

## Root Agenesis of Permanent Teeth: Sequelae of Primary Dentition Trauma with Chronic Secondary Infection.

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**Abstract:** Primary teeth and the permanent successors behave as interdependent units, where each one of them interact with and depend on each other. Traumatic injury to a primary tooth has a potential to damage the underlying permanent tooth germ. It may lead to various developmental disturbances of permanent dentition. However, the root abnormalities as a result of primary teeth trauma in permanent teeth are relatively rare. An unusual and rare case of sequelae to primary tooth trauma occurring at the age of 6 years and 2 months has been described here. The traumatic impact led to avulsion of 72 and 73 and secondary infection later on, involving the tooth germs of 42 and 43. The infection led to root agenesis in 42, 43 as seen radiographically. Clinically the affected teeth presented with mobility and an extraoral draining sinus. A systematic treatment approach of the affected teeth is described here.

**Keywords:** Root agenesis, primary dentition trauma, chronic infection of tooth germ.

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### I. Introduction

Traumatic injuries to primary dentition can result in a wide range of developmental disturbances in the succedaneous permanent teeth. It has a reported prevalence rate of 12% to 74%<sup>1</sup>. A relevant factor in this high prevalence is the close anatomical relationship between the apices of primary teeth and their developing permanent successors<sup>2,3,4</sup>. The developmental disturbances affecting the permanent dentition depend upon the type of trauma, its intensity, direction of impact, and the stage of developing tooth germ<sup>5,6</sup>. Irrespective of the developmental stage of the successor, the types of traumatic injuries which affect them the most are the luxation and the avulsion injuries of deciduous tooth<sup>4,7,8</sup>. This is because of the pliability of the facial skeleton and of the periodontal ligament, the large volume of teeth in relation to the bone in primary and mixed dentition and finally, the shorter roots of primary teeth<sup>9</sup>. The sequelae in permanent teeth caused by traumatic injury in their predecessors most commonly include coronal abnormalities such as enamel hypoplasia, crown dilacerations and white, yellow-brown discolorations. Anomalies of root include root duplication, dilacerations and partial or complete arrest of root formation. In addition, trauma may also lead to alteration in the eruption process, sequestration of permanent tooth germ and odontoma like malformations<sup>6</sup>.

The root abnormalities especially interruption of root formation are relatively rare<sup>10</sup> having a prevalence of 2%<sup>1</sup>. A rare case of root agenesis in permanent teeth as a result of traumatic injury in primary dentition has been presented here.

### II. Case report

An eight year-old, male patient was brought to the outpatient department of Pedodontic with Preventive dentistry, Faculty of Dental Sciences, CSM Medical University, Lucknow, with a chief complaint of mild pain and extraoral pus discharge from lower left front region, since nine months. The medical history of the patient was non-contributory. However, the dental history revealed a history of trauma at the age of 6 years and 2 months. He had fallen from a height of approximately 30 feet, which led to laceration in lower lip and avulsion of 71, 72. The soft tissue injury was adequately managed with no further discomfort. However, eight months after the trauma a swelling was observed with a "pimple" in the centre, as described by the patient. The parent told that this pimple has been discharging pus for the past one year and two months. The patient had been

treated previously with incision and drainage under antibiotic coverage a number of times by the physician. On recurrence for the last time, the patient presented to a dermatologist who referred him to our department for evaluation and treatment.

The intra-oral clinical examination revealed grade three mobility in erupting 42 and 43, with labially erupting 43 near the apex of 42 (fig 1a and 1b). The extra-oral examination revealed a scar mark in lower lip and crusted, erythematous extraoral draining lesion, 2 cm in diameter, on lower left anterior region in relation to 42, 43 (fig 2).

The radiographic examination in a panoramic view revealed root agenesis in 42 and 43 (fig 3). A periapical radiolucency in relation to 42 and 43 was also seen extending around the tooth bud of 43. Intraoral periapical radiograph examination showed normal crown structure with normal enamel and dentin except for incomplete root formation in 42 and 43 (fig 4).

Routine blood investigations were advised to the patient. The results of the investigations were within normal range. The patient was taken under antibiotic coverage and surgical intervention was planned. The surgical procedure involved raising of a labial periosteal flap in the 42, 43 region (fig 5). The incomplete tooth germs 42, 42 were extracted. Tooth number 73 was also sacrificed for their extraction (fig 6). The lesion cavity after extraction was thoroughly curetted, flap repositioned and sutured. The patient was continued under antibiotic and anti-inflammatory drugs coverage. Post operative instructions were given to the patient and the guardian. The patient was recalled after seven days for sutures removal.

On recall after seven days, the draining of the extra oral lesion had ceased. The intraoral tissues at the site of surgery were also free from signs of inflammation. A lower arch impression was taken two weeks after the surgery and a removable prosthesis for extracted teeth was delivered (Fig 7). The patient was then recalled every three months for post operative evaluation. On radiographic examination at the end of one year, the radiolucency was found to be reduced (fig 8). There were also no clinical signs and symptoms of infection at the affected site (fig 9).

### III. Discussion

Traumatic dental injuries to the primary dentition may result in disturbances in development and eruption of their permanent successors. The traumatic injury to primary teeth has been described to be most commonly associated with coronal abnormalities in the permanent teeth<sup>6,10</sup>. It is known that the topographic association of the apices of the primary teeth to the permanent tooth germs explains the potential for possible developmental disturbances of the permanent teeth after injuries to their predecessors<sup>4</sup>. Moreover, Von Arx acknowledged the close approximation of the roots of primary teeth and the permanent crowns to be the principal factor for the high frequency of the enamel hypoplasia and crown malformation<sup>4</sup>.

The aetiology of various root anomalies has been described to be trauma, genetic factors, therapeutic radiation, orthodontic treatment and mechanical blockage of the path of eruption by neoplasms, cysts and supernumerary teeth<sup>11</sup>. Andreasen et al. have stated that the partial or complete arrest of the root formation is a rare sequel occurring in only 2% of the permanent teeth following trauma to the primary dentition<sup>6</sup>.

In the present case, the root agenesis in 42 and 43, without any coronal abnormality, can be attributed to the timing of the traumatic incident. The impact of the injury which resulted in avulsion of 71 and 72 leading to secondary infection might have indirectly affected the proper function of Hertwig's epithelial root sheath of the developing lateral incisors and canine. Since the crown formation of permanent lower central incisor and canine is completed between 5 and 7 years of age, the crowns of 42 and 43 remained unaffected.

The present case report highlights the significance of regular follow-ups after a traumatic dental injury. The patient here, was not regularly examined after the first episode of trauma leading to avulsion of primary teeth. As a result secondary infection developed leading to cessation of root formation in the permanent teeth at the affected site. There was no alternative treatment for the affected teeth, except for extraction. In the absence of infection, the sacrifice of these teeth could have been avoided. Therefore, the complications of the sequelae of traumatic dental injuries should be critically followed up by the examining dental surgeon/general physician, and the patient must also be made aware of the possible complications in case of non-compliance.

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**Figure legends**



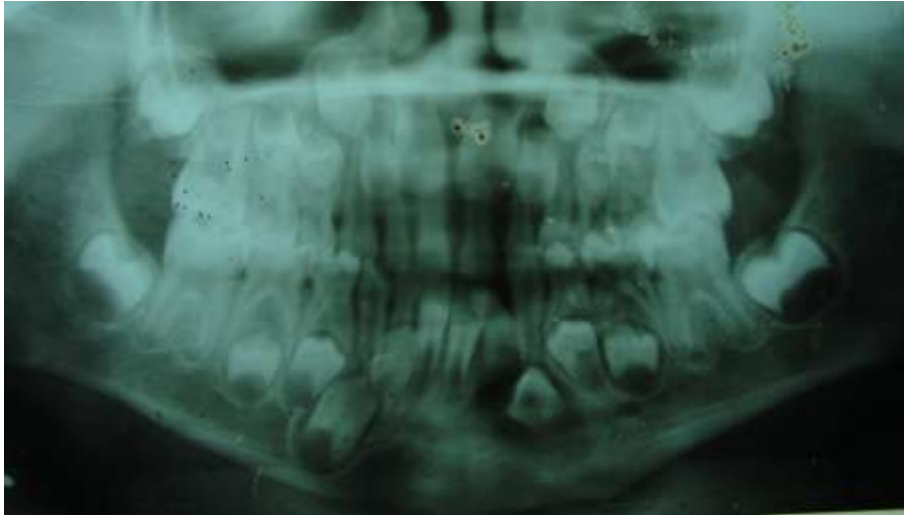
**Fig 1a-** Preoperative intra-oral view (Occlusal)



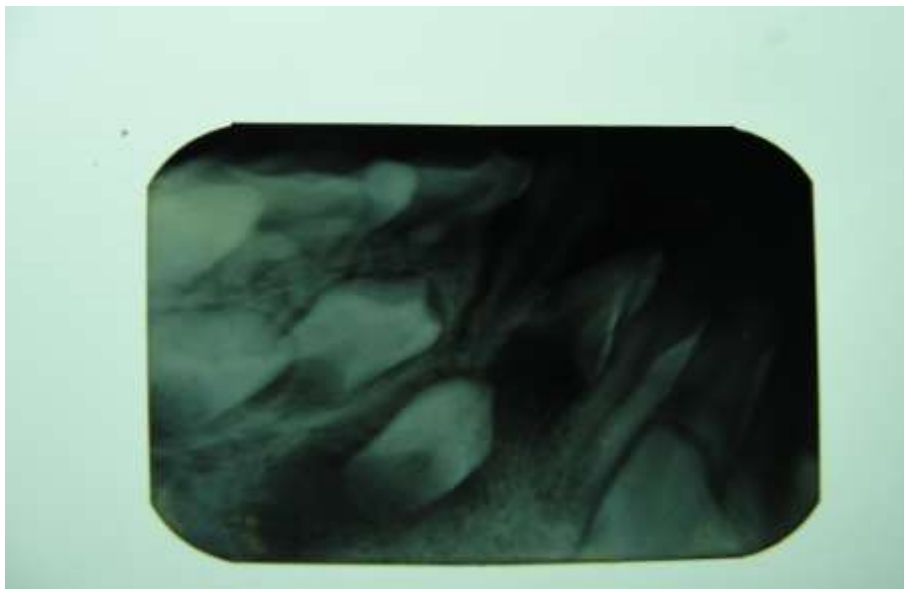
**Fig 1b-** Preoperative intra-oral view (Labial)



**Fig 2-** Preoperative extra-oral view showing draining sinus on skin



**Fig 3-** Preoperative panoramic radiograph



**Fig 4-** Preoperative intra-oral periapical radiograph



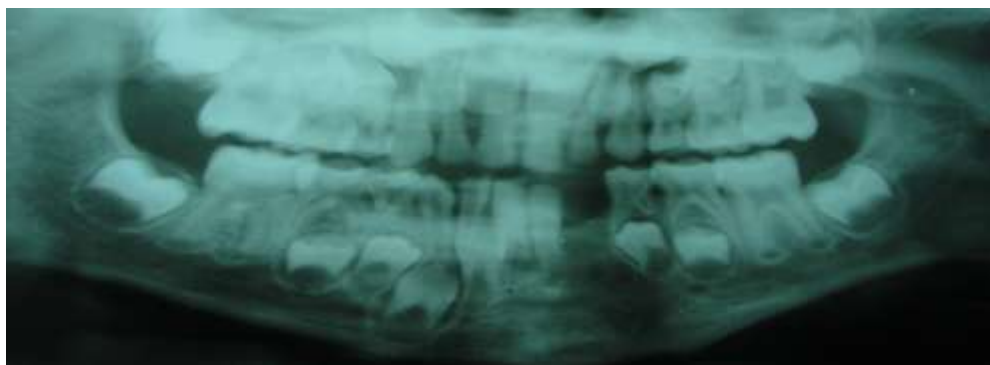
**Fig 5-** Surgical procedure-flap raising and lesion cavity after extraction of affected teeth



**Fig 6-** Extracted teeth during surgery



**Fig 7-** Post operative intra-oral view



**Fig 8-** Postoperative panoramic radiograph at 1 year follow up



**Fig 9-** Postoperative extra oral view showing healed scar of draining sinus.