



## Endodontic Management of Mesotaurodontic Mandibular Second Molar combined with C-shaped Canal - A Case Report

\*Dr. Ashwini KS<sup>1,2</sup>, Dr. Nagaveni NB<sup>3</sup>

<sup>1</sup>Senior Lecturer, Department of Conservative Dentistry and Endodontics SJM Dental College and Hospital Chitradurga, Karnataka, India.

<sup>2</sup>Consultant Endodontist Dental wing, Karnataka ENT Hospital and Research Centre Chitradurga, Karnataka, India.

<sup>3</sup>Professor, Pediatric Dentist “Garike Dental Care” Davangere, Karnataka, India

DOI: 10.5281/zenodo.13628216

Submission Date: 31 July 2024 | Published Date: 02 Sept. 2024

\*Corresponding author: Dr. Ashwini KS

Senior Lecturer, Department of Conservative Dentistry and Endodontics SJM Dental College and Hospital Chitradurga, Karnataka, India.

### Abstract

Taurodontism is a morpho-anatomical change in the shape of the tooth in which the body of the tooth is enlarged and the roots are reduced in size. Although taurodontism is a dental rarity, this unusual radicular form should merit circumspect considerations in planning and treatment. Endodontic management in taurodont teeth has been described as complex and difficult. The present case report describes the successful completion of endodontic treatment in a Mesotaurodont teeth with a c-shaped canal in the permanent mandibular second left molar with appropriate use of instruments and techniques and also emphasizes the importance of its management.

**Keywords:** C-Shaped canal, Endodontic treatment, Enlarged pulp chamber, Mandibular second molar, Taurodontism.

### Introduction

Extensive review of endodontic literature shows occurrence of root number variations and root canal configuration in human both primary and permanent dentition [1-5]. Taurodontism is a developmental disturbance of a tooth that lacks constriction at the level of the cemento-enamel junction (CEJ) [6-9]. It is characterized by vertically elongated pulp chambers, apical displacement of the pulpal floor and bifurcation or trifurcation of the roots. The term was first used by Sir Arthur Keith in 1913 to describe molar teeth resembling those of bulls. The word taurodontism is derived from two words. The first word is the Latin term meaning ‘Tauros’ (means ‘bull’) and the second word is the Greek term meaning ‘odus’ (means ‘tooth’ or ‘bull tooth’) [6,8].

### Review of literature

**Etiology: Various etiopathogenesis has been suggested in the literature like [6]**

- Failure of Hertwig’s epithelial sheath diaphragm to invaginate at the proper horizontal level
- Interference in the epitheliomesenchymatose induction
- Genetically transmitted
- Associated with an increased number of X chromosomes

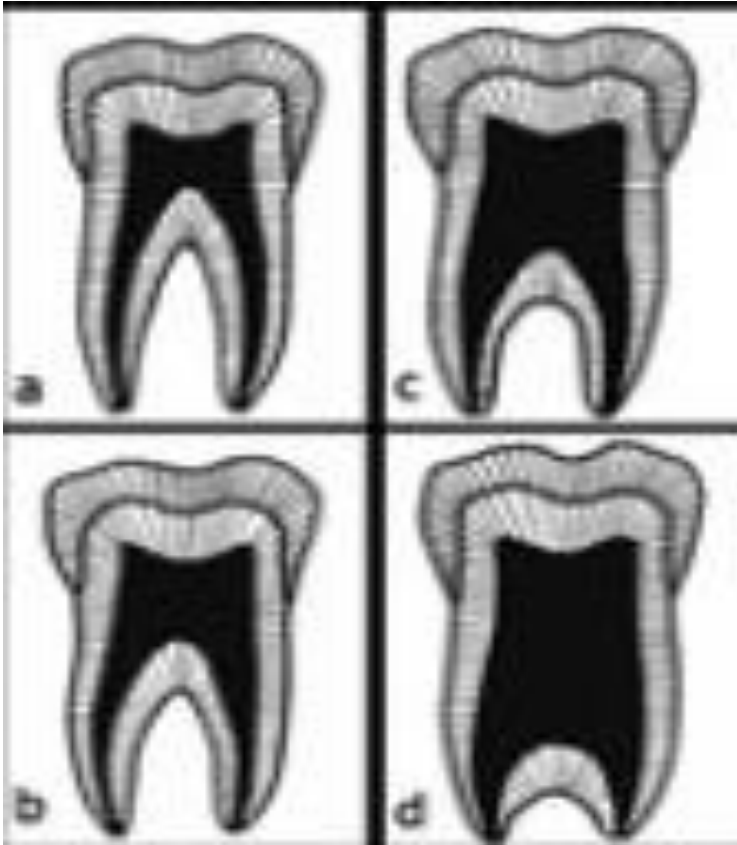
### Syndromes associated with taurodontism [6]

Down syndrome, Tricho-dento-osseous syndrome, Ellis van Creveld syndrome, Apert syndrome and Mc Cune Albright syndrome.

## Categorization or Classification

Shaw in 1928 [8], based on the external morphological criteria (based on the relative amount of apical displacement of the pulp chamber floor), classified into four types as shown below (Figure 1).

- a) Cynodont
- b) Hypotaurodont
- c) Mesotaurodont
- d) Hypertaurodont



**Figure 1:** Diagrammatic picture showing types of Taurodontism [8]

## Clinical characteristics [6-9]

Clinically taurodontic teeth appear as a normal tooth (body and roots of a taurodont tooth lie below the alveolar margin).

## Radiographic characteristics [7]

Radiographic features include

- Extension of the rectangular pulp chamber into the elongated body of the tooth
- Shortened roots and root canals
- Location of furcation (near the root apices)

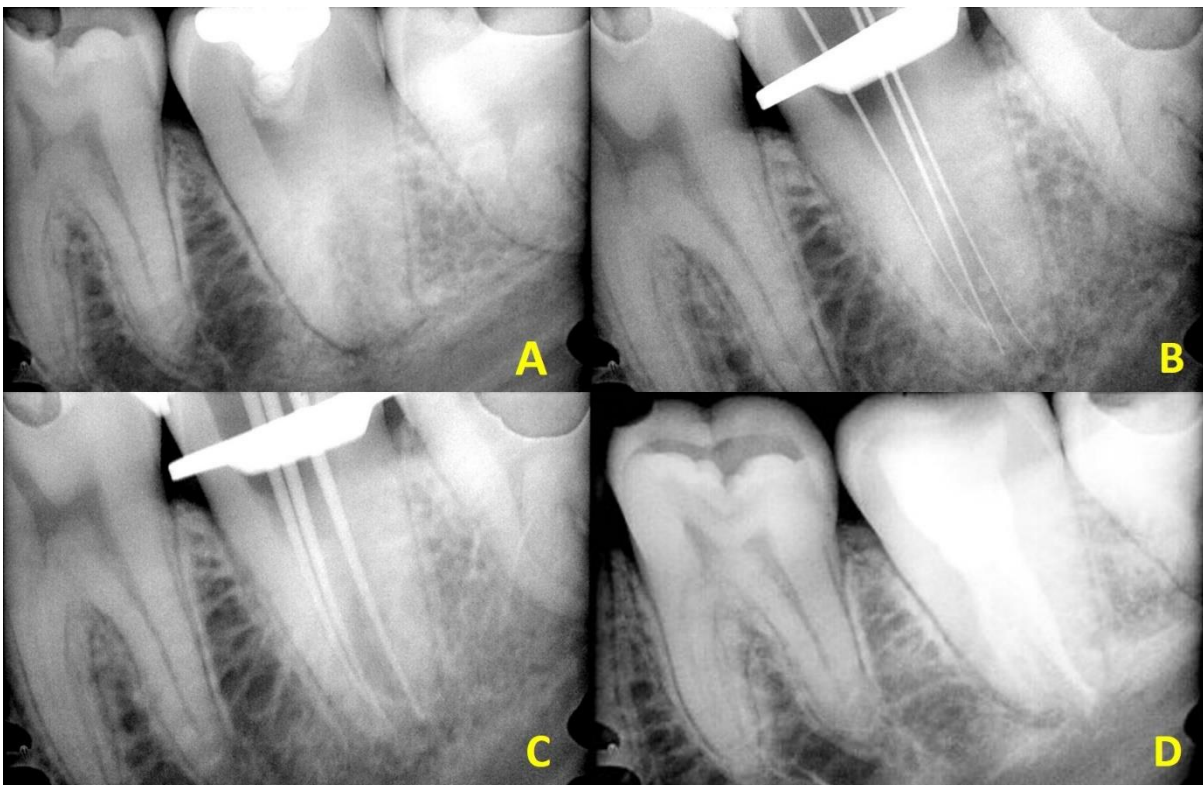
## Case report

A patient of age 26-year-old female patient complains of pain in left mandibular molar region from one week. There was no history of systemic diseases. On Clinical examination tooth was restored with silver amalgam and it was tender on percussion. Vitality tests were performed and the tooth was found symptomatic. Based on clinical features a diagnosis of irreversible pulpitis with apical periodontitis with respect to mandibular left second molar was made. Intraoral periapical radiograph using radioviseography (RVG) was taken with respect to the same tooth which showed a large pulp chamber with an elongated body of tooth, shortened roots and furcation located apically. Based on radiographic features this case was categorized as mesotaurodont according to Shaw given in 1928 [8]. A treatment plan consisting of root canal treatment was planned. Inferior alveolar nerve block was given to obtain local anesthesia and rubber dam isolation was done. Access cavity was prepared (Figure 2). The pulp chamber was found large because the tooth was mesotaurodontic (Figure 3). Floor of the pulp chamber was not seen. The two canal orifices were seen as buccal and lingual (Figure 2). It

was classified as Melton's classification- category 2. Working length was determined with K-files. Biomechanical preparation was done using both hand and rotary instruments. Canals were irrigated with 2.5% sodium hypochlorite solution (NaOCl). Master cone selection was done using gutta percha (ISO standard – 4%). A modified obturation technique was implemented i.e. combined lateral condensation of the individual canals followed by vertical compaction of the elongated pulp chamber (thermoplasticised obturation technique by using Calamus) and Sealapex was used as sealer (Figure 3). Access cavity restoration was done using type IX GIC later followed by crown placement.



**Figure 2:** Access cavity preparation



**Figure 3:** Radioviseography (RVG) showing Mesotaurodontic mandibular left second molar (A). Working length determination (B), Master cone selection (C), Post-obturation (D).

## Discussion

Taurodontism is a dental anomaly in tooth morphology characterized by vertically enlarged pulp chambers, apical displacement of pulp floors and short roots [8,10]. This rare embryologic anomaly of the teeth has been classified as cyno, hypo, meso or hypertaurodontism according to the severity of the anomaly [8]. Compared to other permanent teeth, mandibular second molars exhibit more variations in root canal configurations such as C-shaped canals. Taurodontism is found with a prevalence of 0.25% to 11.3% in general population. Based on Shaw classification the present case was categorized as mesotaurodont [8]. Although Taurodontism is a dental rarity and a challenge to the dentist, thorough knowledge of dental anatomy, radiographic examination and its association with other syndromes of this dental rarity should be well-understood. The combined use of modern diagnostic aids and treatment facilities as well as the clinicians' skill and acumen are instrumental for successful endodontic outcome of taurodontism [10-12]. In the present case, modified obturation technique was employed as suggested in the endodontic literature which included combined lateral condensation of the individual canals followed by vertical compaction of the elongated pulp chamber using thermoplasticised obturation technique with Calamus. Because of the complexity of irregular root canal configuration in taurodontic teeth, sufficient instrumentation is not possible [12]. Therefore, literature suggests use of 2.5% sodium hypochlorite which improves root canal cleaning as well as dissolves the remaining pulp stones. The same irrigation solution was used in the case described here.

The pre-operative diagnosis of taurodontism prior to root canal treatment is highly essential [6-12]. It is useful especially in cases with meso and hypertaurodontism. The treatment of such teeth is very complicated and requires much more attention from the clinician [6]. Due to the considerable elongation of the pulp chamber and subsequent shortening of the root canals, it is much more difficult to localize and avoid perforation [7,10]. However, it is possible to observe increased haemorrhage during pulp extirpation which misleads to a perforation. Recently preliminary diagnosis with CBCT in a taurodont tooth and using magnification to determine the C-shape configuration throughout the canal system has been practised in many institutions which can increase the success of endodontic treatments [6]. Measuring the length of the pulp chamber with 3-Dimensional images can help determine the canal length or type and reduce the possibility of perforation. Visualization of canal orifices is difficult because pulpal floor is too far apically in taurodontic molars giving false feeling of perforation. Therefore, CBCT and dental microscope both helps in understanding the exact location of bifurcation or trifurcation of the canals in such cases [6].

## Conclusion

An awareness and knowledge about occurrence of various dental anomalies such as taurodontism in human dentition is very important among clinicians. Based on the present case report and literature evidence, dental professionals should be highly skilled in providing successful endodontic treatment as endodontic management varies in these teeth.

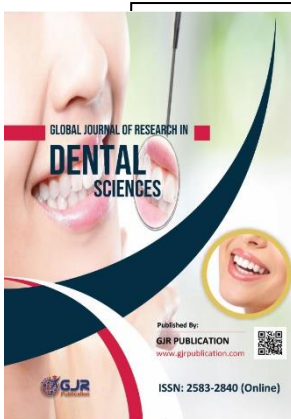
## References

1. Nagaveni NB, Radhika NB. Prevalence of taurodontism in primary mandibular first molars of ethnic Indian children. *Gen Dent*. 2012; 60(5): e335-40.
2. Nagaveni NB, Umashankara KV. Permanent maxillary lateral incisor with bifid canal – A case report with literature review. *Research* 2014; 1-701.
3. Nagaveni NB. Prevalence of two rooted mandibular first premolars in Indian population. *J Surg Anesth* 2023; 1(1): 1-3.
4. Nagaveni NB, Ashwini KS. Bifurcated mandibular second premolars: Report of unusual root anomaly (supernumerary root) – A case series. *J Dent Oral Health*. 2023; 10: 1-7.
5. Nagaveni NB, Umshankar KV, Radhika NB, Satisha TS. Third root (Radaix Entomolaris) in permanent mandibular first molars in pediatric patients – an endodontic challenge. *J Oral Health Commun Dent*, 2011; 5: 49-51.
6. Tian X, Qiao J, Guo N, Liu K, Li K. CBCT imaging and root canal treatment for taurodontism in mandibular second molar – A case report and literature review. *J Radiol Case Rep*. 2023; 30; 17(11): 1-7.
7. Lim A, Le Clerc J. Endodontic treatment of a hypertaurodontic mandibular left second molar in a patient with many taurodonts combined with multiple pulp stones. *Aust Endod J*. 2019; 45(3): 414-419.
8. Shaw JC. Taurodont teeth in South African races. *J Anat* 1928; 62: 476-498.
9. Jafarzadeh H, Azarpazhooh A, Mayhall JT. Taurodontism: a review of the condition and Endodontic treatment challenges. *Int Endod J*. 2008; 41: 375-388.
10. Pach J, Regulski PA, Tomczyk J, Struzycka I. Clinical implications of a diagnosis of taurodontism: A literature review. *Adv Clin Exp Med*. 2022; 31(12): 1385-1389.
11. Aydin H, Mobaraki S. Comparison of root and canal anatomy of taurodont and normal molar teeth: A retrospective cone-beam computed tomography study. *Arch Oral Biol*. 2021; 130: 105242.
12. Da Y, Zhang L, Chai Z, Du H, Hao L, Zhang L, et al. An improved diagnostic method for taurodontism and a comparative study on its effectiveness evaluation. *PLoS One*. 2024; 7; 19(5): e0302810.
13. Nagaveni NB, Umashankara KV. Radix entomolaris in permanent mandibular first molars: case reports and literature review. *Gen Dent (General Discussion)* 2009; 57: e24-29.

14. Nagaveni NB, Umashankar KV, Radhika NB. A retrospective analysis of accessory roots in mandibular molars of Indian pediatric patients. *Int J Dent Anthropol* 2012; 20: 38-46.
15. Nagaveni NB, Umashankara KV. Radix entomolaris and paramolaris in children – A review of the literature. *J Indian Soc Pedod Prev Dent* 2012; 30: 94-102.

#### CITATION

Ashwini KS, & Nagaveni NB. (2024). Endodontic Management of Mesotaurodontic Mandibular Second Molar combined with C-shaped Canal - A Case Report. In *Global Journal of Research in Dental Sciences* (Vol. 4, Number 5, pp. 3–7). <https://doi.org/10.5281/zenodo.13628216>



## Global Journal of Research in Dental Sciences

### Assets of Publishing with Us

- **Immediate, unrestricted online access**
- **Peer Review Process**
- **Author's Retain Copyright**
- **DOI for all articles**