

FIBRE REINFORCED COMPOSITE RESIN PROSTHESIS AS INTERIM REPLACEMENT FOR CONGENITALLY MISSING PERMANENT MANDIBULAR CENTRAL INCISORS:A CASE REPORT

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ABSTRACT: Hypodontia or tooth agenesis is the most common prevalent craniofacial malformation in humans. It may occur as a part of a recognized genetic syndrome or as a nonsyndromic isolated trait. Both environmental and genetic factors are involved in the etiology of hypodontia, with the latter playing a more significant role. It may be noted that bilateral agenesis of mandibular central incisors is very rare and very few cases have been reported in literature. A 12 year old child reported with congenitally missing permanent mandibular central incisors of idiopathic etiology in which the missing teeth were replaced by acrylic teeth as pontic using fiber reinforced composite. The Patient had no hereditary predisposition or any associated syndrome. The aim of enhancing esthetics and attaining functional space maintenance was thus obtained in a single sitting chair side procedure

KEYWORDS: Congenital, Missing, Mandibular, Central Incisors, Hypodontia

INTRODUCTION

The congenital absence of one or more teeth, either primary or permanent, is referred to as hypodontia.¹ Hypodontia or tooth agenesis is the most common prevalent craniofacial malformation in humans. It may occur as a part of a recognized genetic syndrome or as a nonsyndromic isolated trait. Both environmental and genetic factors are involved in the etiology of hypodontia, with the latter playing a more significant role.

The agenesis of permanent teeth can seriously affect children, both physically and emotionally, especially during the years of transition into adolescence. According to Hobkirk et al.(1994) the most common complaint of patients with hypodontia relates to their appearance or function, and most of them are detected between the ages of 6–12 years, as late eruption is noticed by the dentist or commented upon by the patient or parent.²

The absence of teeth may be unilateral or bilateral. There are reports showing unilateral absence of permanent mandibular central incisors (Pfeiffer et al., 1994; Newman and Newman, 1998). But agenesis of bilateral (both right and left) mandibular central incisors are not well documented and literature shows paucity of data pertaining to this anomaly.³

Many systemic conditions such as Down's syndrome, Hypohidrotic ectodermal dysplasia, Chondroectodermal dysplasia and Van Der Woude syndrome, have presented hypodontia as a common feature on clinical examination. Several other factors like infection, trauma, metabolic disorders, radiation, environmental, genetic factors and idiopathic are considered as possible etiological factors of congenital agenesis.⁴

The necessary treatment depends on the pattern of tooth absence, the amount of residual spacing, the presence of malocclusion and patient's attitude. For the missing tooth to be replaced - natural preservation, minimal invasion, esthetics, and cost are some of the important factors that are considered.⁷ In addition an important deciding factor is age. In pediatric dentistry the age of the child determines whether an interim or a permanent prosthesis is the treatment of choice at that particular point in time.

One of the variants of composites are Fiber-reinforced composites (FRCs). These are resin-based materials containing fibers to improve their physical properties. They were introduced first in the 1960s by Smith when glass fibers were used to reinforce polymethyl methacrylates.

Different fiber types, such as glass fibers, carbon fibers, kelvar fibers, vectran and polyethylene fibers have been added to composite materials to enhance their properties.⁷ fiber-reinforced composite (FRC) is advocated today for their favorable elastic modulus as compared to metals and better adhesion of the composite luting agent to the framework. One of the latest forms of interim prosthesis is FRC bridges. These are adhesive, minimally invasive, and economic restorations that can be used for single visit replacement of a missing tooth.⁵

Case Report

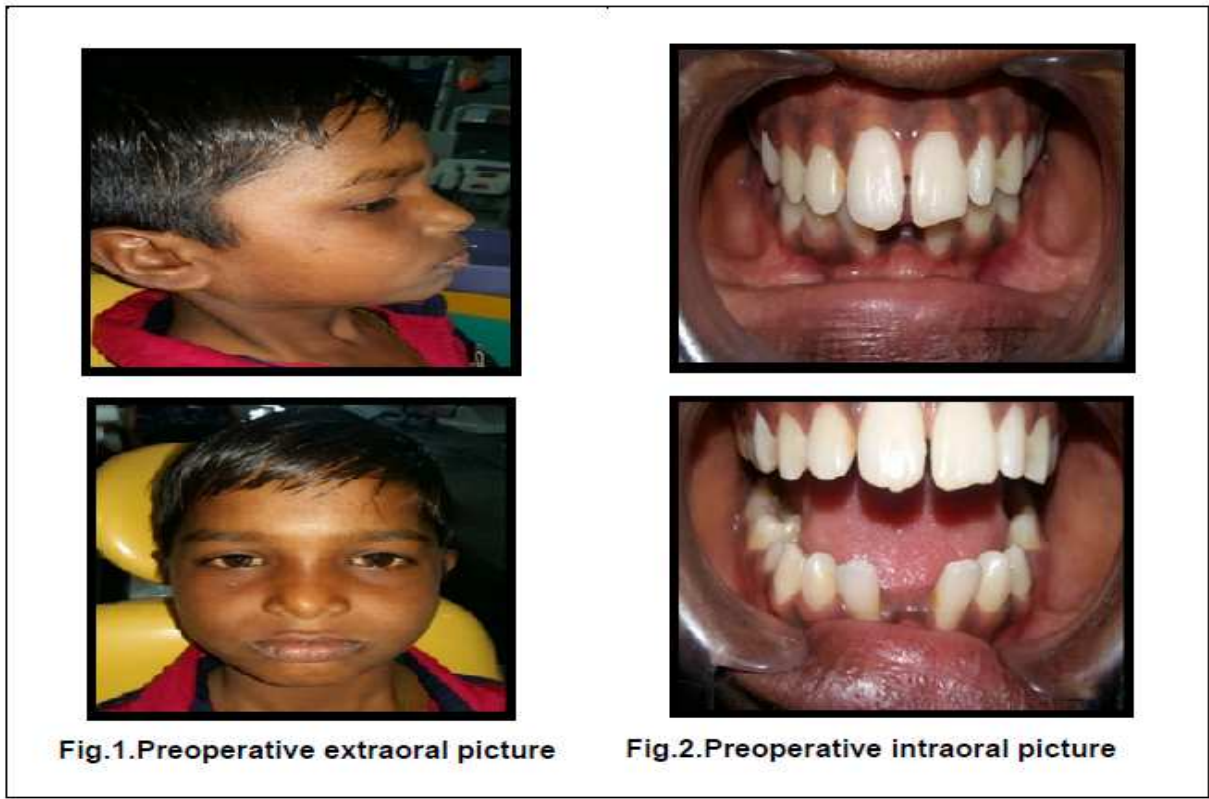
A 12 year old boy reported to the department of pediatric and preventive dentistry with the chief complaint of missing teeth in lower front region since the past 4-5 years. The case appeared to be of idiopathic etiology as the patient presented facial symmetry, normal development and was not related to any syndrome. (Fig.1) On examination the mandibular central incisors were found to be missing which was further confirmed by an anterior tongue thrust habit in the child due to congenital absence of permanent incisors.(Fig.2). The radiological examination revealed no abnormalities (Fig.3)

In addition he gave no history of any genetic predisposition to the same. The objective being to maintain functional space and occlusion and most importantly to enhance esthetics; a fixed appliance using acrylic teeth bonded by ribbon on the adjacent teeth was decided to be the treatment of choice.

The patient and the parents were explained the treatment plan and they expressed their consent for the same. Then maxillary and mandibular alginate impressions were taken and the casts made (Fig.4). Shade selection of the acrylic teeth was done in natural light, and the teeth then stabilized in the cast using modeling wax(Fig.5). A horizontal groove was made on the lingual surfaces of the lateral incisors (42 and 32). Then these surfaces were etched using 37% phosphoric acid for 15 seconds. Subsequently the tooth surfaces were dried and dentin bonding agent (tetric n bond universal, ivoclar) was applied for 10 seconds which was dried for 5 seconds and then cured for 10 seconds.

The measurement between distal surfaces of both lateral incisors was measured in the cast with the help of a measuring scale and found to be 2 cm. Interlig (fibre reinforced composite) measuring 2cm was cut and adapted to the lingual surfaces of lateral incisors . It was then dipped in the bonding agent (tetric n bond universal, ivoclar) and placed over the middle third of the lingual surfaces of the lateral incisors and light cured for 40 seconds respectively on both sides. (Fig.6 and Fig.7).

Composite resin was placed on the lingual surfaces of the acrylic teeth and after seating the teeth in the correct position, the composite resin was light cured for 40 seconds. Composite resin was also applied on the lingual aspect of the fiber in contact with the pontic and photo-polymerized in the same manner (Fig.8).



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Fig.3. OPG of the patient



Fig.4. Preoperative diagnostic cast of the patient



Fig.5. Preoperative cast with attached acrylic teeth

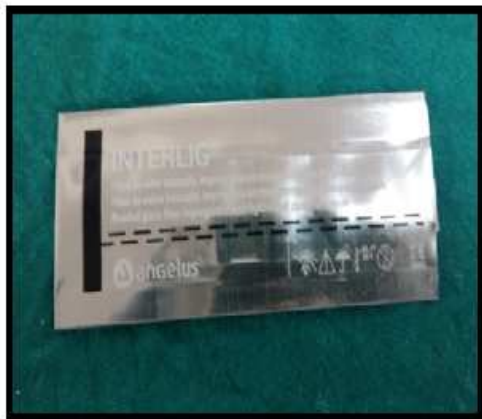


Fig.6. Interlig material used (glass fibre reinforced composite)

The occlusion was checked, and finishing was done. A well-adapted bridge with good esthetics was the final outcome. (Fig.9 and Fig.10)

Discussion

Agenesis defines teeth which are missing and can neither be observed clinically, nor radiographically, and also when there is no history of trauma or extraction. In other words hypodontia is a congenital absence of one or more teeth in primary or permanent dentition. According to Jones, there are three types of hypodontia which include mild (1 or 2 teeth missing), moderate (3–5 teeth missing), and severe (above 6 teeth missing). Hypodontia may also be classified as isolated or nonsyndromic and syndromic or hypodontia associated with syndromes.² Although the exact etiology of congenital agenesis of both central incisors is unknown, several factors like trauma, radiation, infection, metabolic disorders and are the possible etiological factors³. In addition individuals reported with hypodontia may give a familial history or may exhibit no hereditary history.⁴

Newman and Newman (1998) have given four main theories for the cause of agenesis of incisors. Heredity or familial distribution is the primary cause. Secondly, anomalies in the development of the mandibular symphysis may affect the dental tissues forming the tooth buds of the lower incisors. Thirdly, a reduction in the dentition which may be regarded as nature's attempt to fit the shortened dental arches (an expression of the evolutionary trend) and finally, localized inflammation or infections in the jaw and disturbance of the endocrine system destroying the tooth buds. It has also been reported that genes MSX1, TGFA and PAX9 interaction sometimes play a role in human tooth agenesis.⁸

Management of hypodontia involves a multidisciplinary approach. The ideal multidisciplinary team for management of hypodontia includes specialists from orthodontics, pediatric dentistry, prosthodontics, and implantology. An early consideration of the likely definitive replacement for missing teeth forms the basis for the multidisciplinary management of hypodontia. The need to await complete eruption and root formation of permanent abutment teeth with huge pulp chambers has contraindicated the provision of fixed prosthetic reconstructions in children with hypodontia.

Removable partial dentures had been used as interim restorations for missing teeth to maintain appearance and function but in today's day and age fixed FRC bridges offer a much better alternative to replace missing permanent anterior tooth, especially in a growing child until a fixed prosthesis can be provided at the end of growth period. Patient cooperation proves to be one of the major obstacles in pediatric dentistry while dealing with removable appliances as it is an uphill task to motivate children to wear their appliances all the time and is often the leading cause of treatment failures.



Fig.7. Fibre reinforced composite bonded on the lingual surfaces of teeth



Fig.8. Complete bonding of fibre and acrylic teeth on lingual surface



Fig.9. After the bonding of acrylic teeth

Fibre reinforced composite resin prosthesis on the other hand have a great advantage as being fixed they are not dependent on patient compliance. In addition, they are less bulky as they do not have an acrylic plate and retentive clasps, thereby providing greater comfort to the patient as well as giving a more esthetic appearance. Fixed FRC bridges also have a definite edge over the RPD as their fabrication is less time consuming and can be performed in a single appointment. The clinical technique which has been described here is noninvasive and reversible so that all other restorative options can be evaluated at a later date.⁵



Fig.10.Comparison of before and after treatment

CONCLUSION

FRC bridge fabrication technique presented in this article suggests a new treatment option for the replacement of missing anterior teeth. This technique restores esthetics and function while at the same time being more comfortable (non-irritating) and hygienic when compared to a removable appliance because of less tissue coverage. And patient compliance as mentioned earlier does not present a problem here.⁶In this particular case, the patient will be kept under observation until the end of the craniofacial growth and then will be evaluated once again and forwarded for final oral rehabilitation.

References

1. Kagitha PK et al. Agenesis of Permanent Mandibular Central Incisors: A Concordant Condition in Siblings. *Int Jof Clin Ped Den*.January-March 2016; 9(1):74-77.
2. Prakash P, Hallur JM, Gowda RN. Interim Restorative Approach for the Management of Congenitally Missing Permanent Mandibular Incisors: Presentation of Three Cases. *Case Rep in Den* 2011:1-6.
3. .Nagaveni NB, Umashankara KV. Congenital bilateral agenesis of permanent mandibular incisors: Case reports and literature review. *Arch of Orofac Sci* 2009; 4(2): 41-46.
4. Satish BNVS et al. Bilateral agenesis of permanent mandibular central incisors. *J of Int Oral Health* 2014; 6(3):103-105.
5. Shastri D et al. Interdisciplinary management of hypodontia. *J of Interdiscip Dent*;2015;5(2):105-110.
6. Chafaie A, Portier R. Anterior Fiber-reinforced Composite Resin Bridge: A Case Report. *Ped Dent*2004; 26(6):530-534.
7. Gupta A,Yelluri RK, Munshi AK. Fiber-reinforced Composite Resin Bridge: A Treatment Option in Children. *Int J Clin Ped Dent* 2015;8(1):62-65.
8. Newman GV, Newman RA. Report of four familial cases with congenitally missing mandibular incisors. *Amer J of Orthod Dentofacial Orthop*,August 1998;118(2):195-207.

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