

Overlay Removable Partial Dentures for a 10-Year Old Child with Oligodontia and Posterior Open Bite Occlusion: A Clinical Report

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Abstract

The most common congenital and developmental anomaly in teeth is the missing of one or more of them. Congenitally missing teeth (CMT) or teeth agenesis mentions failure of tooth formation due to disturbances during the early stages of tooth germ development. There are several definitive treatment options for these patients including fixed, removable or implant-supported prostheses. Economic limitations and age of treatment prevent us from choosing the most desirable treatment. This clinical report describes a noninvasive approach for full mouth reconstruction of a child with multiple missing teeth besides posterior open bite occlusion.

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Introduction

Congenitally missing teeth (CMT) is a common dental anomaly that occurs in three categories: Hypodontia, Oligodontia and Anodontia. In hypodontia, agenesis occurs for less than 6 teeth and it usually has a familial history, but it may occur sporadically. Oligodontia is used to describe conditions when more than 6 permanent teeth do not develop. Anodontia is the absence of all teeth, usually seen with ectodermal dysplasia (1).

Hypodontia may also be found as part of a syndrome, although it usually occurs alone (isolated). It is important to know that "isolated" in this usage means not occurring as part of a syndrome; it may still be familial. Missing can occur for any of 32 permanent teeth, but there is a tendency for the last tooth in each series to be absent, such as: third molars, mandibular second premolars, maxillary lateral incisors, maxillary second premolars, and mandibular central incisors (2,3).

Oligodontia has a multifactorial etiology which includes environmental factors (infection, trauma and drugs, radiation, and systemic conditions such as rickets and syphilis), the combination of environmental and genetic factors and heterozygous mutation in the MSX1, AXIN2, EDA, or PAX9 gene. There are more than 200 syndromes in which tooth agenesis may be a major feature of them. These encompass ectodermal dysplasias and Incontinentia pigmenti and Down, cleft lip or cleft palate or both, Rieger and Book syndromes (1,4,5).

Other dental anomalies such as small and short crowns and roots of the teeth that are present, conical crowns, enamel hypoplasia, taurodontism, increased overbite, delayed eruption, ectopic eruption, infraocclusion of primary teeth, prolonged retention of primary teeth, lack of alveolar bone, transposition, reduced vertical dimensions, and tooth impaction (particularly palatal displaced canines) may be associated with hypodontia (1,6).

For children with a large number of missing teeth, partial dentures can be constructed at an early age. The importance of such rehabilitations is esthetic and functional concerns as well as positive psychological impact for the patient. Partial dentures may be used until the child is old enough for implants or a fixed partial denture (7).

Overlay removable partial dentures (ORPDs) are often used as an RPD which cover the occlusal surface of the abutment teeth to restore facial esthetic, masticatory function, speech and improve vertical dimension and uneven occlusal plane (8,9). These super structures usually cover abutment teeth completely or at least one-third of the tooth structure is remained (10). ORPDs are most often used as interim prostheses prior to fixed and permanent removable of full mouth prostheses (11,12). The greatest advantage of that is lack of the need for the preparation of the abutment teeth. Interim and permanent ORPDs are often prescribed to patients with severe dental and skeletal malocclusion (13-15). These

malocclusions are almost seen in patients with cleft palate (13) class II or III skeletal malocclusion (16-18) or open-bite or open occlusal relationship (8,14,19).

Failure to replace a missing posterior tooth may cause balance disruption of the stomatognathic system (20). Posterior open bite is defined as the lack of occlusal contact in posterior teeth in any occluding position of the anterior teeth (21). Treatment options in such patients are ORPDs and orthodontic treatment in combination with segmental osteotomy.

In this case report, we present a noninvasive approach for the full mouth reconstruction of a child with multiple missing teeth as well as posterior open bite occlusion.

Case report

A 10-year-old Caucasian boy was referred to our pediatric department for his dental condition. His parents did not report any family history of oligodontia and there was no consanguineous marriage. The child was born at full term after an uneventful pregnancy. He reported no bodily alterations. Hematological tests were normal and the level of Ca, P and TSH were between the reference ranges. Physical and intellectual developments were normal and he was alert and cooperative.

The patient had overclose face with conical upper anterior teeth. Examination of the patient's oral cavity showed normal soft tissue with oligodontia and only six permanent (11,16,21,26,36,46) and fourteen primary teeth (53,54,55,62,63,65,71,72,73,75,81,82,83,85) were present (Figure 1). Teeth 73 and 83 had dental caries. We also noted amalgam fillings in (36,55,75,85) teeth and a composite filling in tooth number 46. Both of the two maxillary permanent first molars were treated by fissure sealant therapy and there was a brass post in tooth number 53. Panoramic radiographs at 9 years (Figure 2) showed tooth germs of maxillary permanent second molars (17,27), right mandibular permanent second molar (37) and impacted permanent canines (13,33,43). There were no

dental or facial abnormalities except multiple missing teeth, posterior open bite and peg shaped maxillary permanent centrals.

Chief complaints of the patient were chewing function and esthetic appearance.



Figure 1. Clinical view of maxillary and mandibular arches individually and in occlusion

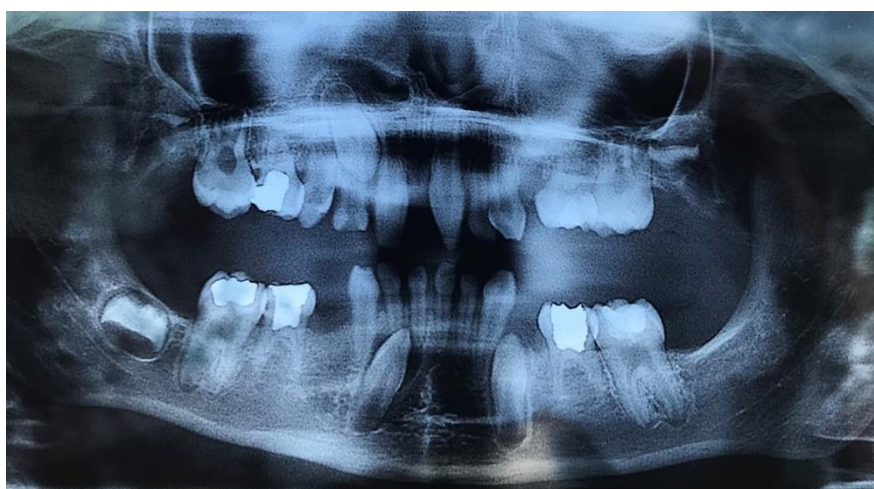


Figure 2. Panoramic Radiograph showing unerupted and multiple missing teeth

Diagnosis and Treatment Planning

As there was no facial abnormality, familial history of oligodontia, body alteration, and the patient had normal hematological tests and physical developments, we ruled out other syndromes. Also, we could not order genetic analysis due to financial issues.

Open bite in posterior region happened as a part of failure eruption. All the teeth had periodontal ligaments around and thyroid stimulating hormone was normal to rule out

hypothyroidism, which is the most common systemic disorder in failure or delay eruption of teenagers.

Primary teeth (53,71,72) which had root resorption were extracted and teeth 73 and 83 were restored with composite resin.

Master casts were made by special trays constructed from diagnostic casts and were mounted on a semi adjustable articulator (A7plus, Bio-Art, Sao Carlos, Brazil) in a face-bow record and centric relation record (Figure 3,4).

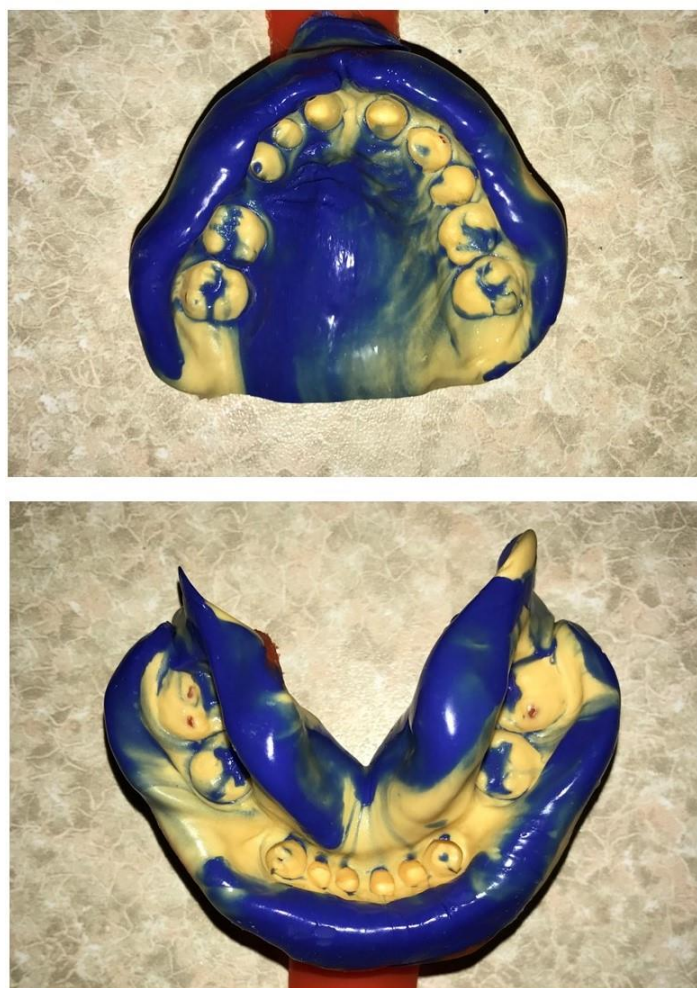


Figure 3. Definitive impression making of both arches



Figure 4. Frontal and lateral views of both arches in semi adjustable articulator

Prosthetic solutions for patients with oligodontia besides posterior open-bite include RPDs, fixed partial dentures, and endo-osseous implants. RPDs are the most common treatment options at lower ages. Overlay RPDs can preserve alveolar bone and we can achieve retention by abutment teeth (7).

Implant is a desirable modality but bone quality and quantity, soft tissue contour and financial problems can be limitations of the treatment (15,16).

For both arches, we selected overlay RPDs with artificial teeth for onlay like rests in posterior regions and laminate forms

of tooth colored acrylic resins in anterior of upper jaw. Conical incisors without any undercut surfaces allowed these forms of laminates in this procedure.

The overlays were processed with heat-polymerizing acrylic resin (IvoclarVivadent, Schaan, Liechtenstein) and tooth-colored heat-polymerizing acrylic resin polyglass (IvoclarVivadent, Schaan, Liechtenstein). The artificial teeth were arranged and tried-in to verify jaw relation records. We obtained the patient's approval before the final processing (Figure 5).



Figure 5. Wax up model of ORPDs in occlusion

After deflasking procedures, occlusion was adjusted and the prostheses were finished and polished. The patient was

instructed to wear these dentures less than 6 hours a day and remove them at night time in order not to miss the chance of the

teeth eruption. Oral hygiene, education regarding the insertion or removal and the use of fluoride mouthwash were given to the patient (Figure 6,7).

Patient follow up was done at one-, four weeks, and 6 months' postoperative visits. He was informed to be checked every 3 months for adjusting the acrylic basal surface in order to provide space for the eruption of canines.



Figure 6. Intra oral photograph after insertion



Figure 7. Frontal smile view of patient after insertion of ORPDs

Discussion

CMT is a common dental anomaly and its prevalence varies in different populations from 0.3% to 34.3%. Patients with CMT may suffer from unfavorable appearance, malocclusion, reduced chewing ability, periodontal damage, insufficient alveolar bone growth, problems in speech and pronunciation. After the third molars, the second premolars have the highest incidence of congenital absence (4).

The patient of this case had multiple missing teeth as well as posterior open bite. Economic limitations and age of treatment prevented us from choosing the most desirable treatment. Considering that restorative procedures for this child should be conservative and should maintain the dental structures intact, functional, comfortable, and aesthetically pleasant, the ORPDs were the best choice of treatment. We did not use cast metal denture base due to the difficulty in future relining (18).

The advantages of overlay removable dentures include the preservation of the residual ridge, support and stabilization of their base, improving the soft tissue profile and the aesthetic

aspect, and giving patients a sense of security in knowing that teeth do support their prostheses (17).

The therapy promoted chewing efficiency, esthetics, and tonicity of muscles with reversible and inexpensive treatment. After follow up periods, the patient was pleased with the retention, function, and even his facial appearance.

Absolutely this treatment option has some disadvantages such as complaints related to compromised esthetic results when the dentures are removed and high possibility of caries and periodontal disease adjacent to the abutments. However, these problems can be sometime due to the poor oral hygiene.

Conclusion

This case report describes the use of overlay RPD to close the uneven posterior open bite and esthetic appearance of anterior teeth. It also improved vertical dimension of occlusion.

We successfully met the treatment goal of rehabilitation of chewing function and improved appearance. In patients with financial limitation for future segmental osteotomy, this treatment option may be a feasible or often the only one.

References

1. Rakhshan V. Congenitally missing teeth (hypodontia): a review of the literature concerning the etiology, prevalence, risk factors, patterns and treatment. *Dent Res J (Isfahan)* 2015; 12(1):1-13.
2. Bock NC, Lenz S, Ruiz-Heiland G, Ruf S. Nonsyndromic oligodontia: does the Tooth Agenesis Code (TAC) enable prediction of the causative mutation. *J Orofac Orthop* 2017; 78(2): 112-20.
3. Jha P, Jha M. Management of congenitally missing second premolars in a growing child. *J Conserv Dent* 2012; 15(2):187-90.
4. Sheikhi M, Sadeghi MA, Ghorbanizadeh S. Prevalence of congenitally missing permanent teeth in Iran. *Dent Res J (Isfahan)* 2012; 9(1):105-11.
5. Bicakci AA, Doruk C, Babacan H. Late development of a mandibular second premolar. *Korean J Orthod* 2012; 42(2):94-8.

6. Avery DR, McDonald RE, Dean JA. McDonald and Avery Dentistry for the Child and Adolescent. 9th ed. China: MOSBY, Elsevier Health Sciences; 2010.
7. Nunn JH, Carter NE, Nohl FS. The interdisciplinary management of hypodontia: background and role of paediatric dentistry. *Br Dent J* 2003; 194(5):245-51.
8. Gankerseer EJ. Case report: a new technique for the treatment of the severely worn dentition. *Restorative Dent* 1987; 3(1):13-14.
9. Patel MB, Bencharit S. A treatment protocol for restoring occlusal vertical dimension using an overlay removable partial denture as an alternative to extensive fixed restorations: a clinical report. *The Open Dent J* 2009; 3: 213-8.
10. Windchy AM, Morris JC. An alternative treatment with the overlay removable partial denture: a clinical report. *J Prosthet Dent* 1998; 79(3):249-53.
11. Zarati S, Ahmadian L, Arbabi R. A transitional overlay partial denture for a young patient: a clinical report. *J Prosthodont* 2009; 18(1):76-9.
12. Phoneix RD, Cagna DR, Defresst CF. Stewart's Clinical Removable Partial Prosthodontics. 4th ed. Canada: Quintessence; 2008.
13. Gitt I. Prosthetic rehabilitation of surgically and orthodontically pretreated patients with clefts. *Stomatol DDR* 1980; 30(1):1-7. [In German].
14. Radlanski RJ, Freesmeyer WB. Bilateral open bite in dicygotic twins. a combined orthodontic-prosthetic approach. *J OrofacOrthop* 2002; 63(4):339-47. [In English, German].
15. Del Castillo R, LaMar F Jr, Ercoli C. Maxillary and mandibular overlay removable partial dentures for the treatment of posterior openocclusal relationship: a clinical report. *J Prosthet Dent* 2002; 87(6):587-92.
16. Murray CG. The prosthodontic rehabilitation of selected adults class III malocclusions. *J Oral Rehabil* 1979; 6(2):147-52.
17. Taylor RM. Vitallium removable overlays for deep overbite- case report. *N Z Dent J* 1985; 81(363):28-9.
18. Sakar O, Beyli M, Marsan G. Combined prosthodontic and orthodontic treatment of a patient with a Class III skeletal malocclusion: a clinical report. *J Prosthet Dent* 2004; 92(3):224-8.
19. Glyn Jones JC, Basker RM. Restorative treatment of a bilateral open bite. *Dent Update* 1983; 10(8):511-4.
20. Shugars DA, Bader JD, Phillips Jr, White A, Brantley F. The consequences of not replacing a missing posterior tooth. *J Am Dent Assoc* 2000; 131(9):1317-23.
21. Proffit WR, Fields HW, Larson B, Sarver DM. Contemporary Orthodontics. 6th ed. China: Elsevier; 2018.