

# Prevalence and Distribution of Talon Cusp in Permanent Dentition among Non-Syndromic Pakistani Population

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## ABSTRACT

**Background:** Talon cusp is a rare accessory cusp developing from cemento-enamel junction (CEJ) of the anterior teeth as a vertical ridge. The purpose of this study was to determine the prevalence and distribution of Talon cusp in Non-Syndromic Pakistani population.

**Methods:** This cross sectional study was conducted at Margalla Dental Hospital from April 2022 to September 2022. Non-probability, convenience sampling technique was used. A mouth mirror and Community Periodontal Index of Treatment Needs (CPITN) probe were used for intra-oral examination after drying teeth with the help of cotton gauze. Once identified, Talon cusp was classified and patient's demographics and tooth characteristics were recorded. SPSS 21 was used for data analysis. Descriptive statistics were used for demographic and tooth related variables such as age, gender. An association of demographic variables and characteristics of anomaly was made using Chi-square test. The level of significance was kept at  $\alpha$  at  $< 0.05$ .

**Results:** Of 1298 participants, 653 (50.3 %) were males and 645 (49.7%) were females. The mean age of the participants was  $37.57 \pm 16.2$  years. Most of the participants were Punjabi (1128, 86.8%). The person prevalence of Talon Cusp was 0.45% (6 patients out of 1298 had Talon cusp) with Type 3 Talon cusp most frequently found. No significant difference between genders or ethnicity and presence of Talon's cusp was observed among study participants.

**Conclusion:** Within limitation of this study we concluded that the prevalence of Talon cusp among Pakistani Population is 0.45%. There is an almost equal distribution among maxillary central and lateral incisors with Type 3 Talon cusp most frequently found.

## Keywords:

Talon Cusp, Pakistani Population, Prevalence, Permanent dentition, Non-syndromic population

## INTRODUCTION

Developmental dental anomalies are an important category of dental symptomatology. Talon cusp is a rare accessory cusp developing from cemento-enamel junction (CEJ) of the anterior teeth as a vertical ridge.<sup>1,2</sup> It is considered as an ectopic or anomalous structure having normal enamel structure with pulpal or dentinal extension.<sup>3,4</sup> Mellor and Ripa named this developmental anomaly as talon cusp (Figure 1) because it resembles eagle's claw in shape.<sup>5</sup>

Many terms have been used in the literature to describe Talon cusp like cusped cingulum, accessory cusp, hyperplastic cingulum, dens evaginatus, evaginated odontome, supernumerary lingual tubercle, occlusal enamel pearl, odontomas of axial core type and occlusal tubercle.<sup>6</sup>

Both environmental and genetic factors can be responsible for expression of Talon cusp with exact etiology still undefined.<sup>3,7</sup> Experimental research on animal models has shown that disturbances in non-proliferating epithelial structures can result in additional cups differentiation.<sup>8,9</sup> Other studies postulates that either there is a common mechanism of development for supernumerary teeth and Talon cusp or a link between tooth size and Talon cusp development.<sup>10,11</sup> None of the hypothesis has been tested to date. Hattab et al in 1996 classify talon cusps into three types based on their shape and size<sup>3</sup> (Table 1).

The estimated frequency of this rare dental trait among various populations varies from 0.06-40.8%.<sup>3,12</sup> Most of the recent research is presented in the form of case report or case series.<sup>13,14</sup> Whereas in Pakistan, to the best of our knowledge, no study has been conducted to determine prevalence of Talon cusp.

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**Table 1:** Classification of talon cusp using the scale of Hattab *et al*

Type 1	A defined cusp on the palatal surface of the incisors both in the permanent and primary dentition; it covers at least half of the distance between the incisal edge and the cemento-enamel junction (CEJ)
Type 2	The cusp covers less than half of the distance between the incisal edge and the CEJ but it is larger than 1 mm
Type 3	A small tubercle located on the gingival third of the tooth. It can be T, Y, or V shaped

Identification of these anomalies or traits while performing intra oral dental examination is important in order to identify associated deep fissures and possibility of food stagnation, incipient or cavitated carious lesions. The dentist can plan preventive or interventional treatment accordingly. Moreover the expression and incidence of these traits varies among different population, a record of these traits can be used for phylogenetic and genetic studies. Studying talon cusp is important because it is a rare dental anomaly that can impact aesthetics, occlusion, and oral hygiene. Understanding its prevalence and characteristics aids in early diagnosis and effective management. It also helps clinicians address associated complications like caries, pulp exposure, and periodontal issues. The purpose of the study was to determine the prevalence and distribution of Talon cusp in Non-Syndromic Pakistani population.

## SUBJECTS AND METHODS

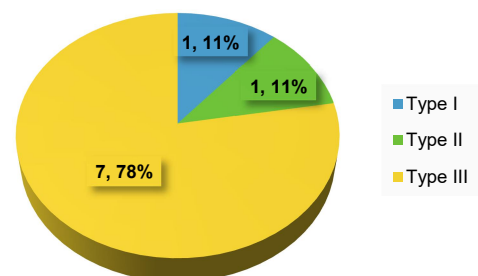
Ethical approval was taken from Ethics Review Committee at Margalla Institute of Health Sciences, Rawalpindi, Pakistan (ERC Ref No: DH/138/22). This cross sectional study was conducted at Outpatient Department (OPD) of Margalla Dental Hospital from April 2022 to September 2022. The estimated frequency of talon cusp among various populations varies from less than 1 % to 8%.<sup>1,3</sup> Keeping confidence level ( $\alpha$ ) of 95%, population portion of 8% and the relative precision of 20% of the population portion, sample size turned out to be 1105 to find out prevalence of Talon cusp. Non-probability, convenience sampling technique was used. Inclusion criteria were individuals with Pakistani origin visiting OPD of Margalla Dental Hospital with permanent dentition (12 years and above). Individuals diagnosed with syndrome or illness affecting odontogenesis or tooth eruption were excluded. Also individuals with extracted, restored or crowned anterior teeth were excluded.

A consent was taken by all OPD patients satisfying inclusion criteria. A mouth mirror and Community Periodontal Index of Treatment Needs (CPITN) probe were used for intra-oral examination after drying teeth with the help of cotton gauze. Once identified, anomaly was classified according to Tables I and patient's demographics and tooth characteristics were recorded. Intra oral Photograph was also taken after patients' consent (Figure 1).

SPSS 21 was used for data analysis. Descriptive statistics were used for demographic and tooth variables (mean and standard deviation for age, frequencies with percentages for gender, ethnicity, tooth type, tooth surface involved, Talon classification). An association of demographic variables and characteristics of anomaly were made using Chi-square test. Level of significance was kept at  $\leq 0.05$ .

## RESULTS

The total number of participants in this study was 1298, of which 653 (50.3 %) were males and 645 (49.7%) were females. The mean age of the participants was  $37.57 \pm 16.2$  years, while median age was 35 years. Most of the participants were Punjabi (1128, 86.8%). The person prevalence of Talon Cusp was 0.45% (6 patients out of 1298 had Talon's cusp). Type 3 Talon cusp was most frequent. Out of 6 participants, 3 had bilateral expression of Talon cusp and 3 had unilateral expression. Talon's cusp was found in 4 central incisors and 5 lateral incisors. The differential count of types of Talon cusp are shown in Figure 2.

**Figure 1:** Type II talon cusp on right maxillary lateral incisor and Type I Talon cusp on left maxillary lateral incisor**Figure 2:** Differential distribution of talon cusp according to Hattab *et al* scale

**Table 2: Differential distribute on of Talon according to demographics**

Age (years)	Gender	Ethnicity	Talon Type according Hattab et al.	Tooth/Teeth involved
24	Male	Pathan	Type 3 (bilateral)	Palatal surface of maxillary central incisors
30	Female	Punjabi	Type 3 (unilateral)	Palatal surface of right maxillary lateral incisor
18	Male	Punjabi	Type 3 (unilateral)	Palatal surface of left maxillary lateral incisor
32	Male	Kashmiri	Type 3 (unilateral)	Palatal surface of right maxillary lateral incisor
30	Female	Punjabi	Type 3 (bilateral)	Palatal surface of maxillary central incisors
40	Male	Punjabi	Type 1 & Type 2 (bilateral)	Palatal surface of maxillary lateral incisors

No significant difference between genders or ethnicity and presence of Talon's cusp was observed among study participants. Table 2 shows the differential distribution of Talon cusp according to demographics in detail.

## DISCUSSION

Talon cusp prevalence was 0.45% and Type 3 was most frequent with an almost equal presentation in maxillary central and lateral incisors. To our knowledge no study has been conducted in Pakistan to find out the prevalence and pattern of expression of Talon cusp. The low prevalence of this rare anomaly was comparable to majority of the studies across the globe with a prevalence of 0.34% (49/14,400) among Turkish population, 0.5% (52/9377) among saudian population and 0.02% (12/5200) to 0.58% (16/2740) to 0.975% (11/1123) among Indian Population.<sup>17-18</sup> A recent study conducted in Greater Noida, India reported a high prevalence of 15.6% (351/2250).<sup>19</sup> This difference in prevalence can be attributed to differences in ethnicity, sample size, study design, age of the population and examination criteria.<sup>3,20</sup> There was no statistically significant association in our research between Talon cusp and gender or ethnicity. These results were similar to studies conducted in Turkey and India.<sup>18,19</sup> However Sharma and Nagpal had reported high prevalence in male as compare to female.<sup>16</sup>

We found an almost equal expression of Talon cusp in maxillary central and lateral incisors. However literature supports a predilection of maxillary lateral incisor followed by maxillary central incisors.<sup>21</sup>

The mandibular talon cusp have been rarely reported in literature as compared to mandibular talon cusp, which is in accordance with the results of our study. The previous studies show exceedingly low prevalence of mandibular talon cusp conducted in Nigeria and Turkey.<sup>22</sup>

Within limitation of this study we concluded that the prevalence of Talon cusp among Pakistani Population is 0.45%. There is an almost equal distribution among maxillary central and lateral incisors with Type 3 Talon cusp most frequently found.

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