

Clinical Study

Talon Cusp: A Prevalence Study of Its Types in Permanent Dentition and Report of a Rare Case of Its Association with Fusion in Mandibular Incisor

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Purpose. The data on various types of talon cusp, a rare developmental anomaly that occurs predominantly on palatal surfaces of maxillary incisors with varied prevalence in different populations, is scarce. Thus, the purpose of study was to evaluate prevalence of various types of talon cusp and its association with sex predilection, site, and other dental anomalies and complications. **Subjects and Methods.** A cross-sectional prevalence study for various types of talon cusp was conducted in 5200 patients selected randomly. Hattab's classification criterion was used for diagnosis of types of talon cusp. The clinical diagnosis was confirmed with radiograph. **Results.** The prevalence of talon cusp was found to be 0.02% (1 in 430 cases). 12 cases of talon cusp in 10 patients (60% males) were documented (2 bilateral cases and 8 unilateral). Type I talon cusp and type II talon cusp were present in five cases each (40.1%) and type III talon cusp was observed in two (16.2%) cases. **Conclusion.** Type I talon cusp and type II talon cusp were the most common types and permanent maxillary central incisor was the most commonly involved tooth (50%). An extremely rare case of talon cusp on a fused permanent mandibular incisor is also reported.

1. Introduction

Talon cusp, first described by Mitchell in 1892, is a debatable and an interesting developmental anomaly [1]. It is a rare dental anomaly with a well-defined morphologically altered cusp-like structure projecting from the cingulum area of the anterior teeth. This anomalous structure may also arise from cemento-enamel junction (CEJ) extending towards the incisal edge of the teeth. It is composed of normal enamel and dentin, has varying extensions of pulp tissue, or maybe devoid of pulp tissue. The etiology of the talon cusp is still unknown [1].

The prevalence rate of talon cusp varies from 0.04% to 10% in the English literature [2]. The permanent dentition is affected more frequently than primary dentition and there is a slight male predilection. The talon cusp has been most frequently documented in permanent maxillary lateral incisors followed by permanent maxillary central incisors and

canines. The occurrence of talon cusp on mandibular teeth has been found to be extremely rare [3].

Hattab et al. classified talon cusp into three types according to degree of the cusp formation and extension [4]. Type 1 (talon) is a morphologically well-delineated additional cusp that projects from the palatal surface to at least half the distance between CEJ and incisal edge. Type 2 (semitalon) refers to an additional cusp (≤ 1 mm) that may blend with the palatal surface or stand away from the rest of crown. It extends less than halfway between CEJ and incisal edge. Type 3 (trace talon) is the enlarged cingula that may have a conical, bifid, or tubercle-like appearance [1]. Though various prevalence studies on talon cusp have been documented, only one study has been conducted to evaluate the prevalence of various types of talon cusp in permanent dentition according to Hattab's classification [5]. Thus a cross-sectional study to report the various types of talon cusp was undertaken in

an Indian population and its association with sex predilection, site, and other dental anomalies and complications.

2. Subjects and Methods

A cross-sectional prevalence study for various types of talon cusp was conducted for 3 months from February to April 2011 in outpatient department of S.R. Dental College, Haryana, India. The study sample consisted of 5200 patients (2714 males and 2486 females), seeking dental treatment, who were selected randomly. Their age ranged from 14 to 75 years. Exclusion criteria included pediatric age group below 14 years, patients having cleft lip/palate, medically compromised patients, and completely edentulous patients. The patient was examined with professional illumination by a single examiner (G.S) trained in oral diagnosis. The sociodemographic and clinical findings were recorded. The diagnostic criterion of Hattab [4] was applied for the diagnosis of talon cusp. The patients were subjected to radiographic examination (intraoral periapical radiograph) to confirm the clinical diagnosis and an informed written consent was taken.

3. Results

Twelve cases of talon cusp (prevalence: 0.02%) in 10 patients were documented (2 bilateral cases and 8 unilateral). In this cross-sectional study, twelve cases of talon cusp (11 maxillary teeth (91.6%) and one mandibular tooth (8.4%)) were observed in ten patients (6 males and 4 females). Six cases (50%) were recorded in permanent maxillary central incisor, four (33.3%) in permanent maxillary lateral incisor, one (8.4%) in permanent maxillary canine, and one (8.4%) in fused mandibular incisor tooth. No specific preference for side was documented. Type I talon cusp and type II talon cusp were present in five cases each (40.1%) and type III talon cusp was presented in two (16.2%) cases (Table 1). Type II talon cusp was the predominant type seen in permanent maxillary central incisor (3/6 cases; 50%), whereas type I talon cusp was most commonly observed in permanent maxillary lateral incisor (2/5 cases; 40%). The frequency of talon cusp in right and left maxillary central incisors was found to be 0.0005%, whereas frequency of maxillary right and left lateral incisors was found to be 0.0003%. A single case of talon cusp was observed in maxillary right canine (0.0001%) and no case was observed in left maxillary canine (Table 2).

During the study, a rare case of talon cusp on a fused mandibular incisor was also observed. This finding (talon cusp on fused tooth) was the only finding observed among the coexisting dental anomalies. To the best of our knowledge, only four cases of talon cusp associated with fusion have been reported in the English literature [3, 6–8]. Due to the extremely rare occurrence of these coexisting dental anomalies on a single tooth, we report a case of fusion with talon cusp on a mandibular incisor.

3.1. Case Report. A 22-year-old male reported to Department of Oral Medicine and Radiology with the chief complaint of missing teeth in the anterior maxillary region. The patient



FIGURE 1: Intraoral photograph showing the presence of double tooth in place of mandibular right central and lateral incisors.



FIGURE 2: Occlusal clinical view showing the presence of talon cusp on the double tooth.

revealed history of trauma resulting in avulsion of teeth 2 years back. The patient had been wearing a removable partial prosthesis since one and a half years and now wanted fixed prosthesis instead of removable partial denture. There was no remarkable medical history. General examination was normal. Intraoral examination revealed presence of three mandibular incisors. A double tooth was observed in the right mandibular incisor region (Figure 1). Clinically, the crowns of the teeth appear to be fused together with absence of any labio-developmental groove. There was also a presence of a pyramidal-shaped cusp suggestive of talon cusp on the lingual aspect of the double tooth (Figure 2). When the anomalous tooth was counted as a single tooth, there was decrease in number of teeth by one. No family history was found to be a contributory factor for this condition. The double tooth was clinically asymptomatic and no history of recurrent ulcerations on the tongue could be elicited. The double tooth looked slightly unsightly because of large size as compared to contra lateral incisors. No occlusal interference due to talon cusp on double tooth was observed on examination.

Intraoral periapical radiograph of the double tooth showed the presence of single large crown and root with a single canal instead of two right mandibular central and lateral incisors (Figure 3). A V-shaped radio-opaque structure overlapping the coronal aspect of double tooth was also observed. There was no radiographic evidence of pulp tissue extending into the talon cusp. The panoramic radiograph showed normally developed permanent dentition (Figure 4)

TABLE 1: Distribution of talon cusps in study according to age, sex predilection, site, and type.

Cases	Age (in years)	Sex predilection	Site (tooth) involved	Type of talon cusp	Side
1	22	M	Anterior right mandibular incisor (fused tooth)	I	Unilateral
2	51	F	21	I	Unilateral
3	21	M	22	III	Unilateral
4	34	F	11, 21	II	Bilateral
5	27	F	12	II	Unilateral
6	36	M	12, 22	I	Bilateral
7	23	M	13	II	Unilateral
8	31	M	11	III	Unilateral
9	25	F	11	I	Unilateral
10	43	M	21	II	Unilateral

M: male; F: female.

TABLE 2: Summary of the observed talon cusp cases according to individual tooth.

Tooth number	Total number of individual teeth observed in patients examined ($n = 5200$)	Number of teeth in which talon cusp was observed	Observed frequency toothwise
Maxillary right central incisor (11)	5200	3	.0005%
Maxillary left central incisor (21)	5200	3	.0005%
Maxillary right lateral incisor (12)	5200	2	.0003%
Maxillary left lateral incisor (22)	5200	2	.0003%
Maxillary right canine (13)	5200	1	.0001%
Maxillary left canine (23)	5200	—	—
Mandibular canines (33 and 43)	5200	—	—
Mandibular Incisors (31, 32, 41, 42)	5200	1*	—

*Fused tooth between mandibular right central and lateral incisor.

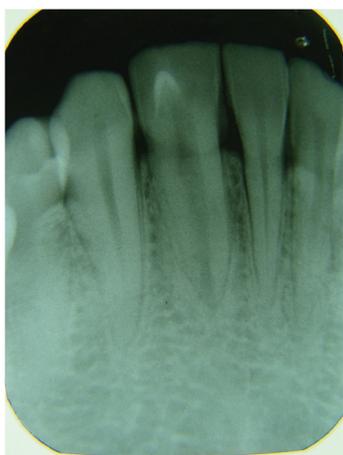


FIGURE 3: Intraoral periapical radiograph showing the presence of single root of double tooth.



FIGURE 4: Panoramic radiograph revealing absence of other dental anomalies.

and there was absence of any impacted or supernumerary tooth.

On the basis of the clinical and radiographic examination, a diagnosis of talon cusp on fused mandibular incisor was

given. The patient was informed about the condition and was advised grinding of the talon cusp. Since the patient was asymptomatic and was also not concerned about the esthetics, he refused treatment of grinding of talon cusp on fused tooth. The patient was referred for fixed prosthesis of the maxillary right central and lateral incisors. The patient was advised regular follow-ups.

4. Discussion

The prevalence of talon cusp in our study (12/5200; 0.02%; 1 in around 430 cases) was found to be comparable to that

in the study conducted by Hegde in 1999 [9]. This figure is however lower than the recent studies conducted in India [10] (0.97%) and Jordan [11] (0.55%). The variation in prevalence could be explained by the dissimilarity in sample population or examination criteria. The prevalence of talon cusp in mandibular dentition was extremely low (8.4%). This is a consistent finding seen in all the studies conducted on talon cusp (Jordan [11], 0%; Turkey [5], 6%). The prevalence of bilateral involvement of talon cusps (2/10 patients; 20%) was in accordance with the literature [12].

The reported prevalence of talon cusp in the literature is most commonly seen in maxillary lateral incisors (56.2%) followed by maxillary central incisor (35.4%) and maxillary canine (8.3%) [5]. However, the permanent maxillary central incisor (50%) was the most commonly involved tooth in our study (Table 2). This finding was in contrast to the study conducted by Gunduz and Celenk who found permanent maxillary lateral incisor (51%) to be most common involved tooth in Turkey [5], whereas Hamasha and Safadi in a recent study in 2010 found permanent maxillary canine (46%) to be the most common affected tooth in a Jordanian population [11]. Type I talon cusp and type II talon cusp were the most prevalent types (40.1%) in our study. In comparison, Gunduz and Celenk had observed type I talon cusp as the most common type (45%) in their study [5]. These differences could be attributed to racial differences. However, more studies are needed to be conducted in various populations to ascertain the most prevalent type of talon cusp in permanent dentition.

A slight male predilection (60%) was also observed in our study, whereas no sex predilection was observed by Gunduz and Celenk [5]. Our finding was in concurrence with the literature that males have been found to be more frequently affected than females (65% prevalence of talon cusp in permanent dentition and 3.5:1 for males: females in primary dentition) that might indicate a sex-linked genetic trait. However, no significant trend of sex predilection for specific types of talon cusp could be observed in our study. The future studies on types of talon cusp can probably identify the sex predilection of each specific type of talon cusp.

Talon cusp has been reported in patients with Sturge-weber syndrome [13], Rubinstein-taybi syndrome [14], Mohr syndrome [15], Ellis van-creveld syndrome [16], and Alagille syndrome [17]. None of the cases observed during the study had any clinical signs/symptoms of these syndromes. Familial involvement in talon cusp has also been reported. Balcioglu et al. had recently suggested genetics as a major cause of occurrence of talon cusp [18]. However, in our study, we could not observe any familial history for talon cusp. Various known complications associated with talon cusp are altered esthetics, accidental cusp fracture, attrition, breast feeding problems, irritation of tongue during speech, periodontal problems due to occlusal interference, and caries susceptibility because of developmental grooves on tongue [2]. None of these complications could be observed in our patients.

A fused tooth is a rare developmental disorder characterized by the union of two adjacent teeth. The occurrence of the fusion is more in primary dentition (0.5%) as compared to

permanent dentition (0.1%) [6]. Fusion may be complete or incomplete depending on the developmental stage at which it occurs. If it occurs late in the developmental stage, it will result in hypodontia of that dental arch and the presence of macrodont in the arch.

The etiology of fusion is still unknown. Environmental factors like hypervitaminosis A, thalidomide embryopathy, and viral infection during pregnancy have been postulated but not proved [3]. The other factors that have been hypothesized are physical forces between the teeth producing necrosis of the epithelial tissue between the two teeth and genetic predisposition. Fusion has also been documented to be associated with Ellis van-creveld syndrome, achondroplasia and osteopetrosis [19].

Fusion is often misdiagnosed as gemination. Gemination is a developmental anomaly of shape, which is considered as an effort by a single tooth germ to divide ensuing in a large single tooth with bifid crown, with the coronal halves having mirror images. Several clinical and radiographic criteria like morphology of crown and root chamber and number of teeth are used to differentiate fusion from gemination. In case of fusion, when the anomalous tooth is counted as one, teeth count reveals a missing tooth, whereas in gemination there is normal teeth count. However, distinguishing fusion and gemination by tooth count alone is not a parameter in all cases because fusion can occur between supernumerary and normal teeth [20]. The diagnosis was arrived at complete fusion of the permanent mandibular central and lateral incisors accompanied by talon cusp after evaluating the clinical and radiographic findings. A summary of documented cases of fusion with talon cusp on same tooth has been shown in Table 3.

The documentation of very few cases of talon cusp with fusion on same tooth prevents the authors from doing a significant analysis. Talon cusp has also been associated with various dental anomalies like mesiodens, microdontia, odontomas, shovel-shaped incisors, germination, and dens invaginatus [21]. A few cases of talon cusp on labial aspect of maxillary incisors have also been reported [22]. However, according to Mayes, labial talon cusps should not be compared with lingual talon cusps as they are two completely different traits [22].

The different types of talon cusp represent varying complications. Type III talon cusp is likely to cause an esthetic problem to patient, whereas type I talon cusp is more likely to be endodontically challenging. Type II talon cusp is a greater risk factor for trauma from occlusion and occlusal interference leading to periodontal problems. All types of talon cusp can present varying degrees of operative difficulty during various dental procedures like periodontal splinting, extractions, and endodontic procedures. However, data on the complications caused by talon cusp and their types is not existent in the English literature. Studies should be conducted to describe the various complications associated with these types of talon cusp.

Asymptomatic cases of talon cusp should be left untreated. However treatment options vary for symptomatic cases from simple grinding to orthodontic, endodontic, and prosthetic procedures depending on the extent of

TABLE 3: A summary of documented cases of fusion with talon cusp.

Authors	Involved arch	Fused teeth involved	Age/gender	Other dental anomalies
Danesh et al. (2007) [7]	Maxilla	Central incisor and supernumerary tooth	9/M	—
Ekambaram et al. (2008) [8]	Mandible	Central incisor and lateral incisor	14/M	—
Rao and Hedge (2010) [3]	Mandible	Central and lateral incisors	11/M	—
Present authors (2012)	Mandible	Central and lateral incisors	22/M	—

complications and size of talon cusp [7]. In our study, since no complications could be anticipated, therefore no intervention was done. The management of symptomatic talon cusp on an anomalous tooth (fusion, gemination) would be most difficult due to varied anatomical factors. Patients should be counseled regarding the unique condition and motivated for frequent recall check-ups for intraoral examination. Patients should be made aware about the diverse complications so that an early and timely diagnosis can thus ensure and prevent any further onset of complications.

5. Conclusion

The prevalence of talon cusp in our study was extremely low (0.02%; 1 in 430 cases) and infrequent in mandibular arch. Type I talon cusp and type II talon cusp were the most prevalent types observed in our study and overall there was a slight male predilection (60%). Clinicians should be alert in diagnosing this unique entity that can help in early treatment of the condition and thereby preventing any potential complications. A larger sample size for the prevalence of types of talon cusp should be conducted. Talon cusp associated with fusion on a same tooth is an extremely rare entity.

Conflict of Interests

The authors declare that there is no conflict of interests regarding the publication of this paper.

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