VITA Zahnfabrik, Bad Sackingen, Germany) was fabricated at the newly established OVD. The restorations were fitted and adjusted in the mouth [Figures 4 and 5]. After provisional cementation, the restorations were maintained intraorally for 3 months before the final impressions were made. During this period, periodic recalls at intervals of 1–4 weeks were performed to evaluate the increased OVD. In the evaluation period, the patient's anterior and posterior speaking space and function were assessed. The muscles of mastication and the temporomandibular joint were evaluated for clinical signs of discomfort. Moreover, the temporomandibular joint was evaluated by taking magnetic resonance. The patient was asymptomatic and comfortable during this period. For the final restorations, the maxillary and mandibular impressions were made with a putty-wash technique using polieter (Ivoclar Vivadent AG, Schaan, Liechtenstein) impression material. Full-mouth zirconia restorations (Zirkonzahn GmbH, Bruneck/South Tirol, Italy)



Figure 1: Preoperative panoramic radiograph of the mouth, 15 permanent teeth are absent



Figure 2: Preparation of the maxillary teeth



Figure 3: Preparation of the mandibular teeth

were fabricated using a semi-adjustable articulator [Figure 6]. Canine guidance was developed to reduce lateral forces in the posterior dentition. The restorations were cemented using polycarboxylated cement (Adhesor Carbofine, Spofa Dental, Frankfurt, Germany). In the final restorations, a diastema was found between the central incisors. When we made contact between the central incisors, they became larger and square shaped. For aesthetic reasons and depending on the patient's request, a diastema could be left between the central incisors [Figure 7a-c].

The patient has been well functioning with her restorations for 12 months and is pleased with the treatment outcome.



Figure 4: Metal adjustment of the provisional porcelain fused to metal restorations

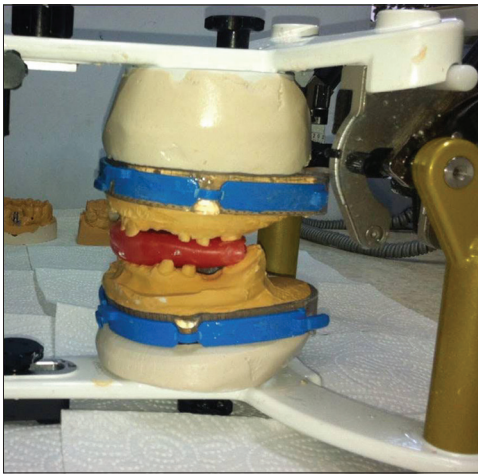


Figure 6: Models are mounted in a hemi-adjustable articulator

Discussion

Nonsyndromic oligodontia is the most common developmental anomaly, and it presents many problems for both patient and clinician.^[22,23] Previous studies reported that mutations in the genes *MSX1* and *PAX9* that encode transcription factors were associated with nonsyndromic oligodontia.^[23,24] Whereas mutations in the *MSX1* gene cause human tooth agenesis of various types of teeth, preferentially premolars, mutations of *PAX9* could be the cause of the presented clinical report. Therefore, the genetic components behind the serious dental anomalies have to be revealed and taken into consideration.

Patients with this anomaly often seek treatment because of their unpleasant appearance, impaired mastication, and speech difficulties.^[21] Moreover, the lack of uniformity of the occlusal plane, supereruption, loss of vertical dimension, and bone morphology in edentulous areas may cause prosthodontic challenges.^[25]

In cases of multiple congenitally missing permanent teeth, an interdisciplinary approach may be required. A number of treatment options are available for these cases. For



Figure 5: Maxiller and mandibular provisional restorations at the newly established occlusal vertical dimension



Figure 7: (a) Lateral view (right side) of the final restorations (b) anterior view of the final restorations (c) lateral view (left side) of the final restorations

example, before the prosthetic treatment, the localizations of the teeth are corrected by orthodontic therapy. Direct composite restorations may be considered to reshape the conical teeth. In residuous spaces, implants are inserted, and implant-supported fixed partial dentures are planned. In the present case report, the patient rejected the orthodontic and implant treatment, and thus the definitive therapeutic approach was conducted using full-mouth, tooth-supported zirconia restorations to replace the missing teeth and to restore occlusion and OVD.

Subtle visual differences in facial soft tissue profiles were reported when OVD was increased by 2–6 mm with fixed restorations.^[26] The facial soft tissue appearance of the present case was not markedly changed after OVD was increased by 2 mm. The patient was well adapted to the increased OVD and showed no signs and symptoms of temporomandibular joint disorders in the 3 months with provisional restorations.

In consideration of the level of complexity in the management of oligodontia patients, treatment should begin with early diagnosis to prevent future functional and aesthetic problems. The type of malocclusion, degree of oligodontia, age of patient, and psycho social aspects should aid the clinician in planning and managing the treatment.

Conclusion

The consequences of missing teeth are numerous and depend on the number and type of teeth missing. Speech, masticatory functional disorders, and aesthetic problems caused by

disturbed growth and development of the oro-facial area occur frequently in oligodontia cases. Although oligodontia is mostly considered to be associated with several syndromes, the nonsyndromic aspect of oligodontia should also be taken into consideration. In the management of oligodontia patients, treatment should begin with early diagnosis to prevent future functional and aesthetic problems.

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