



## Review Article

# Epidemiological Distribution and Data Analysis of Facial Talon Cusp: A Comprehensive Review of the Literature

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### ARTICLE INFO

### ABSTRACT

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**Objective:** The purpose of the present study was to perform a comprehensive literature search on facial talon cusps to evaluate the characteristics and distribution. **Methods:** A review of the articles published in English in between January'1960 and December'2013 involved in the study. The search words "anterior teeth", "talon cusp", "dens evaginatus", "facial", "buccal", "labial", "primary dentition" and "permanent dentition" in various combinations were used in search engines "PubMed", "MEDLINE", "EmBase" and "Google scholar". The retrieved citations from the included references were subsequently checked, and a hand search was performed to find additional reports. The characteristics, distribution, and tooth type have been included in final data analysis. The Hypothesis was facial talon cusps are common in maxillary arch than the mandibular arch. Descriptive statistics were tested using SPSS (version, 17.0). **Results:** Total 32 articles with 43 patients were reported on facial talons. These were frequently seen in females. Facial talons are more common in maxillary arch ( $P < 0.05$ ). Almost 70% of the cases were reported in humans and common in permanent dentition. Only seven cases (18%) were bilaterally involved. A 76% of cases reported only on facial surface and 24% reported along with lingual surfaces. Facial talon cusps are more common on central incisors (76%) and frequently reported in Native Americans and Indians. **Conclusion:** Maxillary facial talons were more common and frequently seen in females. In permanent dentition facial talon cusps are commonly seen in central incisor whilst, lateral incisor is in primary dentition.

**Key words:** Talon cusp, Facial surface, dental anomaly, Primary dentition, Permanent dentition.

## 1. INTRODUCTION

Talon cusps are a rarely described developmental dental anomaly. Almost a century ago Mitchell described a curved horn-like process<sup>1</sup> and prior to that Windle and Humphreys<sup>2</sup> reported supernumerary cuspon the permanent maxillary central incisors. Consequently, various names like accessory cusp, horn, dens evaginatus, hyperplastic cingulum, cusped

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cingulum, supernumerary cusp, evaginatedodontome, and various authors for this anomaly<sup>3</sup> have given supernumerary lingual tubercle. Mellor and Ripa<sup>4</sup> called this anomaly as talon cusp, because its resemblance as eagle's talon. Previously, there has been confusion between dens evaginatus and talon cusp. Both are the projections covered by enamel which may or may not contains pulp tissue, hence, the term "dens evaginatus of the anterior teeth" given for talon cusp.<sup>3,5,6</sup> Most recently Mallineni and co-workers<sup>7</sup> redefined talon cusp as "a cusp-like projection or tooth like structure on the labial or palatal surface of an anterior tooth that contains enamel, dentin and/or pulp and it may be extended at least half the distance from the cement-enamel junction to the incisal border in both the arches and both dentitions".

The etiological factors of the talon cusp are not clearly documented; genetic and/or environmental factors may cause the cusp to develop.<sup>3,5-7</sup> The reported prevalence of the talon cusp ranges from 0.06% to 7.7%.<sup>3,5</sup> Talon cusp is more commonly seen in maxillary teeth that affects both dentitions. Maxillary central incisor is commonly affected in primary dentition while lateral incisor in permanent dentition.<sup>3,5,7</sup> Talon cusps are commonly seen in palatal or lingual surface, where facial talons are extremely rare. Furthermore, there is no data available on characteristics of facial talon cusps. Therefore, the purpose of the present epidemiological review was to carry out a comprehensive literature search on facial talon cusps to evaluate characteristics, and distribution.

## 2. MATERIAL AND METHODS

A review of the articles published in the English language in between January 1960 and December 2013 involved in the study. The search words "anterior teeth", "talon cusp", "Dens evaginatus", "facial", "buccal", "labial", "primary dentition" and "permanent dentition" in various combinations were used

electronically in search engines "PubMed", "MEDLINE", "EmBase" and "Google scholar". The retrieved citations from the included references were subsequently checked, and a hand search was also performed to find additional reports published on facial talons. The characteristics, distribution, and tooth type have been included in final data analysis. The Hypothesis of the study was maxillary facial talon cusps are more common than mandible and descriptive statistics were tested using SPSS (version, 17.0). The study design was shown in Figure 1.

## 3. RESULTS

The comprehensive literature search has retrieved 32 articles reported on facial talons among those three were duplications. In the Randomized controlled trials have not been identified to evaluate. All of short listed studies were reported on the facial talons were case reports and archeological studies<sup>8-39</sup> (Table 1). Total 32 articles with 43 patients were reported on facial talons in the published literature among those two were prevalence studies and rest was case reports. A total of 43 individuals have been observed with at least one facial talon cusp (Table 1). Thirteen cases (30%) were reported in archeological skulls whilst, rest was clinical reports. Facial talons are commonly reported in females than the males. Thirty-seven cases (84%) were reported in permanent dentition while four cases (9%) in primary dentition and three cases (6%) were on supernumerary teeth (Table 1).

On the whole thirty-two cases (76%) were involved on facial surface, and ten (24%) exhibited on facial and lingual surfaces. Facial talon cusps are commonly seen in maxillary arch (70%) than the mandibular arch (30%) where it was statistically significant ( $p < 0.05$ ) (Figure.1). Unilateral (83%) presentation is common than the bilateral (17%) presentation of facial talons in permanent dentition whilst all were unilateral in primary dentition. In permanent dentition central

incisor is commonly affected tooth type (77%) followed by lateral incisor (9%), canine (7%), and supernumerary tooth (7%) shown in Figure 2. Lateral incisor (75%) was commonly affected than central incisor (25%) in primary dentition. Almost 25% of the cases were reported in Native Americans; however, all these cases were reported in archeological skulls. Overall, Asia and Asia derived population were commonly affected populations (Figure. 3).

#### 4. DISCUSSION

Seventy percent of the facial talons were reported in modern population and (30%) were reported based on archeological skulls.<sup>13,16,29,32,34</sup> A total 13 cases were reported on archeological skulls, among these eleven cases of facial talon were reported in permanent dentition.<sup>13,16,29,34</sup> whilst only case reported in primary dentition.<sup>32</sup> A archeological report of “ca. 9500 BP” in the republic of Niger reported a facial talon on tooth 43 in a male, this is considered as oldest facial talon.<sup>34</sup> Prior studies on talon cusps reported that talon cusps are predominantly seen in males.<sup>3,5,7</sup> Contrarily, facial talons are common seen in females than males. Talon cusps are more frequent in permanent dentition than primary dentition. Similarly, thirty-four cases (83%) were reported in permanent dentition while four cases (10%) in primary dentition and three cases were on supernumerary teeth (Table 1). Talon cusps occur most frequently on the lingual or palatal surface of the anterior teeth, less frequent on the facial surface and seldom on both surfaces. Nonetheless, the present review retrieved 43 published cases on facial talon, which was evident that this identity is extremely rare. Among these thirty-four cases (83%) were involved on facial surface, and seven (17%) exhibited on facial and lingual surfaces.

Talon cusps are most commonly reported in the maxillary arch than the mandibular arch; similarly, facial talons are commonly seen in maxillary arch

(70%) than mandible (30%) where the findings were statistically significant ( $p < 0.05$ ). Lingual talons are commonly affecting the lateral incisors in permanent dentition and central incisors in primary dentition.<sup>3,5,6</sup> Contrarily, facial talons are commonly seen in central incisors in permanent dentition and lateral incisors in primary dentition. The unilateral occurrence (83%) of facial talons was more than the bilateral presentation (17%), which was an agreement to that of lingual talon cusps. All the case that reported in primary dentition was unilateral (100%). In permanent dentition central incisor is commonly affected tooth type (77%) followed by lateral incisor (9%), canine (7%), and supernumerary tooth (7%) whilst in primary dentition lateral incisor (75%) was commonly affected than central incisor (25%).

Talon cusp is an uncommon developmental odontogenic anomaly and different authors proposed various classifications. Mayes<sup>29</sup> categorized facial or labial talons into three stages; Stage 1 (slightest form), Stage 2 (moderate form) and Stage 3 (most extreme form). Hattab and co-workers<sup>5</sup> classified talon cusps based on its extent<sup>5</sup>, as three types talon, semi talon, trace talon. Most recently Mallineni and co-workers<sup>7</sup> classified talons Type 1 (facial or labial), Type 2 (lingual or palatal) and type 3 (both surfaces). However, early two classifications were used to describe the facial talons.

Talon cusps are associated with complications such as aesthetic, diagnostic, pathological, and functional variations.<sup>6,20,22,29</sup> Functional complications include displacement of teeth, infra-occlusion of opposite teeth, occlusal interference, speech problems and trauma to the lip and tongue. Stagnation of plaque and debris in deep grooves of talon cusp may become carious and cause periapical pathology.<sup>14</sup> Most importantly, facial talon cusps cause esthetical problem, it has been suggested periodical grinding and composite build-up

SK Mallineni *et al* has been suggested.<sup>19,36,37</sup> Root canal treatment,<sup>19</sup> and extraction and orthodontic treatment also been suggested if pulp infection is present. Nevertheless, the reported management strategies by various authors for facial talon cusps were mention in Table 2.

**Table 1: Reported cases on facial talons in the literature**

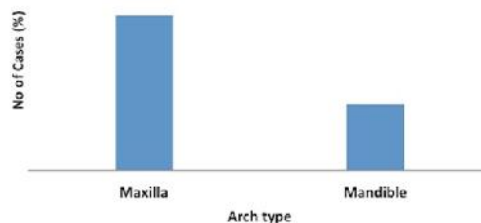
Author	Year	Gender	Tooth*	Surface	Ethnicity	Case type
Schulze <sup>8</sup>	1987		41	Facial	German	C
Tsutsumi and Oguchi <sup>9</sup>	1991	F	21	Facial	Japanese	C
Jowharji et al <sup>10</sup>	1992	F	11	Facial	Africo-American	C
Mcnamara et al <sup>11</sup>	1997	M	31	Facial	Irish	C
		F	13	Facial	Irish	C
Abbott <sup>12</sup>	1998	F	21	Facial and palatal	Australian	C
Turner <sup>13</sup>	1998	F	22	Facial	Native American	A
de Sousa et al <sup>14</sup>	1999	F	11	Facial and palatal	Brazilian	C
McKaig and Shaw <sup>15</sup>	2001	F	11	Facial	British	C
		F	31,41	Facial	Native American	A
		F	31	Facial	Native American	A
		M	31,41	Facial	Native American	A
Lee et al <sup>16</sup>	2003	M	31,41	Facial	Native American	A
		M	31	Facial	Native American	A
		M	31,41	Facial	Native American	A
		M	31,41	Facial	Japanese	A
		F	S11	Facial	Native American	A
Dunn <sup>17</sup>	2004	F	22	Facial and palatal	Northamerican	C
Patil et al <sup>18</sup>	2004	F	21	Facial	Indian	C
Glavina and Skrinjaric <sup>19</sup>	2005	M	21	Facial	Croatian	C
Jeevarathan et al <sup>20</sup>	2005	F	52	Facial and palatal	Indian	C
Llenapuy and Navarro <sup>21</sup>	2005	M	32	Facial	Spanish	C
Oreduga <sup>22</sup>	2005	M	31	Facial	Nigerian	C
Shashikiran et al <sup>23</sup>	2005	F	21	Facial and palatal	Indian	C
Sumer and Zengin <sup>24</sup>	2005	F	11	Facial and palatal	British	C
Cubukuc et al <sup>25</sup>	2006	F	11	Facial and palatal	Turkish	C
Sicari et al <sup>26</sup>	2006	F	SNT61	Facial and palatal	Turkish	C
Batra et al <sup>27</sup>	2006	F	62	Facial	Swedish	C
		F	62	Facial	Swedish	C
Ma <sup>28</sup>	2006	M	12	Facial	Malaysian	C
Mayes <sup>29</sup>	2007		11	Facial	Native American	A
			11	Facial	Native American	A
Topalo lu <sup>30</sup>	2008	M	SNT	Facial and palatal	Turkish	C
Ekambaram et al <sup>31</sup>	2008	M	41&42	Facial and lingual	Chinese	C
Pomeroy <sup>32</sup>	2009		61	Facial	Argentinean	A
Hegde et al <sup>33</sup>	2010	F	11,21	Facial	Indian	C
Stojanowski et al <sup>34</sup>	2011	F	43	Facial	Nigerian	A
Rao et al <sup>35</sup>	2011	M	31	Facial	Indian	C
Kulkarni et al <sup>36</sup>	2012	M	21	Facial	Indian	C
Chinni et al <sup>37</sup>	2012	M	11,21	Facial	Indian	C
Thakur et al <sup>38</sup>	2013	F	13	Facial	Indian	C
Basnur et al <sup>39</sup>	2013	F	21S	Facial	Indian	C

F=female; M=male; S=Supernumerary tooth; C=Clinical; A=Archeological; \*FDI tooth Numbering system.

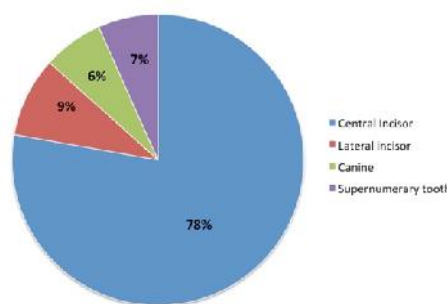
**Table 2: Reported management strategies for facial talon cusps.**

**Management strategies for facial talon cusps**

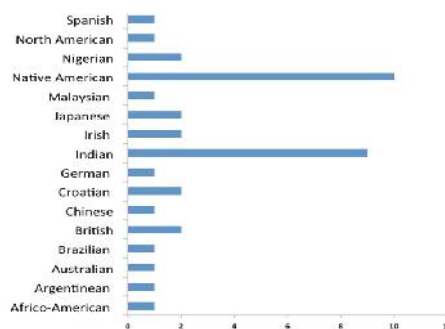
- Fluoride varnish application<sup>14,20</sup>
- Extraction<sup>26</sup>
- Extraction and orthodontic treatment<sup>11</sup>
- Extraction and orthodontic treatment and prosthetic rehabilitation<sup>25</sup>
- Reduction with endodontic treatment and orthodontic correction<sup>12</sup>
- Root canal treatment and aesthetic treatment<sup>14</sup>
- Periodic grinding and fluoride varnish application followed by composite restoration<sup>19</sup>
- Minimal reduction and fluoride gel<sup>22</sup>
- Periodic grinding and fluoride varnish application followed by composite veneer<sup>22</sup>



**Fig 1: Distribution of facial talons based maxillary and mandibular arches.**



**Fig 2: Distributions facial talons based on tooth type**



**Fig 3: Distribution facial talons based on ethnicity**

A facial talon cusp is rare and it is found to be less than one percent of the population. The present epidemiological survey found forty-three cases of the rare facial talons and the first study that estimated of the population frequencies based on occurrence. Facial talons have been found on all anterior teeth (incisors

and cuspids) and supernumerary teeth also. To date, insufficient evidence that indicates a direct relationship of the occurrence of the facial talon cusp. Facial talons commonly affect Native Americans and Indians. Moreover, all the cases that reported in Native Americans were in archeological skulls and the case that reported in Indians were in modern population. Comparatively Asians are Asian derived population exhibited more facial talons. Although, reason for these variations may be due to the use of different diagnostic criteria, non-representative populations, and information from selected racially representative samples could provide useful data for at least some of these dental characteristics. Optimistically, future research will allow the researchers to be better comprehended the etiology and genetic basis of the talon cusps.

As a number of cases of facial talon cusps have now been published, this study presents a survey of cases in the literature to characterize the expression of this rare dental anomaly, and compares it with that of talon cusps. Facial talons were more common in maxillary arch than the mandibular arch, where the findings were statistically significant. In permanent dentition central incisor is the most common effected tooth whilst, lateral incisor is in primary dentition. Occurrence of facial talon cusp in primary tooth is extremely rare. Most of the cases reported from Asians and Asian derived populations.

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