

Mineral trioxide aggregate pulpotomy: An ideal treatment option for management of talon cusp

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Abstract

To use mineral trioxide aggregate (MTA) in prophylactic management of talon cusp. Talon cusp is an endodontic oddity that possesses a treatment challenge to the clinician, especially when it causes esthetic and functional problems. Management ranges from periodic gradual reduction to radical removal followed by vital pulp/endodontic therapy. MTA has replaced calcium hydroxide as pulp capping material because of its superior properties. A 12-year-old boy reported with a complaint of irregular teeth. Clinical and radiographic examination revealed talon cusp on maxillary left central incisor. Radical removal of talon cusp and MTA pulpotomy was performed. The 4-year follow-up showed the positive pulp vitality test without any radiographic changes, emphasizing the use of MTA pulpotomy in successful management of talon cusp.

Keywords: Mineral trioxide aggregate, pulpotomy, talon cusp

Introduction

Mitchel 1892^[1] first reported presence of an anomalous structure and described as “a process of horn like shape, curving from the base downward to cutting edge.” Mellor and Ripa in 1970 coined the term talon cusp because of its resemblance to an eagle’s talon.^[2] Its prevalence has an ethnic variation ranging from 0.06 in Mexican children to 7.7% in north Indian children.^[3] It originates as a result of outward folding of inner enamel epithelial cells (precursor of ameloblasts) and transient focal hyperplasia of peripheral cells of mesenchymal dental papilla (precursor of odontoblasts) during the morpho-differentiation stage of tooth development.

It shows a predilection for permanent dentition (77%) with a higher incidence in maxillary teeth (94%). Maxillary lateral incisors are the most commonly affected (55%) followed by

central incisors (33%) and canines (4%).^[4] Maxillary lateral incisors susceptibility could be related to compression of tooth germ by external pressure from adjacent central incisor and canine, which develops about 7 months earlier.^[5]

Hattab *et al.*,^[5] classified the anomalous cusp based on the degree of their formation and extension as:

Type 1 – Talon: A morphologically well-delineated additional cusp that prominently projects from the palatal or labial surface of primary or permanent anterior tooth and extends at least half the distance from cemento-enamel junction to the incisal edge.

Type 2 – Semi talon: An additional cusp of a millimeter or more but extending less than half the distance from cemento-enamel junction to the incisal edge. It may blend with the palatal or stand away from rest of the crown.

Type 3 – Trace talon: Enlarged or prominent cingula and their variations, i.e., conical, bifid, or tubercle-like.

Radiographically, it is visible as V-shaped radiopaque structure superimposed over the normal image of the crown, in which enamel, dentin, and occasionally pulp space extension can be seen. Early diagnosis and management of talon cusp is essential as it results in compromised esthetics, occlusal and tongue interferences, accidental fractures, increased caries susceptibility leading to pulpal and periodontal involvement.

Case Report

A 12-year-old boy reported to out patient department with a chief complaint of irregular teeth. Clinical examination showed mal-aligned teeth with diastema between maxillary central incisors [Figure 1]. An anomalous pyramidal shaped

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structure was detected on the palatal surface of the left maxillary central incisor extending from the cervical margin of the tooth toward the incisal edge [Figure 2]. It occluded on lower central incisor causing significant labial displacement of tooth #21. An intraoral periapical radiograph of tooth revealed a typical V-shaped radiopaque structure arising from cingulum of central incisor with its pulpal extension superimposed over the image of an affected crown without any signs of periapical pathology [Figure 3]. The tooth showed a positive response to electric and thermal pulp vitality tests. A diagnosis of a Type 1 talon cusp was established.

Complete single sitting reduction of talon cusp was planned. Tooth was anesthetized by local infiltration of 2% Xylocaine with 1:100,000 epinephrine. Isolation was achieved with rubber dam. Cusp reduction was performed using a sterile diamond bur with copious water coolant. A 5-mm deep pulpotomy was performed at the exposure site with a sterile #2 round bur. Hemorrhage was carefully controlled by 3% sodium hypochlorite. Mineral trioxide aggregate (MTA) (Dentsply

Maillefer, Ballaigues, Switzerland) was mixed as per manufactures instructions and placed directly onto exposed pulp [Figures 4 and 5]. Cavity was restored with glass ionomer cement at the same appointment. At 4-year follow-up, patient was asymptomatic without any radiographic signs of periapical pathology [Figure 6].

Discussion

Talon cusp usually occurs on the lingual surface of incisors, although there are case reports of their occurrence on the supernumerary, geminated and fused teeth. Jowhari *et al.*,^[6] documented a case of facial talon and suggested altering definition of talon cusp to indicate possible projection from either lingual or facial surface of a tooth. A case of labial and palatal talon cusp on same tooth was reported by Abbott^[7] in 1998. It is composed of enamel and dentin with or without pulpal extensions. The extent of pulp horn is difficult to distinguish on a radiograph because of its superimposition over the main pulp chamber. Siraci *et al.*, suggested the use of cone beam computed tomography CBCT in determining pulpal extensions into talon cusp.^[8]

Treatment requires careful clinical judgment and depends



Figure 1: Diastema between maxillary central incisors



Figure 2: Type 1 talon cusp



Figure 3: Pre-operative X-ray



Figure 4: Mineral trioxide aggregate pulpotomy clinical photograph

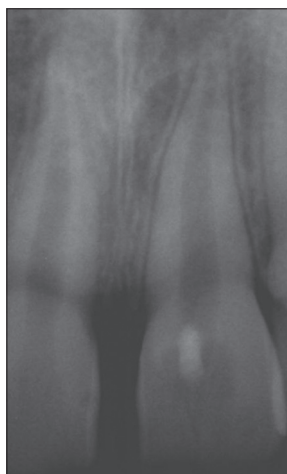


Figure 5: Immediate post-operative X-ray

on the size and shape of talon cusp. Prophylactic sealing of deep developmental groove has been advocated to prevent the development of caries.^[5] In cases of teeth with immature apices, gradual reduction of talon cusp followed by application of desensitizing agent and sealing has been advocated to preserve pulp vitality. Grinding on side of the cusp is recommended to initiate reparative dentin deposition because of the location of most of the odontoblasts along the length of cusp.^[9] Formation of secondary dentin at lateral walls led to constriction of pulp and total obliteration of pulp horn cannot be achieved. However, this cannot be applied predictably in all situations because of chances of sensitivity development, multiple visits, longer duration of treatment and requires patient compliance.

When occlusal interference is severe, a complete reduction of cusp followed by vital pulp therapy or endodontic therapy can be completed in a single visit. Vital pulp therapy has a higher success rate compared to endodontic treatment, irrespective of the size of exposure. Success rates of 91% for pulpotomy was seen in comparison to 80% in direct pulp capping when performed under aseptic conditions and has been attributed to removal of inflamed pulp and reduction in bacterial load. MTA has replaced calcium hydroxide because of its biocompatibility, excellent sealing ability, antibacterial properties and property to induce hard tissue formation in pulpal tissue.

Histological examination of MTA pulpotomies showed a rapid, continuous, thicker dentin bridge with no tunnel defects or imperfections and more frequent presence of odontoblastic layer when compared with calcium hydroxide based materials. Koh *et al.*,^[10] suggested use of MTA as an alternative to existing materials in prophylactic treatment of dense evaginatus. This paper presents a case of Type 1 talon cusp with a 4-year

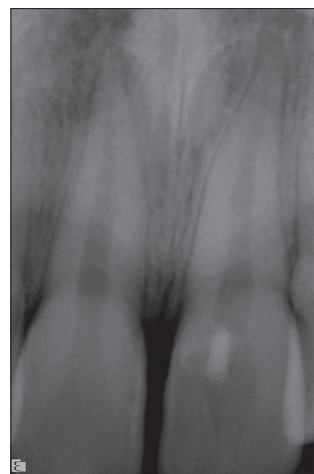


Figure 6: 4-year follow-up X-ray

follow-up, successfully managed by MTA pulpotomy.

Conclusion

Use of MTA pulpotomy can be a possible single-sitting treatment option for management of talon cusp.

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