

Endodontic Management of Mandibular Lateral Incisor with Talon Cusp: A Case Report

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Authors' contributions

This work was carried out in collaboration among all authors. Authors NDLL and AMA designed the study and wrote the first draft of the manuscript. Authors SZ, SHH and NAR managed the literature searches. Author ASH revised the manuscript. All authors read and approved the final manuscript.

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Case Study

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ABSTRACT

Introduction: Talon cusp is an uncommon developmental anomaly which is characterized by the presence of an extra cusp-like structure projecting from the cingulum area of maxillary or mandibular incisors. It consists of enamel, dentine with or without pulp tissue. Its aetiology is still unknown; however, its formation is attributed by the hyperactivity of the enamel organs during the morpho-differentiation stage.

Case Report: A healthy 15-year-old Malay female came to the paediatric dental clinic with the chief complaint of teeth sensitivity. An intra-oral examination revealed presence of a prominent cusp on the lingual surface as well as a deep fissure on the labial surface of mandibular right lateral incisor with a slight degree of mobility due to periapical abscess. An intraoral periapical radiograph revealed a radiopaque projection. The treatment was a root canal.

Conclusions: This case highlights the endodontic treatment of periapical lesions on the mandibular lateral incisor with talon cusp in an adolescent patient. Diagnosis and management of a rare anomaly are essential in the dental practice.

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1. INTRODUCTION

Talon cusp is a rare odontogenic dental anomaly projected from the cemento-enamel junction (CEJ) or on the cingulum region of anterior teeth. It is composed of enamel, dentine, and pulpal tissue with varying extensions [1,2]. It is also commonly known as a supernumerary cusp, hyperplastic cingulum, dens evaginatus, evaginated odontome, accessory cusp, supernumerary lingual tubercle, and cusped cingulum [3]. This particular cusp looks like an eagle's talon and hence is named after it [4].

Although the aetiology is unclear for this particular anomaly; however, it is suggested that there is multifactorial aetiology that proposed the formation of talon cusp [5]. It incorporates both genetics and environmental influences. Mutations in the human genes EDA1, EDAR, and EDARADD frequently lead to more serious phenotypes which would likely lead to tooth loss and malformations [6]. It occurs during the bell stage and is characterized by an irregular proliferation of the inner enamel epithelium into the stellate reticulum of the enamel organ [6]. Transient focal hyperplasia of the mesenchymal dental papilla and altered endocrine functions could also be contributing factors to this predicament [7,8].

According to Hattab et al., talon cusps are classified into three types based on the degree of cusp formation as well as the extension. Type I (Talon): An additional cusp that projects from the anterior tooth palatal surface and reaches at least half the length of the cemento-enamel junction to the edge of the incisors. Type II (Semi-talon): An additional cusp of 1 mm or more in length that extends towards the incisor edge less than half of the length of the cemento-enamel junction. Type III (Trace-talon): Amplified appearance, the cingulum protrudes with variations such as conical, tubercle-like, or bifid [9,10].

The clinical features of talon cusps vary in size, form, length, and mode of attachment to the crown, ranging from an extended cingulum to a broad, well-linear cusp extending beyond the tooth's incisal edge. It may also attach to the

incisal edge to create a T-shaped contour or, if more cervical, a Y-shaped crown contour [6]. Moreover, it seems to be a V-shaped radiopaque structure overlapping the affected crown with its apex directed incisally in the radiograph [11].

Hattab in 2014 stated that the prevalence of talon cusps varies according to the population from less than 0.06 to 7.7% with racial differences. This anomaly was reported to be higher among the Arab population compared to Caucasians and Negroes. Specifically, the prevalence of talon cusps among the Malaysian population is 5.2% [4]. Maxillary incisors are the most frequently affected teeth where 55% occur in the permanent maxillary central incisor and 33% in the permanent maxillary lateral incisor [12], followed by mandibular incisors 6%, and maxillary canines 4% [13]. The affected teeth are reported to have appeared more in males than females in both primary and permanent dentitions.

The occurrence of talon cusps on mandibular anterior teeth is an extremely rare entity. In addition to it, the present case had talon cusps in the permanent mandibular lateral incisor which was associated with a periapical abscess as late detection and further complication of this anomaly.

2. CASE REPORT

A 15-year-old Malay female came to the Paediatric Dental Clinic in Faculty of Dentistry, with the chief complaint of tooth sensitivity on her lower anterior region. Her medical and family histories were unremarkable whereas the dental history revealed that she had a previous restoration done on her maxillary posterior tooth.

Extraoral examination disclosed no significant findings. Intra-oral examination revealed a presence of a cusp-like projection on the lingual surface of the permanent mandibular right lateral incisor including a deep fissure on the labial surface which can be seen in Fig. 1. Additionally, the affected tooth also had mobility grade II. An intraoral periapical radiograph was taken and the presence of radiopacity was noted on the crown of the tooth indicating a talon cusp. Furthermore,

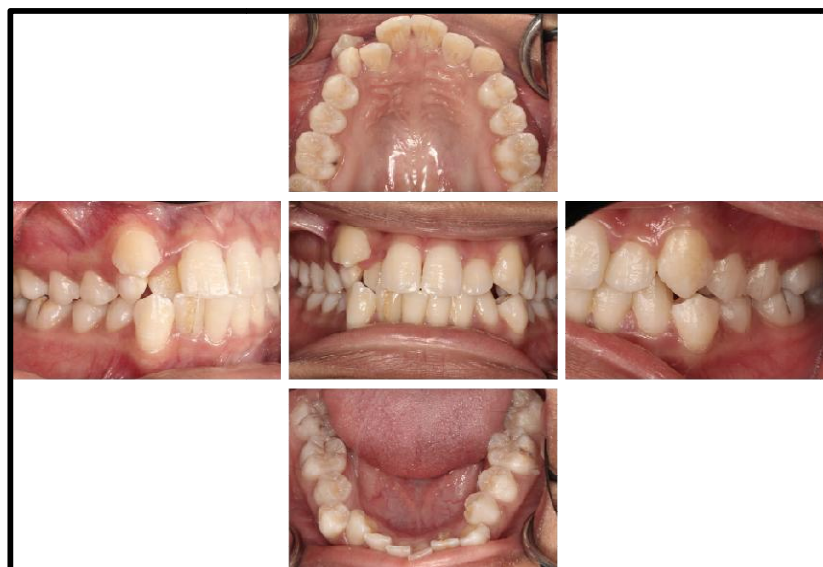


Fig. 1. Intra-oral photographs showing deep fissure on the labial surface of permanent mandibular right lateral incisor, extra-cusp on the lingual surface and presence of crowding and cross bite

a radiolucent lesion was seen at the crown and the periapical area of the particular tooth which indicates caries and a periapical lesion, respectively. A panoramic radiograph was taken to detect possible additional dental anomalies and for orthodontic assessment (Fig. 2a–b). Sensibility tests including percussion, cold test and electrical pulp test were performed to investigate the vitality of the affected tooth. The controlled measures were taken with the permanent mandibular left incisor as a reference. The results revealed that the affected tooth was non-vital. According to these results, the diagnosis of permanent mandibular right lateral incisor with talon cusp type I and pulp necrosis as well as asymptomatic apical periodontitis was made. Hence, non-surgical endodontic treatment of the tooth was planned. Dental examination of the other teeth disclosed no noticeable abnormalities. All the permanent first molars had caries (ICDAS 02 and 03) and mobility on maxillary primary right canine was noted. Furthermore, she had Class I malocclusion with skeletal Class II pattern associated with moderate crowding on the anterior region of the upper and lower arch. Crossbite between maxillary permanent right lateral incisors and mandibular permanent right canine was present (Fig. 1). Oral hygiene was fair with mild gingivitis. Therefore, routine scaling and oral prophylaxis, tooth coloured restorations of carious teeth, exodontia of primary canine and

root canal treatment of affected tooth with talon cusp were performed. The parents and the patient were informed about the condition.

Endodontic treatment was performed in 3 visits. During the first visit, after moisture control protocol was established, the access cavity was done on the palatal surface by removing the talon cusp. Apex locator was used to determine the working length. Cleaning and shaping of the canal with constant irrigation of 2.5% Sodium Hypochlorite was done during the second visit. Intracanal medicament was also done with calcium hydroxide for two weeks. After two weeks, the patient returned to the clinic symptom-free and the root canal was obturated with Gutta-percha and the permanent restoration was done with composite (Fig. 3a-b). One-month post-operative visit revealed that the patient was asymptomatic and had no new complaints pertaining to the endodontic treatment. A 6-month follow-up visit including clinical and radiographic assessment was performed. The tooth was a symptomatic clinically and showing a reduction in the radiolucency indicating a resolution of the periapical lesion (Fig. 4). Currently the patient is under a 3-month review since the patient is at high caries risk. Moreover, the patient was referred to the orthodontist for initiating orthodontic treatment to correct her malocclusion.



Fig. 2a. Preoperative periapical radiograph of the permanent mandibular right lateral incisor showing the presence of talon cusp



Fig. 2b. Panoramic view of the dentition showing the periapical lesion on the permanent mandibular right lateral incisor



Fig. 3a. An immediate postoperative periapical radiograph of the permanent mandibular right lateral incisor with talon cusp after root canal treatment



Fig. 3b. Intra-oral photographs showing the composite restoration on the labial and lingual surfaces of permanent mandibular right lateral incisor



Fig. 4. A 6-month follow-up periapical radiograph of the permanent mandibular right lateral incisor with talon cusp showing reduction in the radiolucency

3. DISCUSSION

There are many clinical problems noted with talon cusp cases including plaque retention and caries susceptibility in the developmental grooves, traumatic occlusion, and aesthetic concerns in cases of facial talon cusp with displacement of the affected and opposing teeth, attrition of the opposing teeth, periodontal problems, hypersensitivity, pulpal necrosis and periapical pathosis due to excessive attrition accidental cusp fracture, irritation of the tongue during speech and mastication, and temporomandibular joint pain due to excessive occlusal forces [12,14]. Therefore, it is critical for dental practitioners to provide early diagnosis, intervention, and definitive treatment for the patients with such anomaly.

Upon review of the literature, the treatment modalities of talon cusp vary according to the associated diagnosis. Treatment and management of talon cusp are usually based on patient presentation and symptoms which should be as conservative as possible [15]. The treatment options ranged from simple prophylactic measures such as fissure sealants or tooth coloured restorations to the invasive approach that include total cusp reduction followed by pulpotomy, root canal treatment, or tooth extraction followed by orthodontic treatment and prosthetic rehabilitation [11].

Since talon cusps are plaque retentive, preventive treatments such as oral prophylaxis and placement of sealant were performed and reported for small talon cusps that are asymptomatic [16]. Moreover, Nuvvula et al. (2014) reported a different approach including reduction of the entire thickness of enamel at the bulk of the talon cusp by merging the borders with the tooth surface in two planes. Then, preventive resin restoration was performed that included placement of fluoride varnish to reduce sensitivity and stimulate reparative dentine formation for pulp protection [17]. Both treatments were performed for paediatric patients and the issue was recognized and addressed immediately. However, the treatment option differs when there are cases of pulpal involvement associated with the talon cusps. In the present case, the root canal treatment performed is similar to Gürhan et al. (2017), which had reported that two visits involving root canal treatment was done for an adult patient due to symptomatic apical periodontitis. Similarly, Lakshman et al. (2013) referred an adult patient for root canal procedure due to the presence of bilateral talon cusp on maxillary incisors which were associated with calcification of the pulp canal. However, in our case, a paediatric patient was involved and was too early for the child to have endodontic treatment at this age. No other

treatment option was available to avoid such invasive approaches due to late presentation. A strong evidence of genetic background of talon cusp was reported by Elmubarak. Therefore, the patients' siblings were called for dental examination to provide early preventive measures in case they have a similar anomaly.

4. CONCLUSION

Despite talon cusp being a rare entity in daily dental practices, proper diagnosis and appropriate management are required. Dental practitioners should have good knowledge and thorough understanding of dental developmental anomalies, their variations as well as the clinical implications for early detection and avoiding any further complications that may happen. Furthermore, the detection and evaluation of the various symptoms are necessary to diagnose the condition and to identify the required care.

CONSENT

Written consent was obtained from the parents for the agreed dental treatment and the use of her records or photographs for publication purposes.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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