PULPECTOMY USING MINERAL TRIOXIDE AGGREGATE IN A NON-VITAL PRIMARY MOLAR WITH NO PERMANENT SUCCESSOR: A CASE REPORT

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ABSTRACT

Root resorption is a physiologic event for the primary teeth. It is still unclear whether odontoclasts, the cells which resorb the dental hard tissue, are different from the osteoclasts, the cells that resorb bone. Root resorption seems to be initiated and regulated by the stellate reticulum and the dental follicle. Primary teeth without a permanent successor eventually exfoliate as well, but our current understanding on the underlying mechanism is still unclear. The literature is also vague on how resorption of the pulp and periodontal ligament of the primary teeth occurs. Knowledge on the mechanisms involved in the physiologic root resorption process may enable us to delay or even inhibit exfoliation of primary teeth in those cases that the permanent successor teeth are not present and thus preservation of the primary teeth is desirable. A case report of 7-year-old boy with nonvital primary molar with no permanent successor. Following pulpectomy, stainless steel crown was given and the tooth was followed up for a period of 1 year and the tooth was asymptomatic and functional.

Key Words: Tooth agenesis, MTA Pulpectomy, Stainless steel crown, Irreversible Pulpitis, Non-Syndromic Tooth Agenesis

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INTRODUCTION

Tooth agenesis is a developmental dental anomaly in humans that can be challenging in clinical practice. Hypodontia is the term used for congenital absence of primary or secondary teeth, although specifically describing the absence of one to six teeth excluding third molars. It can affect both primary and permanent dentitions, although predominantly seen in permanent dentition.[1] The reported incidence of tooth agenesis is 3%-10% with a higher prevalence among females.[2,3] In Indian scenario the prevalence of tooth agenesis was found to be 6.3%. The most common missing teeth in the deciduous dentition are the maxillary lateral incisors and mandibular central incisors. Usually, tooth agenesis appears in a unilateral pattern according to 60 % of the affected population.[4]

Tooth agenesis is a very common developmental dental anomaly in children. It is a result of disturbances during the initial period of tooth formation in the initiation and proliferation stages which can be due to genetic or environmental causes. The cause for tooth agenesis is

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heredity affected by an autosomal dominant gene. Agenesis is mainly the result of mutations in MSX1, PAX9, AXIN2, TGFA genes. Another school of thought about tooth agenesis is expression of an evolutionary process (phylogenetic tendency), where jaws and the number of teeth is being reduced. As a general rule, the missing tooth is always the most distal tooth of the arch.

The radiographic study, specifically Panoramic radiography is a complimentary means of diagnosing features like tooth agenesis that may go undetected. When encountered with such feature multidisciplinary treatment is usually initiated, often by the paediatric dentist or general practitioner. A treatment plan may be prepared depending on the patient's age, complaints and dental development.

This paper describes the management of irreversible pulpitis of primary second molar with no permanent successor, using MTA as the root canal filling material.

CASE REPORT

A healthy 7-year-old boy was reported to the Department of Pedodontics with the complaint of a toothache in the mandibular left molar region. Clinical and radiographic examination could diagnose the condition as an irreversible pulpitis in relation to deciduous mandibular left second molar. The panoramic radiograph revealed widening of periodontal ligament space and absence of the successional premolar on both sides with deep dental caries on mandibular left primary molar. [Figure 1,2]. It was noted that agenesis of the bilateral mandibular left second premolar.

Figure 1: OPG of the patient

Figure 2: Intra oral photograph showing upper and lower arch, right and left occlusion of the patient

A detailed case history had been taken emphasising mainly on the medical and family history of the patient and there were no such etiologic factors contributing to tooth agenesis. From these findings, we could diagnose this condition as Non syndromic tooth agenesis.

Considering the age of the patient, the treatment plan formulated was MTA Pulpectomy followed by crown placement. The procedure started after the administration of Local anesthesia. After access opening, pulp extirpation using barbed broach. Kedo SG Blue rotary files were introduced into each canal and the irrigation of the canals was done using 2.5% NaOCl and saline.

In the second visit, thorough irrigation followed by drying of the canals using sterile paper points and finally obturation was done with E- MTA by using hand plugger [Figure 3]. Post endodontic restoration was done using composite and stainless-steel crown was also given. In the subsequent follow up done in 3 months and 1 year, the teeth were found to be asymptomatic. [Figure 4]

Figure 3: Radiograph showing MTA pulpectomy followed by stainless steel crown

Figure 4: Follow up after 1 year

DISCUSSION

The dentists are faced to a challenge to choose the right treatment in case of retained deciduous molars with missing second premolar because of the multiplicity of etiological factors: the age, the development stage of adjacent teeth, and the root resorption and infraocclusion of the primary predecessor. There is a variety of treatment options such as maintaining the primary tooth or extract it to be replace with an implant or prosthesis.

If extraction of the second primary molar is indicated, the timing is imperative because of its harmful effects on dental arches such as arch-length reduction, malalignment of adjacent teeth, alveolar bone resorption, and extrusion of the antagonist tooth. So future malocclusion can be prevented by maintaining it.[5] Hence, if we decide to retain the deciduous tooth, we indicate pulpotomy or pulpectomy depending on pulp status.

Previously, the pulpectomy of primary tooth with a missing permanent successor was done like permanent tooth and the canals were filled with gutta-percha following reconstruction of the crown.[6]

Recently, O'Sullivan and Hartwell showed successful treatment of a primary molar that had no successor permanent tooth using MTA as a root canal filling material. However, no long-term results were reported.[7] MTA have excellent proprieties such as sterility, radiopacity, resistance to moisture, good sealability against bacterial microleakage, and bioinduction. Due these proprieties, it stimulates mechanisms responsible for the bioremineralization and resolute of periapical disease that can improve treatment outcomes.[8,9]

A study done by Holland et al. showed that MTA consistently induces closure of the main canal foramen by new cementum deposition with an absence of inflammatory cells after 6 months.[10]
In 2007, the same researchers examined the influence of the obturation's extent on apical and periapical tissue response in dogs' teeth after filling root canals with MTA. Their results showed closure of the apex in 80% of their samples with hard tissue after 90 days and the presence of chronic inflammatory cells around the majority of periapical tissues.

In our case, no periapical pathological changes were appreciated thus recommending MTA as an option for pulpectomy material for non-vital primary teeth with no permanent successors.

CONCLUSION

Congenital tooth agenesis is a common dental anomaly which causes both

aesthetic and functional disorders. Early diagnosis along with comprehensive treatment planning involving and space arrangements is necessary in such cases. Future innovations in this field may bring up treatment of the genes causing tooth agenesis with gene therapies and development of tooth tissues from dental stem cells to the agenda.

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