

# 12 Bulls with A Twist: A Rare Case Report

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## Abstract

Tooth root dilacerations with taurodontism in primary teeth are a rare disease according to Genetic and Rare Diseases Information Center, National Institutes of Health and Orphanet, a European website of database of rare diseases. Till date, only one case with 10 taurodonts in a African-American male has been reported in the literature. This is a rare case of 7-year-old child with 12 taurodont along with bilateral flexion and taurodontism in primary mandibular first molars. This case reports the challenges and difficulty faced during the endodontic management of taurodontic and dilacerated tooth.

**Keywords:** Bull tooth, dilaceration, flexion, primary dentition, taurodont

## INTRODUCTION

Tomes J in 1848 coined the term dilaceration. It is derived from the Latin term “dilacero” which means “tear up.” He described dilacerations as a forcible separation of the cap of the developed dentine from the pulp in which the development of dentin is still progressing.<sup>[1]</sup> Dilaceration is defined as a distortion occurring during the development of a tooth which disrupts the normal axial relationship between the crown and root.<sup>[2]</sup> A deviation of the root by 90° or more from the long axis of the tooth is called tooth root dilaceration and <90° is called flexion.<sup>[3]</sup> Dilaceration can be present occur anywhere along the length of the tooth; crown, amelo-cemental junction, along the root, or by only involving the apex of the root.<sup>[4]</sup> Flexion is a deviation present only in the root, and it is characterized by a smooth physiologic curvature of the root.<sup>[5]</sup>

Tooth root dilaceration and flexion in permanent dentition are considered to be caused by trauma to deciduous anterior teeth.<sup>[6]</sup> The incidence of dilaceration in permanent teeth is very low when compared to 11%–30% of prevalence of traumatic injuries to the primary dentition. The prevalence of traumatic tooth root dilacerations and flexion is less than atraumatic tooth root dilacerations. Dilacerations are also recorded in the roots of deciduous dentition and permanent posterior teeth in the absence of trauma.<sup>[7]</sup> Therefore, trauma to primary dentition cannot accounts for all the cases of tooth

root dilaceration and flexion, chiefly those involving primary teeth.<sup>[8]</sup> Hence, the possible etiologies of tooth root dilaceration and flexion are altered tooth germ position, delayed tooth eruption, displacement of tooth root sheath due to gradients of bone remodeling present within alveolar bone or prolonged endotracheal intubation during infancy. The prevalence of dilacerations is very low deciduous dentition as compared to permanent dentition.<sup>[9]</sup>

In 1913, Sir Arthur Keith introduced the term taurodontism and defined it as a tendency for the body of the tooth to enlarge at the expense of the roots.<sup>[10]</sup> It is derived from the Latin word “tauros” which means “bull” and the Greek word “odus” which means “tooth.”<sup>[11]</sup> Witkop in 1971 defined taurodontism as teeth with large pulp chambers in which the bifurcation or trifurcation are displaced apically, so that the chamber has greater apico-occlusal height than in normal teeth and lacks the constriction at the level of cemento-enamel junction.<sup>[12]</sup> Teeth with taurodont are classified by Shaw as hypotaurodont, mesotaurodont, and hypertaurodont depending upon the relative displacement of floor of the pulp chamber. Hypo-taurodontism being the least pronounced form, meso-taurodontism the moderate form and hyper-taurodontism being the most severe form in which the bifurcation or

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trifurcation occurs near the root apices.<sup>[13]</sup> Most commonly used classification system is introduced by Shifman and Chanannel in 1978. A tooth is called a taurodont when the distance to the highest point of pulp floor “b,” when divided by the distance from “a” to root apex “c” should be equal to or  $>0.2$  mm and/or distance from “b” to CEJ “d” should be  $>2.5$  mm.<sup>[14]</sup>

Taurodontism is presumed to be caused by a delayed or incomplete union of the horizontal flaps of the epithelial diaphragm and the failure of Hertwig’s epithelial diaphragm to invaginate at a suitable horizontal level, resulting in a tooth with short roots, elongated body, enlarged pulp, and normal dentin.<sup>[15-17]</sup> The prevalence of taurodontism is 2.5%–3.2% in permanent teeth and 0.54% in primary teeth.<sup>[18]</sup> Taurodontism can be associated with other developmental anomalies and syndromes such as amelogenesis imperfecta, Down’s syndrome, ectodermal dysplasia, Klinefelter syndrome, trichodontosseous syndrome, Mohr syndrome, Wolf Hirschhorn syndrome, and Lowe syndrome. These developmental anomalies are diagnosed on radiographs.<sup>[19-21]</sup>

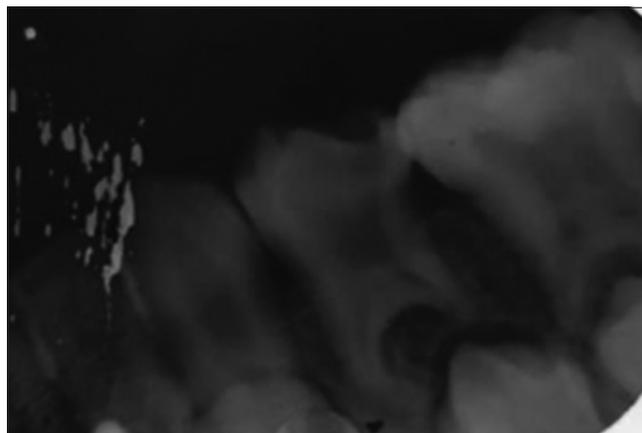
Flexion along with taurodontism is a very rare occurrence in primary dentition. This case report is unique because both the primary mandibular first molars had these developmental anomalies. No case has been reported till date where primary molars are having both flexion and taurodontism. There are the case reports of primary tooth affected by either taurodontism or tooth root dilaceration but not both. The present case was challenging and complex owing to the difficulty encountered during the endodontic management of the dilacerated and taurodontic primary mandibular molar. The child was also having multiple other molars with taurodontism.

## CASE REPORT

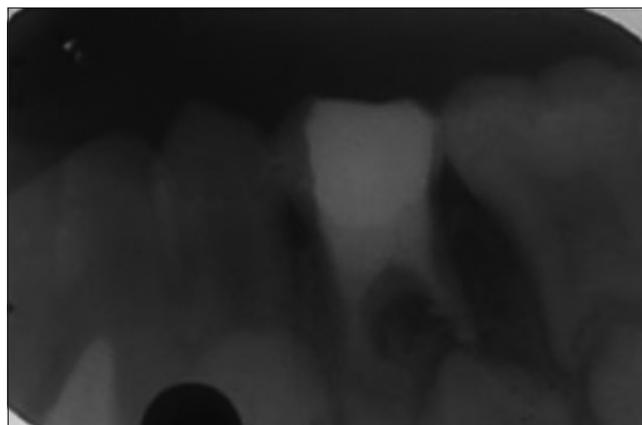
A 7-year-old female child reported to our department with a chief complaint of pain in the lower left back region of the jaw for the past 4 days. The medical history was noncontributory, and her developmental milestones were within the normal limits. The intraoral examination revealed deep carious lesion in the mandibular left deciduous first molar (74). The tooth was tender on vertical percussion with intraoral swelling associated with it. Routine diagnostic intraoral periapical radiograph was advised which revealed taurodontic mandibular first and second molars (74, 75) [Figure 1]. The primary first molar (74) had flexion in the mesial root. Based on the clinical and radiological findings, the diagnosis of acute periapical infection was made in relation to 74. A multivisit pulpectomy followed by the placement of stainless steel crown was planned. The access opening was done to extirpate the pulp tissue. As the tooth was taurodontic, the pulp tissue was voluminous and hyperemic. 2.5% of sodium hypochlorite was used for irrigation. As the mesial root had flexion in the distal direction, precurved flexible nickel–titanium (Ni-Ti) files were used for biomechanical preparation. The mesial canals were instrumented up to 35 number file and the distal canal up to 40

number file. The obturation was done with metapex followed by restoration of 74 [Figure 2].

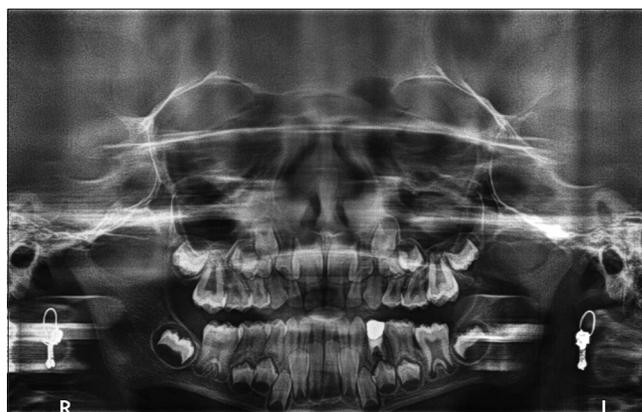
Orthopentamograph (OPG) was taken to evaluate the condition of other teeth [Figure 3]. OPG showed that all the primary molars were taurodontic along with first permanent molars. Bilaterally, the primary mandibular first molars had flexion in their mesial roots like a mirror image. Altogether there were four permanent and eight deciduous molars with taurodontism.



**Figure 1:** Taurodontic mandibular first and second molars (74, 75).



**Figure 2:** IOPA of 74 after obturation.



**Figure 3:** Orthopentamograph showing taurodontic primary and permanent molars.

It was difficult to evaluate the premolars and second permanent molars as they were in their developmental stage.

## DISCUSSION

Primary teeth with tooth root dilaceration and taurodontism is considered to be an extremely rare disease by Genetic and Rare Diseases Information Center, National Institutes of Health and Orphanet, a European website of database of rare diseases.<sup>[22]</sup> Gorjanovic-Kramberger in 1908 described the bull teeth in a 70,000-year-old pre-Neanderthal fossil.<sup>[23]</sup> Taurodontism was considered to be an atavistic trait, but presently, it is considered to be an anatomic variant that can occur in the normal population.<sup>[24]</sup> Taurodontism can be present unilaterally or bilaterally. The permanent teeth are more affected than the primary teeth.<sup>[25]</sup> The prevalence of taurodontism is 2.5%–3.2% in permanent teeth and 0.54% in primary teeth. Studies have shown that the mandibular molars are affected more often than maxillary molars.<sup>[26-30]</sup> The incidence of occurrence of taurodontisms in both the primary and permanent dentition bilaterally is extremely rare as seen in our case.

Till date, only one case with 10 taurodonts in a black male has been reported in the literature.<sup>[31]</sup> This is a rare case report of a 7-year-old child with 12 hyper taurodonts along with bilateral flexion and taurodontism in primary mandibular first molars. The affected teeth were diagnosed with taurodont of meso and hyper types. The child had primary mandibular first molars with tooth root dilaceration along with taurodontism bilaterally. Both the primary first molars had distal curvature of the mesial roots in the apical third. The child was healthy with no physical abnormalities.

Endodontic management of primary mandibular first molar having both taurodontism and flexion was complex and challenging. Careful negotiation, instrumentation, and obturation were done. 2.5% sodium hypochlorite was used as irrigant for complete debridement of the pulp tissue. Flexible Ni-Ti files were used for negotiating the dilacerated root. Metapex was used for obturation. It is a combination of calcium hydroxide and iodoform with faster rate of resorption. Preventive care was given to all the teeth affected with taurodontism to avoid the complications in future.

## CONCLUSION

Taurodontism and tooth root dilaceration are diagnosed on radiographs. They pose a great challenge during endodontic, orthodontic, surgical and prosthetic treatment. Hence, knowledge of such dental anomalies helps in proper diagnosis and management. The significance of diagnostic radiographs for the early identification of such dental anomalies and preventive care of these teeth is also very important.

## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have

given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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## Conflicts of interest

There are no conflicts of interest.

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