

## CASE REPORT



## Esthetic rehabilitation of non-syndromic oligodontia: An innovative approach

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### Keywords

Composite restoration, oligodontia, reinforced polyethylene fibers, thermoformed template

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Received 02 May 2015;

Accepted 20 June 2015

doi: 10.15713/ins.jcri.75

### Abstract

This case report describes the esthetic rehabilitation of a 13-year-old girl presenting with non-syndromic oligodontia, who had compromised esthetics, occlusal function, development, and retarded skeletal growth. The esthetic rehabilitation was completed with direct composite restoration using thermoformed templates along with reinforced polyethylene fibers. The present technique is a viable alternative to reestablish the masticatory function, esthetics with improved self-esteem.

### Introduction

A tooth can be considered congenitally missing if it has not erupted and is missing on the radiograph. Primary dentition gets completed by 3 years and permanent by the age of 12-14. Thus, an unerupted primary tooth beyond 3 years and a permanent tooth by 14 years can be considered congenitally missing.<sup>[1]</sup> The congenitally missing tooth can occur itself as an entity or as a component of underlying syndrome.<sup>[2]</sup>

Hypodontia is more common with a prevalence of 1.6-9.6% whereas, oligodontia occurs in only 0.3% of the population. In the primary dentition, hypodontia is infrequent (0.1-0.9%) and has no significant sex distribution.<sup>[3]</sup> Based on the number of teeth missing, agenesis is classified into hypodontia, oligodontia, and anodontia. Thus, congenital absence of less than six permanent teeth, can be considered as hypodontia and full anodontia denotes the absence of all permanent teeth.<sup>[4]</sup>

The term oligodontia is generally used when the development of six or more teeth did not occur (Kotsiomiti *et al.*, 2000), and such a condition may be related to family history, syndromes, traumas, infections, and severe intrauterine or endocrine disorders (Kotsiomiti *et al.*, 2000; McDonald and Avery, 2000). Oligodontia usually occurs as a part of syndromes. It may occur as a non-syndromic isolated familial trait linked with altered gene

expressions of MSX1 and PAX9, or as a sporadic finding.<sup>[5]</sup> Non-syndromic oligodontia has been found either sporadic or familial in nature.<sup>[6]</sup> Syndromic and other variants of oligodontia can be identified by ruling out the presence of associated symptoms. Oligodontia presents clinical symptoms depending on the number and location of missing teeth. Positional changes of teeth, variation in their morphology, and size may occur in the existing teeth. It may be associated with growth disturbances of the maxillofacial skeleton thus affecting the facial appearance.<sup>[7]</sup>

Any missing teeth, especially maxillary, and mandibular front teeth in young adolescents risk them with low esthetic, functional, and psychological difficulties. The clinical examination along with radiographic examination constitutes the basic method of evaluation of any dental anomaly.<sup>[8]</sup> Treatment for congenital agenesis of teeth in young children is more challenging due to lack of literature.<sup>[9]</sup> An interdisciplinary team approach with positive interaction between pediatric dentists, orthodontists, oral and maxillofacial surgeons, and prosthodontics helps to render the best treatment.<sup>[10]</sup>

The present article reports the successful full mouth rehabilitation of a young child using composite resin restorations. Thermo plasticized templates were utilized for the indirect mode of restoration. These templates not only act as crown formers to reshape the lost tooth structure but also help to control the

amount of restorative material used. They also minimize the patient's chairside time. Reinforced polyethylene fibers were also used as an interim restoration.

### Case Report

A female child aged 13 years brought to the Department of Pedodontics, College of Dental Sciences, Davangere, with a chief complaint of spacing between teeth in the upper and lower front region. A detailed history was recorded with the patient and his guardian. Her past medical history, was insignificant and family history revealed that she was born to non-consanguineous marriage parents with normal delivery and mother did not suffer from any disease during pregnancy, none of family member had any of their teeth missing since birth. The child had no history of trauma but was unhappy with compromised esthetics.

On general physical examination, her height and weight were normal according to her age, and she was well oriented and active. On extra oral examination, she was normal in her facial appearance and no physical or skeletal abnormality noticed. She had a concave profile, reduced lower facial height, with a deep nasolabial angle and procumbent lip contours. The facial symmetry was normal. Temporomandibular joint finding were normal.

On intra oral examination, soft tissues examination was normal. Oral hygiene was considered satisfactory. Hard tissue examination revealed presence of erupted 11 permanent teeth and 8 over retained primary teeth (11, 21, 24, 37, 34, 33, 31, 41, 42, 44, 47) 63 and 83 were in Grade II mobility. The remaining permanent teeth were missing clinically; she also had upper midline diastema between permanent central incisors, generalized spacing, and poorly developed alveolar ridges in the mandibular front teeth region. In addition, no parafunctional habit was present. Panoramic radiograph was taken which showed missing teeth; 12, 16, 17, 22, 26, 27, 32, 35, 36, 43, 46 [Figures 1 and 2]. Rest of the teeth were devoid of decay, and no previous treatment was taken for the missing teeth.



**Figure 1:** Pre-operative intraoral view of oligodontia

A provisional diagnosis of partial anodontia was estimated. For differential diagnosis ectodermal dysplasia, Rieger syndrome, and Witkop syndrome were considered. Thorough clinical examination of the child was carried out to exclude syndromic variant of oligodontia. The pediatric consultation was taken regarding general health status of the patient. A complete set of investigations were done. Routine blood tests including serum calcium, alkaline phosphate, thyroid stimulating hormone, T3, and T4 were done. The findings of these investigations were within normal range. Hairs, nails were normal; no difficulty in perspiration was observed which ruled out the presence of ectodermal dysplasia. Ocular examination was normal with no signs of glaucoma ruling out Rieger syndrome, and Van Der Woude syndrome was ruled out since palate and lower lip were normal. Final diagnosis of non-syndromic partial anodontia/ oligodontia was given.

Full mouth rehabilitation was planned; the teeth present were abnormal in morphology and were aesthetically restored after extraction of mobile teeth. The restorations of the defective teeth were done in stages. Each treatment session lasted between 1 and 2 h depending on the patient's tolerance and acceptability toward treatment. Several problems were noticed when attempting to restore the palatal and lingual surfaces of the affected teeth using composite with free-hand technique so as to create a proper anatomical contour and to achieve an uniform amount of the resin. In order to avoid these problems, indirect method was opted and casts of both the dentition were prepared after obtaining alginate impressions. The defective areas of the tooth on the stone casts were restored and reconstructed anatomically using inlay wax [Figure 3]. Over the contoured cast, the secondary impression was made and the final cast was poured with stone.

The reconstructed stone casts were used for the fabrication of transparent thermoform "Biostar" templates. The templates were moulded to the shape of recontoured teeth by heating to a desired temp. The pressed templates were later allowed to cool. Selective trimming was done later [Figure 4]. These templates act as moulds to reshape and regain lost tooth structures. The



**Figure 2:** Panoramic radiograph demonstrating oligodontia in both maxillary and mandibular arches

upper four permanent incisors were restored initially. Minimal tooth structure was removed to enhance retention.

Templates were filled with composite resin in adequate quantities according to the tooth to be recontoured. Later they were seated over corresponding teeth and light cured. After curing, the thermo plastic moulds were removed from the teeth, and the restored teeth were checked for any defectiveness. The final finishing and polishing were done using rotating discs and burs. Due to congenitally missing 43 there was a wide gap present between 42 and 44 which was aesthetically not pleasing even after restoring all four lower anteriors.

Hence, an assembly of a fiber reinforced composite (FRC-Ribbon) space maintainer using the acrylic tooth was planned. An acrylic crown of desired size and form was selected. Horizontal groove was cut in the middle 1/3 of the crown to a depth of nearly 2 mm deep with a round diamond bur (No. 8) to ensure enough thickness and width of Ribbon. The adequate length of the Ribbon was measured and cut. Enamel on the lingual surface was etched with 37% phosphoric acid for 20 s (Scotchbond Etchant; 3M ESPE, St. Paul, MN, USA). The fiber soaked in bonding agent was placed over the virtual crown to make sure the fit which was then light cured.

Later flowable composite (3M, ESPE) was coated, and light cured for 20 s from various directions. Fiber-adapted acrylic crown was then placed and adjusted. The acrylic crown was stabilized initially by utilizing flowable composite. Once stabilized the rest

of the fiber was covered with composite resin and cured. Later the rest of the fiber was covered with composite and light cured. Once occlusion was checked finishing and polishing (Sof-Lex; 3M ESPE) were performed [Figure 5]. The patient was advised to maintain good oral hygiene. Follow-up of 6 months revealed good retention and satisfactory esthetics [Figure 6].

**Discussion**

The term oligodontia (severe partial anodontia) refers to congenitally missing teeth more than six in a number other than third molars. The cause for this condition is unknown. But several reasons have been described in the literature.<sup>[11]</sup> Oligodontia condition should not be neglected. It leads to compromised esthetics and altered occlusion. This in turn causes difficulty in speech and mastication.

The management of oligodontia remains challenging since there are several missing teeth and malocclusion



**Figure 3:** Mock wax build-up of defective teeth in both arches



**Figure 4:** Trimmed maxillary and mandibular thermoformed "Biostar" templates



**Figure 5:** Placement of fiber reinforced composite (FRC-Ribbon) in horizontal groove of acrylic and adjacent crown



**Figure 6:** Post-operative intraoral view of esthetic rehabilitation

present. Treatment planning should take into account the patient age, a number of teeth remaining, absent teeth, the integrity of surrounding tissues, occlusion, and interocclusal space.<sup>[12]</sup> The treatment should be planned thoroughly as it needs a multidisciplinary approach. Treatment options include orthodontic therapy, implant, speech therapy, adhesive techniques, fixed prostheses removable partial prostheses, and over dentures to ensure adequate and durable results.<sup>[13,14]</sup> Most young patients require the fabrication of a partial denture as an interim procedure before definitive restoration is planned. Early treatment improves speech and mastication in young patients.

Prosthetic rehabilitation is fundamental in these situations that allow the child to lead a normal life without damaging self-esteem or psychological development and ensuring that behavior remains unaffected.<sup>[15]</sup> The prosthetic rehabilitation using complete dentures had a lot of benefits including better social acceptance, self-esteem, and restoring normal functional demands of the patient such as chewing as showed in a case report by Manu *et al.*<sup>[16]</sup> Patient age was given prime consideration since younger adults require special attention to their psychological and emotional condition, and also the anatomical changes related to facial growth.

In our case, complex restorations were contraindicated since the child was young, and teeth were still developing. Composites were used in our case as an interim restoration due to its esthetics and promising results.<sup>[17]</sup> The free-hand technique can also be used to restore such defects, but it's inconvenient for lingual, palatal surfaces due to limited accessibility. The time required for free-hand restoration also is more comparatively. Thus, these template methods of restoration are an alternative to free-hand method. Similarly, this template method has also been proven successful in a case report by Sockalingam.<sup>[18]</sup>

Satisfactory restoration of the lost teeth space present in between mandibular anterior teeth is a challenging.<sup>[19]</sup> When replacing the single tooth in elder patients fixed bridges, resin bonded dentures, removable dentures, and implants can effectively be utilized but their use is limited in children. In growing children, gingival and bone architecture undergoes constant change requiring provisional restorations to achieve good esthetics and also to maintain edentulous space until permanent restoration is planned.<sup>[20]</sup> For the single tooth restoration, bonding of the restoration of adjacent teeth is mandatory.<sup>[19]</sup> In the present case, a lingual furrow was made on the lingual surface of the acrylic tooth, 42 and 44 for maximum adhesion, durability, and for enhanced mechanical support.

Acrylic restorations have many advantages such as esthetics, easy to use, and direct bonding to tooth structure and cost effective. It provides better gingival health (less plaque retention), greater patient-parent satisfaction, and less clinical time in acquiring natural crown anatomy.<sup>[19]</sup> In our case, Ribbond was selected because of strength with virtually no memory, colorless, translucent, and merges within the composite and also in acrylic with excellent esthetics. It has an advantage of merging to teeth which is beneficial as children with oligodontia have poor oral health in comparison to children with dental decay

and malocclusion.<sup>[14]</sup> However, further studies are required to substantiate clinical efficacy.

## Conclusion

Children of oligodontia may have several problems related to function, appearance especially during the early years of life as reported in the present case. Thus, these thermoformed templates act as an alternative for reshaping teeth. The FRC space maintainer technique can effectively restore esthetics along with function and hence can be considered as an alternative to conventional techniques. It is only an interim restoration till permanent restoration is done.

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**How to cite this article:** Poornima P, Bajaj M, Bharath KP, Nagaveni NB. Esthetic rehabilitation of non-syndromic oligodontia: An innovative approach. *J Adv Clin Res Insights* 2015;2:184-188.