

Management of supernumerary tooth in association with talon cusp on the primary incisor

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ABSTRACT A talon cusp is an uncommon anomaly in the primary dentition. Since it was first reported in 1977, there have been only 37 documented cases in normal children. Most involved the primary maxillary central incisors, with five cases where the primary maxillary lateral incisors were affected. All the cases with talon cusps on the primary maxillary central incisors were not associated with any odontogenic abnormality of the corresponding permanent successor. However, in the five cases with talon cusps on the primary maxillary lateral incisors, three cases were associated with supplemental lateral incisors; one case had a supernumerary tooth while the condition of the permanent successor was not mentioned in the other case. In the present study, the primary maxillary lateral incisors in all three of the children with talon cusps were associated with supernumerary teeth which were all conical-shaped. A conservative approach was used to manage these non-inverted conical supernumerary teeth.

Introduction

A frequently quoted report, which is thought to be the first report of a talon cusp, appeared more than a century ago. Mitchell ¹ described a female patient with an abnormal permanent maxillary left central incisor with a curved horn-like process extending from the palatal surface to the incisal edge and the pulp extending almost into the tip of the process. In fact, 5 years earlier, in 1887, two cases with supernumerary cusps on the palatal surfaces of

permanent maxillary incisors and canines, which extended not more than half the distance between the cemento-enamel junction and incisal edge, had been published ². Different terms have been used to describe the same anomaly; for example, in 1970, Mellor and Ripa ³ used the term “talon cusp” because the anomaly resembled an eagle’s talon. They defined a talon cusp as a cusp-like structure of variable length projecting from the cingulum area of a maxillary or mandibular incisor which may extend past the incisal edge of the tooth. The term “talon cusp” has been used loosely in various studies and no strict diagnostic criteria exist for its definition. Several researchers have defined the talon cusp differently ⁴⁻⁶. A more detailed classification of talon cusps was proposed by Hattab *et al* ⁷ who classified talon cusps into three types. Due to the reporting of facial talon cusps ⁸⁻¹⁰, the classification was modified to include the facial talon cusp ¹¹. Recently, a few reports have described the occurrence of both facial and palatal talon cusps on the same tooth ¹²⁻¹⁴ which has led to a slight refinement of the definition ¹⁴. A type 1 (major) talon was defined as a morphologically well-defined additional cusp that projects from the facial and/or palatal/lingual surface of an anterior tooth and extends at least half the distance from the cemento-enamel junction to the incisal edge. A type 2

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(minor) talon extends more than one fourth, but less than half the distance from the cemento-enamel junction to the incisal edge, while a type 3 (trace) talon is an enlarged or prominent cingulum and its variations which occupy less than one fourth the distance from the cemento-enamel junction to the incisal edge.

Mellor and Ripa³ stated that a talon cusp, which was an unusual and relatively rare anomaly, had only been reported on permanent teeth. Although a talon cusp was reported in the primary dentition of cleft lip and/or palate patients where dental anomalies are more common¹⁵, the first report of a talon cusp in the primary dentition of a non-cleft lip and/or palate patient was published in 1977. A talon cusp projecting from the cervico-lingual ridge to within 2 mm of the incisal edge of a discolored primary left maxillary central incisor in a 4-year-old Filipino girl was described¹⁶. We performed a literature review and found that a total of 57 cases of talon cusps in the primary dentition have, to date, been reported in the English literature. This includes 13 cases in syndromic or cleft lip and/or palate patients^{14,15,17-20} and a further seven cases in a survey which did not provide details²¹. Among the 37 documented cases in normal children, 31 involved maxillary central incisors, one case on the mandibular lateral incisor²², and five cases were identified on the maxillary lateral incisors²³⁻²⁷. Of these 37 cases, 20 were Chinese; seven were Asians including four Indians, a Malaysian, a Japanese, and a Filipino; seven were non-Asians and three cases did not mention the ethnic origin. The present report describes the clinical management of supernumerary teeth which were associated with talon cusps on the primary maxillary lateral incisors in three Chinese children.

Case reports

Case 1

A 9.5-year-old healthy Chinese boy attended for a routine dental check-up in a regional school dental clinic. The clinical examination showed that the patient was in the mixed dentition stage, with his permanent incisors erupted, except the maxillary right lateral incisor. The retained primary maxillary lateral incisor had a tooth-colored filling on the buccal surface and a talon cusp which exhibited substantial attrition on the palatal surface. Due to the erupting rotated permanent right central incisor, an occlusal radiograph was taken by the previous dentist, when the patient was 7 years old, which showed that there was a conical supernumerary tooth forming in the

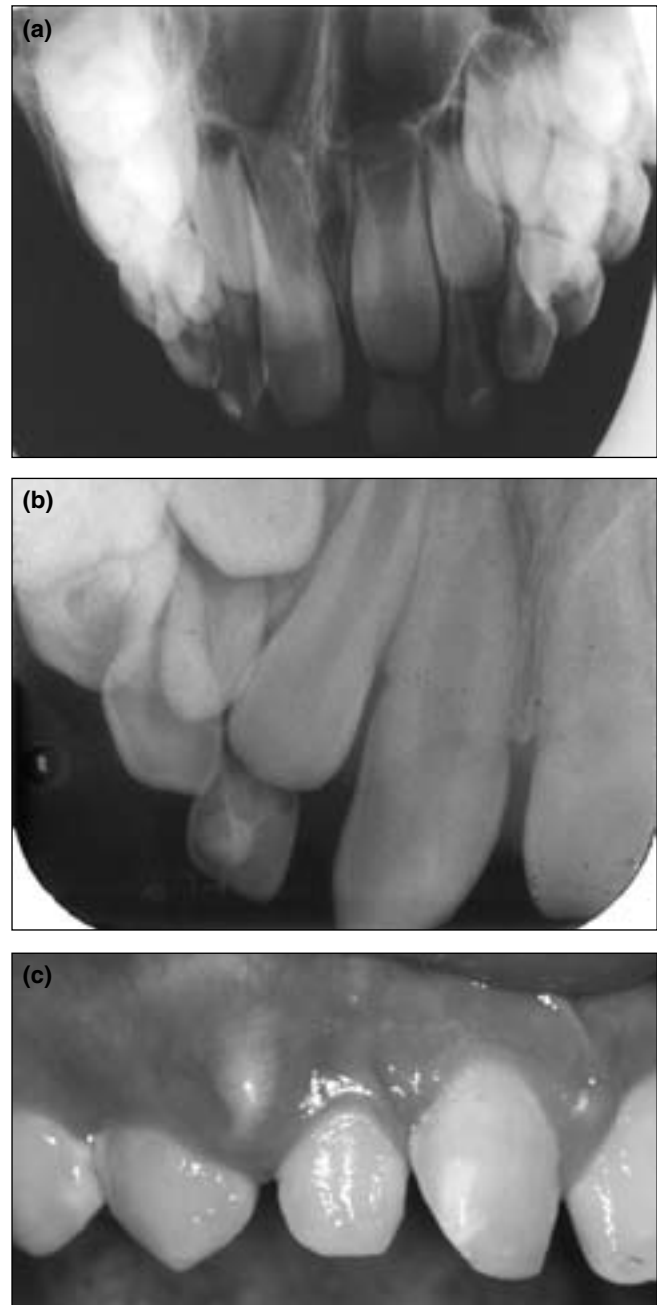


Figure 1 (a) Upper occlusal radiograph taken at 7 years of age showing a conical supernumerary tooth forming in the region of the right lateral incisor. (b) Periapical radiograph showing a conical supernumerary tooth forming distal to the lateral incisor. (c) The conical supernumerary tooth was just visible under the thin buccal mucosa

region of the right lateral incisor (Figure 1a). A periapical radiograph (Figure 1b) and a panoramic radiograph taken during the consultation visit showed that the root of the retained primary lateral incisor had been resorbed. Utilizing the vertical parallax technique²⁸, the conical su-

pernumerary tooth was diagnosed as buccally positioned relative to the permanent right canine and lateral incisor but the supernumerary tooth was not palpable clinically. The treatment plan was discussed with the parents but they preferred to review the eruption of the supernumerary tooth. Therefore, half-yearly reviews were arranged and when the patient was aged 11 years and 10 months, all the permanent canines and premolars had erupted and the conical supernumerary tooth lay just under the thin mucosa buccal to the lateral incisor and canine without affecting their alignment. A year elapsed with no further eruption of the supernumerary tooth (Figure 1c). A periapical radiograph showed that the root apices of the incisors and canines had formed while that of the supernumerary was yet to complete formation. At that visit, the supernumerary tooth was easily removed after raising a small one-sided mucoperiosteal flap, without any bone removal. Healing was uneventful.

Case 2

A Chinese boy aged 9 years and 5 months attended for a routine dental check-up in a regional school dental clinic; his medical history was non-contributory. The clinical examination revealed that he was in the mixed dentition stage and all the permanent incisors except the maxillary right lateral incisor had erupted. The firmly retained primary right lateral incisor was associated with a type 1 talon cusp which extended to the incisal edge (Figure 2a). An upper occlusal radiograph (Figure 2b) and a panoramic radiograph showed that a conical supernumerary tooth had formed between the right central incisor and the unerupted lateral incisor. The supernumerary tooth could not be palpated clinically. Utilizing the vertical parallax technique²⁸, the tooth was located in the arch adjacent to the resorbing root of the primary lateral incisor. At that visit, the retained primary lateral incisor was extracted under local anesthesia. The conical supernumerary tooth could be seen inside the socket and was subsequently elevated without any bone removal. A 4-month review showed that half of the crown of the lateral incisor had erupted into the oral cavity and the tooth was in good alignment.

Case 3

A healthy Chinese boy aged 6 years and 10 months, who attended for a routine dental check-up in a regional school dental clinic, was found to be in the early mixed dentition stage with two mandibular permanent incisors erupted. The primary maxillary lateral incisor was associated with

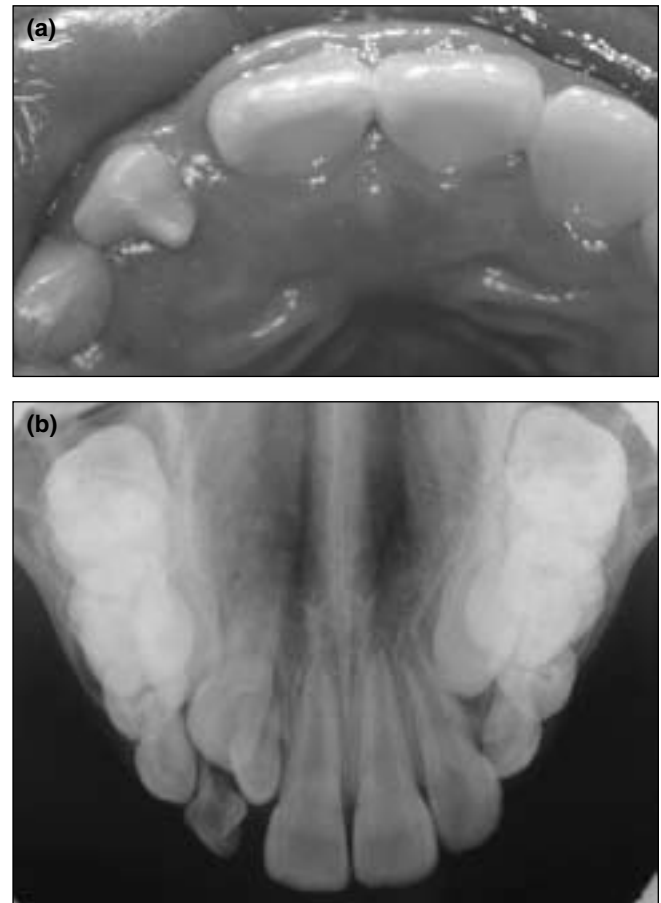


Figure 2 (a) A retained primary maxillary right lateral incisor with a type 1 talon cusp extending to the incisal edge. (b) Upper occlusal radiograph showing a conical supernumerary tooth between the right central and lateral incisors

a type 1 talon cusp which extended up to the incisor edge. An occlusal radiograph revealed an unerupted, non-inverted conical supernumerary tooth in the region of the right central incisor. The root of the primary right central incisor was beginning to resorb while its antimere had exfoliated naturally. A review appointment 2 months later showed that the permanent left central incisor was erupting and after a further 11 months, the right central incisor was fully erupted. At the age of 7 years and 11 months, an upper occlusal radiograph (Figure 3a) showed that the crown of the left lateral incisor was associated with an invagination, while the right lateral incisor had a malformed crown and a conical supernumerary tooth was mesially located. When the patient was 8 years and 9 months old, the permanent left lateral incisor had fully erupted and the primary right lateral incisor had exfoliated but the permanent right lateral incisor and the conical supernumerary tooth had not yet erupted. Four months

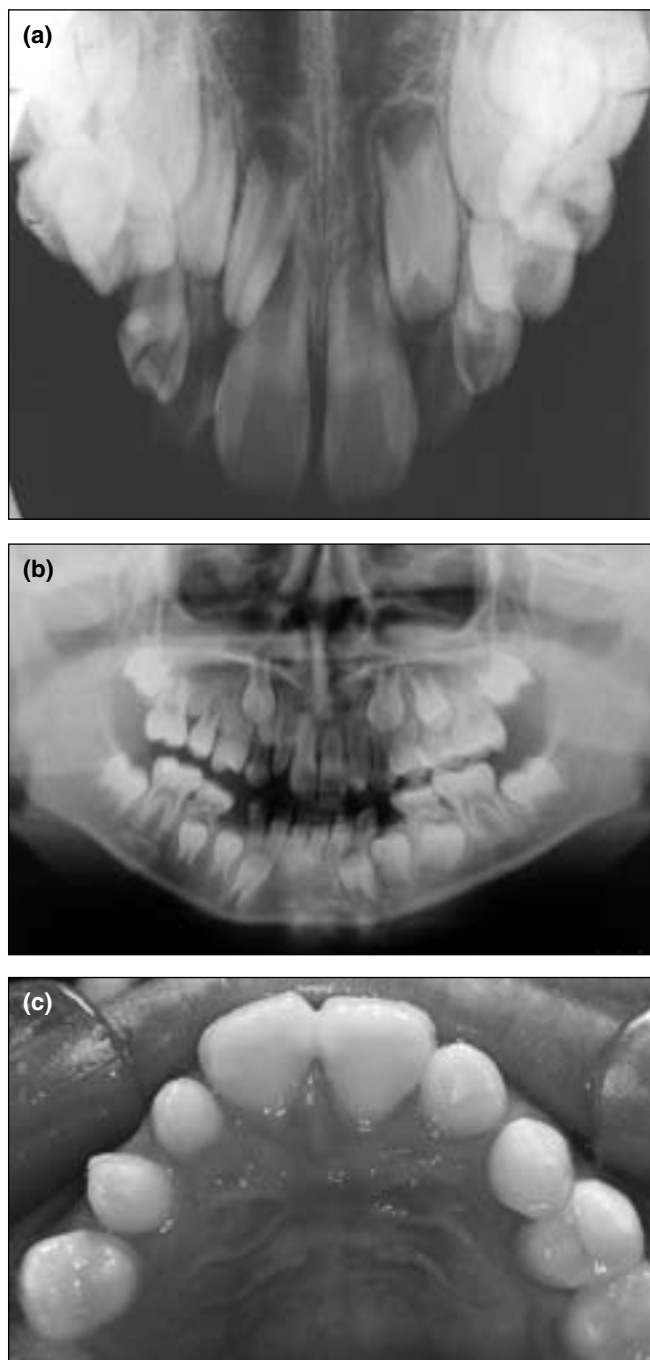


Figure 3 (a) An occlusal radiograph showing a conical supernumerary tooth in the region of the right central incisor. (b) A panoramic radiograph showing the erupted conical supernumerary tooth and the malformed maxillary right lateral incisor erupted in the canine region. (c) The conical supernumerary tooth has erupted in the lateral incisor region and the malformed right lateral incisor, with a deep enamel invagination, has erupted into the canine region

later, the conical supernumerary tooth began to erupt into the region of the right lateral incisor (Figure 3b) and another 6 months elapsed before the malformed right

lateral incisor erupted into the region of the right canine (Figure 3c). Clinically the malformed right lateral incisor was tuberculated and associated with a deep enamel invagination. The parent declined orthodontic treatment for financial reasons and decided to have the malformed permanent right lateral incisor extracted and have a composite build-up placed on the supernumerary tooth to make it mimic a lateral incisor.

Discussion

The prevalence of talon cusps has been frequently studied in permanent dentition but seldom in primary dentition. The only prevalence study of talon cusps on the primary teeth reported that the prevalence in the primary dentition of Japanese children was 0.6%²¹. Although it has been reported that permanent teeth are affected by talon cusps 3 times more frequently than primary teeth²⁹, it has also been suggested that the prevalence of talon cusps in primary dentition may not actually be lower than that in permanent dentition^{30,31}. The prevalence of the talon cusp in permanent dentition ranges from 0.06% to 7.7%^{5,32-35}. Such a wide disparity in prevalence may be due to variations in ethnic group, age, sample populations, and the criteria used to diagnose talon cusps¹¹.

Among the 31 cases of talon cusps on primary maxillary central incisors reported in the literature, no odontogenic abnormality was associated with the corresponding permanent successor. However, in the five cases of talon cusps on the primary maxillary lateral incisors, three cases were associated with supplemental lateral incisors, one case with a supernumerary tooth while one case did not mention the condition of the permanent successor²⁴⁻²⁷. In the present study, the primary maxillary lateral incisors in all of the three children with talon cusps were associated with supernumerary teeth which were all conical in shape.

Supernumerary teeth, which occur in 0.1% to 3.8% of the population³⁶, are more common in Mongoloid ethnic groups; the prevalence in Chinese being 2.2%³⁷ to 2.7%³⁸ and in Japanese 3.4%³⁹. About 90% of supernumerary teeth occur in the anterior maxilla³⁶, 56%-75% are conical in shape^{36,40-42} and most of them lie between the central incisors or near that region. In a study of 232 supernumerary teeth in the anterior maxilla of Chinese children, only five (2.2%) were in the lateral incisor region⁴³ while a similar study of 152 supernumerary teeth reported a figure of 3.3%⁴⁰. In a study of 130 supernumerary teeth in the anterior maxilla of children in

Jerusalem⁴², six (4.6%) were between the maxillary lateral incisor and canine while a study of 202 supernumerary teeth in children in Jordan revealed 13 such teeth in the maxillary lateral incisor region³⁶. Although all these studies did not mention the morphology of supernumerary teeth in this region, it is said to be more common to find a supplemental lateral incisor than a conical supernumerary tooth⁴⁴. The present report showed three cases of erupting conical-shaped supernumerary teeth in the maxillary lateral incisor region. The supernumerary teeth in cases 1 and 2 had less root development than the adjacent normal incisors while that in case 3 had similar root development. This is uncommon since conical supernumerary teeth in the anterior of the maxilla usually complete root formation, ahead of the adjacent normal incisors^{36,45,46}.

There has been much controversy over the prophylactic removal of unerupted supernumerary teeth which have no apparent pathological complications. On one side, the proponents argue that early removal will prevent space loss and avoid future extensive orthodontic treatment^{43,45}. On the other side, an eruption rate of about 80% for normally positioned supernumerary teeth has been reported⁴⁰ means that, in a conical non-inverted supernumerary tooth, delaying the surgical removal until after eruption is more prudent and less traumatic⁴⁵. In case 1, the conical supernumerary tooth had root formation that lagged behind that of the adjacent canine and lateral incisor, which explained its delayed eruption. From the periapical radiograph taken at the age of 9 years 6 months (Figure 1b), the right canine seemed to be impacted by the supernumerary tooth. However, using the vertical parallax technique²⁸, the supernumerary tooth was diagnosed as lying buccal to the canine, which is unusual. This is reflected in a study of 1153 supernumerary teeth where only 2.0% of the teeth in the anterior of the maxilla were vertically and labially placed⁴⁷; only three teeth (2.0%) were labially placed in a similar study of 152 supernumerary teeth in Chinese patients⁴⁰. In the present case, a conservative approach was used to manage the eruption of the canine which erupted in good alignment; the supernumerary tooth was later removed. In case 3, the unerupted conical supernumerary tooth was in a close relationship with the adjacent forming central incisor and the lateral incisor. Moreover, the crown of the unerupted lateral incisor was malformed. Therefore, a conservative approach was adopted to review the eruption of the malformed lateral incisor and supernumerary tooth, instead of performing surgical removal of the supernumerary tooth. After its eruption, the right lateral incisor was found to have a malformed crown with

a deep enamel invagination. Due to its displaced position and malformed crown morphology, the lateral incisor was removed and the conical supernumerary tooth was modified to mimic the lateral incisor.

In conclusion, this report illustrates three rare cases with talon cusps affecting the primary maxillary lateral incisors, in association with conical supernumerary permanent successors. A conservative approach was used to manage these non-inverted conical supernumerary teeth and the results were satisfactory to all parties concerned.

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