

## Occurrence of talon cusp on a geminated maxillary central incisor: a case report

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**Abstract:** This article reports an uncommon case of talon cusp on a geminated permanent maxillary central incisor, including details of the clinical and radiographic findings and treatment. A 28-year-old woman presented at the university dental clinic, and intraoral examination revealed a maxillary central incisor of abnormal size with a prominent accessory cusp on the lingual aspect. The case was diagnosed as talon cusp on a geminated tooth. Early diagnosis of this anomaly is important since it may cause clinical problems such as esthetic concerns, caries and tooth crowding. In the present case, these anomalies did not complicate the subsequent endodontic treatment. (J Oral Sci 51, 297-300, 2009)

**Keywords:** talon cusp; tooth abnormality; tooth gemination.

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### Introduction

Talon cusp is a developmental disorder characterized by the presence of an accessory cusp at the cingulum or at the cemento-enamel junction of a deciduous or permanent tooth (1). This accessory cusp, which can vary in size, is formed by enamel and dentin, and may or may not have a projection of pulp tissue (2).

This is a relatively rare anomaly, with a prevalence ranging from 0.04% to 10% (3), and occurring more in

males than in females (4). It affects mainly the maxillary lateral incisor, uni- or bilaterally, and in some cases may also affect the central incisors, premolars, canines and molars (3).

Even though it may occur in isolation, the talon cusp may also be associated with other variations in crown anatomy, such as paddle-shaped incisors (5), which exhibit prominent lateral lingual margins, creating a depression. It is also frequently associated with supernumerary teeth, *dens invaginatus*, congenitally missing teeth, odontoma and impaction. Talon cusps may also be present in individuals affected by the Mohr, Sturge-Weber and Rubinstein-Taybi syndromes (6).

Association of talon cusp with tooth gemination is very rare, and few such cases have been reported (2,7-9). Tooth gemination is a developmental anomaly that occurs after failure of tooth division, whereby a single tooth germ attempts to divide, giving rise to a single wide tooth with a bifid crown and a single root canal (9). It is observed more frequently in the deciduous than in the permanent dentition, with prevalences of 1% and 0.1%, respectively (10). The most affected teeth are the maxillary incisors and canines.

This paper reports a case of talon cusp on a geminated tooth and describes the endodontic therapy performed.

### Case Report

The present case was approved by the institutional ethics committee. A female patient, aged 28 years, presented at the university dental clinic with an esthetic complaint and was referred to the restorative dentistry department, where observation revealed that the maxillary right central incisor had a wide and bifid crown (Fig. 1). The patient reported that no other individual in the family had this anomaly, and

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that there had been no anomaly of the deciduous dentition or a history of trauma.

Intraoral examination revealed that, in addition to the abnormal crown size, there was a well defined and



Fig. 1 Buccal aspect of the maxillary right central incisor, with a wide and bifid crown.



Fig. 2 (a, b) Occlusal view, indicating the presence of an accessory cusp extending from the gingival region to the cemento-enamel junction—talon cusp.

prominent accessory cusp on the lingual aspect projecting from the cemento-enamel junction, which was diagnosed as talon cusp or *dens evaginatus* (1,9,11,13) (Fig. 2). A carious lesion was observed at the junction between the palatal aspect and the accessory cusp, and the patient was referred to the endodontics department for evaluation of pulp involvement.

Radiographic examination revealed that the tooth had a single root with a single pulp chamber dividing into mesial and distal root canals, which were joined at the apical third (Fig. 3), a characteristic feature of tooth gemination. Therefore, based on the clinical and radiographic findings, the case was diagnosed as talon cusp associated with tooth gemination.

Since the patient exhibited a carious lesion at the junction between the talon cusp and the lingual aspect, removal of the carious tissue ultimately led to pulp exposure and the

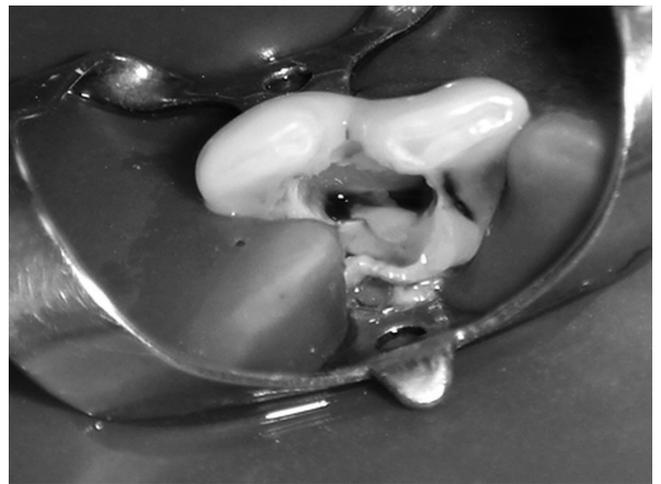


Fig. 4 Pulp exposure after removal of carious tissue and the accessory cusp.

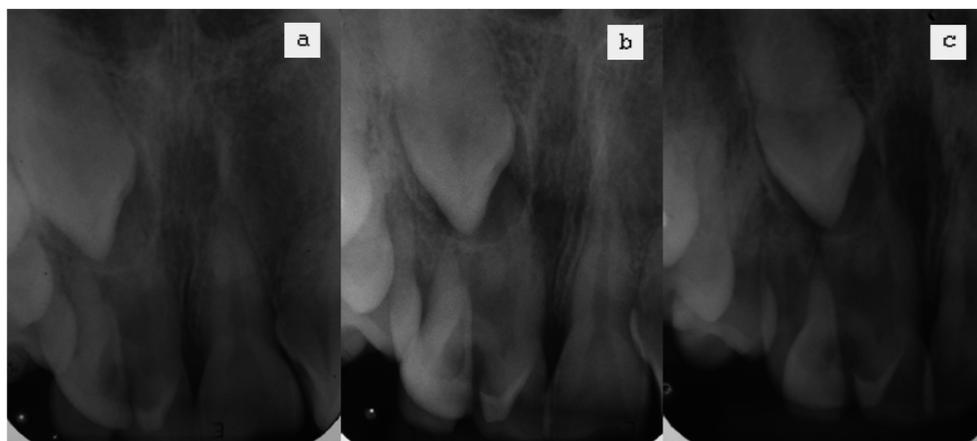


Fig. 3 Diagnostic radiograph: (a) mesio-radial; (b) orthoradial; (c) distoradial.

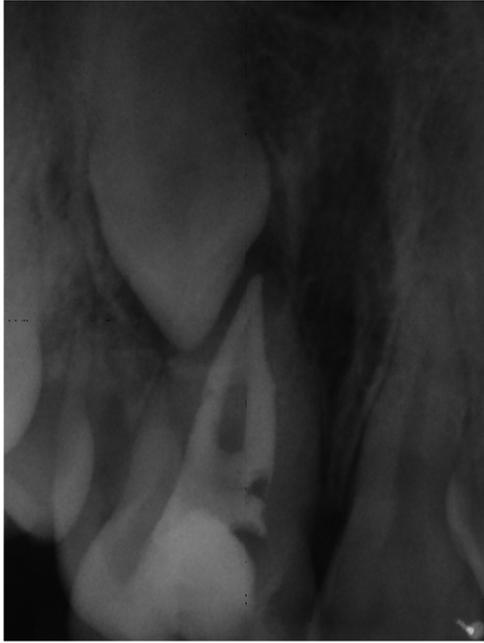


Fig. 5 Final radiograph after endodontic treatment.

need to perform endodontic treatment (Fig. 4). Local anesthesia was performed, followed by removal of the carious tissue and talon cusp, and placement of rubber dam. Afterwards, the pulp tissue was removed and odontometry was performed. Root canal preparation was performed with the Profile .04 system (Maillefer/Dentsply, Ballaigues, Switzerland) and the root canal was filled with gutta percha points, thermoplastified using the Touch'n Heat system (SybronEndo, Orange County, California, USA) and the sealer AH Plus (Dentsply, DeTrey, Konstanz, Germany). Figure 5 shows the final radiograph after the endodontic treatment.

### Discussion

The etiology of talon cusp is still unknown, even though there is evidence of a multifactorial nature including genetic and environmental factors (14). Disturbances during the period of tooth morphodifferentiation may affect their shape without altering the function of ameloblasts and odontoblasts, possibly leading to formation of new portions, such as accessory cusps composed of normal enamel and dentin. Hyperactivity of these cells would lead to formation of a talon cusp (8).

The etiology of tooth gemination is also unknown, but is suggested to result from trauma occurring during development of the tooth bud. Evidence obtained from case studies suggests that this anomaly has a hereditary tendency, similar to that affecting the dental lamina and resulting in

a supernumerary tooth. The heredity probably has recessive autosomal inheritance or dominant autosomal inheritance with little penetration. It seems that gemination is caused by complex interactions of a variety of genetic and environmental factors (9).

Talon cusp has been classified by Hattab et al. (15) into three basic types according to its formation and extent: type I (talon), characterized by an additional cusp projecting from the palatal aspect of an anterior tooth and extending for half the distance between the cemento-enamel junction and the incisal edge; type II (semi-talon) is characterized by an additional cusp 1 mm in extent or more, extending from the cemento-enamel junction for less than half the distance to the incisal edge; and type III (trace talon) manifests as a prominent cingulum and its variations. According to the classification of Hattab et al., the present case of talon cusp would have been type I, characterized by various clinical complications such as occlusal interference, caries, attrition, tongue injury and malocclusion.

Tooth gemination occurs more frequently in the anterior teeth, causing esthetic problems, bad positioning and impaction of adjacent teeth due to the greater volume of the tooth crown (11). In the present case, the patient sought treatment for esthetic reasons, and there was impaction of the canine. In addition to the esthetic concerns, there was a carious lesion at the union between the talon cusp and the lingual aspect. When the caries was removed, the accessory cusp became unsupported and also had to be removed. The presence of this developmental anomaly did not complicate the endodontic treatment, since the accessory cusp was removed.

The prognosis of teeth with talon cusp depends on the timing of diagnosis. If it is diagnosed early, the accessory cusp may be progressively removed with polishing diamond bur every two months. The abraded area should be treated with fluoride varnish. At the last appointment, to avoid postoperative sensitivity, this area should be covered with resin composite. This procedure can prevent premature contact and reduce the risk of caries (12). The present case was diagnosed late, when there was already caries and pulp involvement. Reports describing the treatment of tooth gemination are scarce and inconclusive because this is an unusual condition, especially in the permanent dentition.

Endodontic treatment of teeth showing this type of anatomical variation requires more attention during certain phases, especially in diagnostic radiology, and in access to, and location of root canals. The initial radiography should be conducted from three angles – ortoradial, mesioradial and distoradial – to allow better viewing of the tooth. Planning of the endodontic treatment was done after a detailed study of these images.

In the present case, three radiographs were taken from different angles, and distoradial radiography allowed a better view of the apical region. Caries was removed, along with unsupported dentin structures that interfered with direct access to the root canals. Root preparation was performed with rotary instruments, which facilitated this phase of the endodontic treatment. Filling of the root canal was performed by the gutta percha thermo-plastification technique, using the Touch'n'Heat system. This technique permitted proper filling of the apical third, which was a critical area because of the connection between the mesial and distal canals.

Despite the fact that caries removal at the talon cusp led to pulp exposure, the geminated tooth and the talon cusp itself did not interfere with endodontic therapy.

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