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Case Report

Displacement and pulpal involvement of a maxillary incisor associated with a talon cusp: report of a case

Maroto M, Barbería E, Arenas M, Lucavechi T. Displacement and pulpal involvement of a maxillary incisor associated with a talon cusp: report of a case. © Blackwell Munksgaard, 2006.

Abstract – The talon cusp is a relatively uncommon dental anomaly manifested as an accessory cusp-like structure on the crown of anterior teeth. The presence of a talon cusp can cause clinical problems. This article reports the case of a patient presenting a talon cusp affecting the permanent maxillary right central incisor causing clinical problems related to caries, displacement of the tooth, occlusal position and tendency to dental traumatism. The management of this tooth included caries removal and reduction of the cusp. Pulp-capping with calcium hydroxide was required because of the presence of pulp horn extensions in the talon cusp.

Myriam Maroto, Elena Barbería, Marcela Arenas, Tania Lucavechi

Pediatric Dentistry Attention Program, School of Dentistry, Complutense University of Madrid (UCM), Madrid, Spain

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Myriam Maroto, Facultad de Odontología, Programa de Atención Odontológica Integral en pacientes en edad infantil, Estomatología IV, Universidad Complutense de Madrid, Avda. Complutense sn. Ciudad Universitaria, 28040 Madrid, Spain
Tel.: 91 394 20 44
Fax: 91 394 19 44
e-mail: myriammaroto@yahoo.com

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A talon cusp is a tooth developmental anomaly characterized by the presence of an accessory cusp-like structure in the area of the palatal cingulum of incisors and canines. This anomaly, described for the first time by Mitchell in 1892, was named as talon cusp by Mellor and Ripa because of its resemblance in shape to an eagle's talon (1–8). It is also considered as a 'dens evaginatus' of anterior teeth (5, 9–14). The talon cusp is composed of enamel and dentine and it is possible to find in it varying extensions of pulpal tissue (1, 5, 9–12). The structure can occur in either maxillary or mandibular anterior teeth in both the primary and permanent dentition, and even if it is usually located on the palatal surface it has also been described on the labial surface. Bilateral occurrence has also been reported (1–4, 13, 14).

Hattab et al. (6, 11) proposed a classification system for these anomalous cusps, on the basis of the degree of cusp formation and extension: type 1 (talon) is the structure that projects from the palatal surface of the tooth and extends at least one half the distance from the cementoenamel junction to the incisal edge; type 2 (semitalon) is the additional cusp with a length of 1 mm or more, but extending less than one half the distance from the cementoenamel junction to the incisal edge; type 3 (trace talon) is an enlarged and prominent cingulum (6, 11).

The presence of a talon cusp in the dentition is a relatively uncommon finding. Some authors consider that 73 cases have been reported since the first description of this anomaly in 1892 (1, 15). But the prevalence of talon cusp varies considerably between different articles, from 0.006 to 7.7%. These differences are probably due to the lack of precise criteria for classifying an accessory cusp as a talon cusp, and the variation between different ethnic groups (3, 5–7, 11, 13, 14). As reported in several studies, this anomaly occurs with a higher incidence in Mongoloid populations than in Caucasians and

Negroes, and men have higher frequency than women (3, 10, 13, 15). The occurrence of talon cusp is three times higher in the permanent than in the primary dentition (1–6, 10). In most of the cases (3, 5, 6, 11, 12, 14), the maxilla seems to predominate, and the maxillary lateral incisors are the most frequently involved (67%), followed by the central incisors (24%) and canines (9%).

The aetiology of talon cusps is unknown, though it is thought to be a combination of genetic and environmental factors. Most of the authors consider that, as with other dental abnormalities, talon cusp occurs during the morphodifferentiation stage of odontogenesis, when genetic and environmental disturbances might affect the anatomy of teeth. Developmentally, they may be a result of an outfolding of the enamel organ or hyperproductivity of the dental lamina (1, 3, 5, 7, 14, 15).

The presence of talon cusp has not been reported as an integral part of any specific syndrome, but it has been described as highly prevalent in patients with Rubinstein-Taybi syndrome, Mohr's syndrome, Sturge-Weber syndrome, Ellis van-Creveld syndrome and Incontinentia Pigmenti Achromians syndrome (1, 3, 14–16).

Clinical problems attributed to talon cusp include poor aesthetics, caries, occlusal trauma, displacement of tooth, periodontal problems, irritation of the tongue and accidental cusp fracture causing pulpal exposure or periapical pathology. Clinical management of this anomaly can be very different depending on the size and shape of the affected tooth and on the problems caused by this enlarged cusp (1, 3, 6, 8, 16).

This article reports the case of a patient presenting a talon cusp in the permanent maxillary right central incisor, causing displacement of the tooth and tendency to accidental traumatisms.

Case report

An 8-year-old boy was referred to the Pediatric Dentistry Attention Program of the Complutense University in Madrid. The patient appeared healthy and medical history did not reveal any severe illness or general developmental disorder. No dental anatomical abnormalities were found in any family member. The dental history of the patient showed that the only treatment received previously was the application of fissure sealant on the occlusal surface of the first permanent molars and on the palatal surface of the permanent maxillary right central incisor.

Clinical intraoral examination revealed a normally developing mixed dentition. The presence of an enlarged cingulum in the palatal surface of the permanent maxillary right central incisor was detected. This accessory cusp-like structure was prominent, extending two-thirds from the cemento-enamel junction to the incisal edge. The cusp projected away from the rest of the crown (Fig. 1). The crown of the affected tooth did not look larger than the one of the other maxillary central incisor (Fig. 2). A diagnosis of unilateral talon cusp of the permanent maxillary right central incisor was made on the basis of clinical observations. A deep-extended carious developmental groove was present at the junction of the anomalous cusp with the palatal surface of the affected incisor, destroying the tip of the cusp (Figs 1 and 2). This maxillary right central incisor was also clearly labially displaced (Fig. 3a,b). Moreover, the incisal edge of this tooth had a depression on the enamel surface similar to the beginning of a crown germination and this sign of anatomical abnormality could also be seen in the incisal edge of the mandibular right central incisor (Fig. 3b).

Fig. 1. Prominent accessory cusp on the palatal surface of the permanent maxillary right central incisor.

Fig. 2. Facial view of the maxillary incisors.

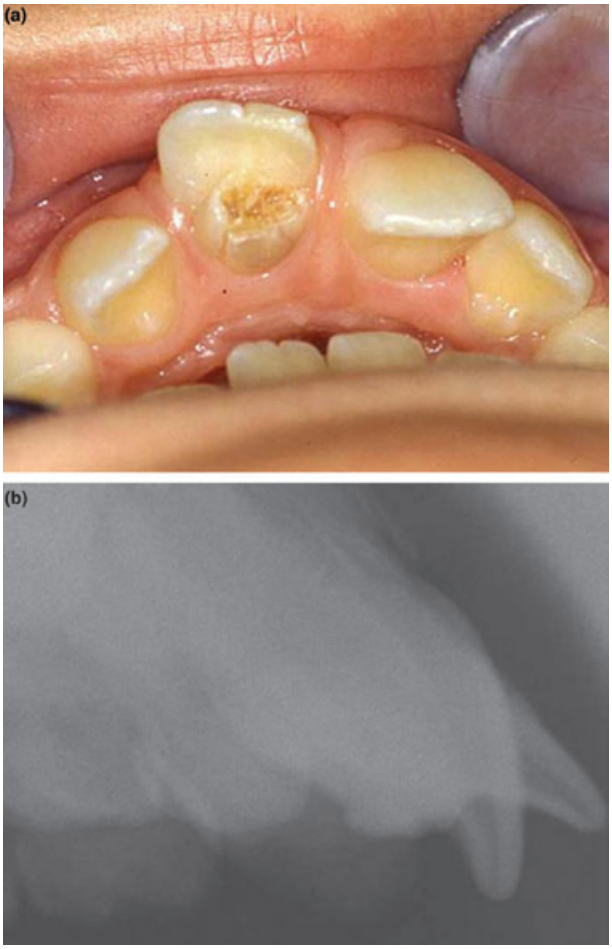

Fig. 3. (a) Clinical image showing the displacement of the permanent maxillary right central incisor. (b) Lateral radiograph showing that the permanent maxillary right central incisor is labially displaced.

The periapical radiograph showed that both central incisors were in a similar physiological moment of development, with an open apex. The image of the pulp canal and the pulp chamber was also similar in both incisors.

The treatment plan included removal of the carious lesion and the restoration of the tooth. It was also decided to reduce the talon cusp to avoid occlusal interferences and correcting the position of the affected tooth orthodontically.

The treatment started with local anaesthesia. A rubber dam was placed and the carious lesion was removed with rotatory instruments. The enamel and dentine of the talon cusp were also reduced, giving a normal anatomy to the tooth. This reduction would help in obtaining a correct occlusal relation after the orthodontic treatment. Once the carious lesion was removed, three pulp horn extensions were detected under the dentine tissue (Fig. 4). Pulp-capping with calcium hydroxide was then carried out to protect the pulp and to permit

Fig. 4. Pulp horn extensions of the pulp detected after removal of the carious lesion.

secondary dentine formation. Finally, the cavity was sealed with glass–ionomer cement and composite (Fig. 5). After the treatment, a control periapical radiograph was taken (Fig. 6) and the patient was requested to attend the clinic for follow-up every 3 months.

Fig. 5. Clinical image of the affected incisor after treatment.

Fig. 6. Control periapical radiograph of the treated maxillary incisor.

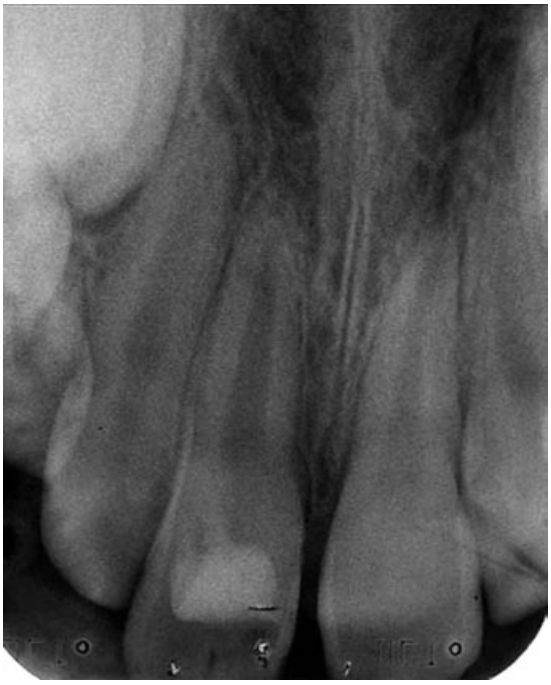

Fig. 7. Control periapical radiograph 1 year and 4 months after the treatment. Physiological root development of the treated incisor can be seen.

One month after the treatment, the patient came to the clinic suffering a dental injury with a soccer ball. Intraoral examination showed a small enamel fracture of the incisal edge of the maxillary right central incisor. No treatment was required and the periapical radiograph showed a normal development of the root. Three months later, the patient came back to the clinic for a control visit, referring a new dental traumatism caused by the hit against a street lamp on the same treated tooth. No pathological lesions were found during clinical and radiographic examinations.

Clinical controls were repeated every 3 months without finding any pathological sign. A year and 4 months after the treatment, physiological root development of the treated immature incisor could be detected on the periapical radiograph (Fig. 7). This showed the vitality of the pulp and therefore the success, of the treatment on the incisor presenting the talon cusp. Follow-up controls and orthodontic treatment could not be undertaken because the patient moved to another city.

Discussion

The presence of a talon cusp is, in itself, not indicative of dental treatment, unless it is associated with clinical problems such as compromised aesthetics, occlusal interferences, displacement of tooth, caries, periodontal problems or irritation of the tongue (1, 3, 6, 8, 16). In the case reported in this article, the presence of a talon cusp in the palatal surface of a permanent central incisor caused an extended caries lesion. Early diagnosis and management of this anomaly is important in order to prevent caries development and pulp infection. Pulp infection and pulp necrosis are frequent in talon cusp structures because of the pulp extension (1, 5, 9–12). In immature teeth with open apex early diagnosis and early treatment of the carious lesion are required because pulp necrosis can disturb root development (9–12, 17–19). In the reported case pulp extensions were found in the talon cusp, appearing in the crown cavity made after removal of the carious lesion, as three well-defined pulp horn extensions. Pulp-capping with calcium hydroxide permitted the protection of the pulp and physiological root development, as described in other cases (17–19).

Another possible clinical problem caused by the presence of a talon cusp is the displacement of the affected tooth. The central incisor was labially displaced and the tooth seemed to be more displaced each day. This displacement could have been produced by an anomalous eruption of the incisor due to its enlarged size and by an occlusal interference with the inferior teeth. One of the consequences of this dental displacement is the tendency to accidental traumatisms. In such cases, reduction of the talon cusp and proper orthodontic treatment have been advocated (3, 5, 7, 10, 12, 15).

A talon cusp can appear in association with other dental anomalies (4, 7, 11, 14–16). We detected the presence of a depression on the enamel surface consistent with the beginning of a crown germination in the tooth affected by the talon cusp. This finding is similar to the one described by Hattab et al. (14) who found both anomalies in a permanent maxillary left central incisor. The management of this tooth was also very similar.

Finally, even if clinical treatment is not required in all the cases of talon cusp, it is important to know the possible consequences of this anomaly to carry out an early diagnosis and treatment, most of all in cases where the pulp is involved due to a carious lesion or trauma.

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