REVIEW ARTICLE

Talon Cusps- A Review of Literature

Karthik Shunmugavelu

ABSTRACT

Background: A talon cusp is an accessory cusp-like dental anomaly that projects from the cingulum or cementoenamel junction to the incisal edge of the maxillary or mandibular anterior teeth in both primary and permanent dentition. A significant genetic impact has been proposed by the presence of talon cusp in immediate family members. Talon cusp affects both sexes and can be unilateral or bilateral in primary and permanent incisors. Males have a greater level of incidence than females. Hattab and colleagues suggested a classification scheme for these irregular cusps based on their degree of development and extension: type I, type II, type III. There have been many reported clinical cases of predominantly facial talon cusps, 75 % of which were found in permanent dentition. A talon cusp occurs radiographically as a "V"-shaped radiopaque structure. A radiopaque "V"-shaped form is superimposed on a regular picture of a tooth's crown. Depending on the individual appearance and complexities, talon cusp management may be traditional or progressive. Since small talon cusps are asymptomatic, there is no need for therapy. **Objective**: The purpose of this article is to give a comprehensive knowledge on talon cusps for etiology, prevalence, clinical features and management based on recent literature. **Conclusion**: Talon cusp is a serious dental anomaly, since it can make diagnosis and recovery preparation difficult for clinicians. The scale, presenting problems, and patient cooperation both affect how talon cusp is handled and treated.

Keywords: Talon Cusps, Aetiology, Features, Treatment

Dentistry/Oral and Maxillofacial Pathology
Mercy Multispeciality Dental Centre
8/27, Parvathipuram 1st Street, Thiruneermalai Main Road, Chrompet, Chennai, Tamilnadu, India.

Corresponding Author:

Dr. Karthik Shunmugavelu
Consultant – Dentistry/Oral and Maxillofacial Pathology
Mercy Multispeciality Dental Centre
8/27, Parvathipuram 1st Street, Thiruneermalai Main Road, Chrompet, Chennai, Tamilnadu, India.
Mobile: 0091-9789885622/9840023697
Email: drkarthiks1981@gmail.com

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Introduction

Talon cusp is a tooth defect that protrudes from the cingulum or cementoenamel junction of the maxillary or mandibular anterior teeth. A cusp is a morphologically well-defined projection from the lingual/palatal surface of a main or permanent anterior tooth that extends at least half the distance from the cementoenamel junction to the incisal tip[1]. A talon cusp is an accessory cusp-like dental anomaly that projects from the cingulum or cementoenamel junction to the incisal edge of the maxillary or mandibular anterior teeth in both primary and permanent dentition. The cusp is made up of regular enamel, dentin, and various extensions of pulp tissue, but due to its superimposition on the main pulp chamber, its structure is difficult to ascertain.[2] Regular enamel and dentine, and differing degrees of pulp tissue, make up the talon cusp. Males and females may have it unilaterally or bilaterally. Mitchell was the first to describe a talon cusp on a woman's upper central incisor as "a mechanism of horn-like form curving from the base downwards to the cutting edge" in 1892[3]. Mellor and Ripa coined the word "talon" cusp in 1970 to describe its shape, which resembles an eagle's talon. Talon cusp affects only a limited proportion of the

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population, with figures varying from less than 1% to around 8%. This effect was later called a talon cusp by Ripa and Mellor because of its similarity to an eagle's talon[3].

The definition for this condition in the anterior teeth is not well described in the literature, which uses terms like talon cusp, accentuated cingulum (when it impacts the lingual or palatal surface), and dens evaginatus to explain it (the term that is usually used when it is present in the posterior teeth). The verrucose protuberance on the occlusal surface of the damaged teeth in dens evaginatus may be made of enamel, enamel and dentine, or enamel, dentine, and a slight extension of the pulp tissue. The purpose of this article is to give a comprehensive knowledge on talon cusps based on recent literature.

Aetiology

While the precise cause is unclear, it is believed to be a multifactorial aetiology involving a mixture of environmental and genetic factors. Outfolding of the inner enamel epithelial cells, as well as a temporary focal hyperplasia of the mesenchymal dental papilla organ or hyperactivity of the dental lamina, was thought to cause it during the morphodifferentiation stage of tooth growth. A significant genetic impact has been proposed by the presence of talon cusp in immediate family members. Talon cusp may be seen alone or in combination with other dental abnormalities including mesiodens, complex odontome, macrodontia, unerupted or impacted teeth, peg-shaped maxillary incisor, and dens invaginatus.

The aetiology of the talon cusp's formation is uncertain. However, it has been proposed that a mixture of genetic and environmental causes, as well as the hyperactivity of the dental lamina during early odontogenesis, play a part. Patients with Mohr syndrome, Sturge–Weber syndrome, Rubinstein–Taybi syndrome, incontinentia pigmenti achromians, or Ellis–van Creveld syndrome have also been reported to have talon cusps[4]. A multifactorial etiology affecting both genetic and environmental influences is strongly supported[5]. The morphologic stages and physiologic processes of tooth growth are classified into six morphologic stages and five physiologic processes. Any anomalies in these stages/processes of tooth production will lead to unexpected outcomes. Anomalies such as talon cusps, fusion, mesiodens, dens invaginatus, peg laterals, and mulberry molars may result from morphodifferentiation disruptions[6].

Prevalence

Talon cusp affects both sexes and can be unilateral or bilateral in primary and permanent incisors. Males have a greater level of incidence than females. The maxilla is affected in 92% of cases, while the mandible is affected in 8% of cases. In the main dentition, only central incisors are involved, and the maxillary lateral incisor (67%) is the most frequently impacted in the permanent dentition, followed by the central incisor (24%) and canine (3%). Talon cusps come in a variety of shapes, sizes, structures, locations, and origins. The prevalence has been stated to be 0.06 percent in Mexicans, 7.7 percent in northern Indians, and 1.2 percent in Turkish dental patients. Chinese[5] and Arabs have been shown to have talon cusps in very large numbers[7]. According to a study of the literature, 25% of cases are in the main dentition and 75% are in the permanent dentition[8,9]. The cusp can be unilateral or bilateral, with a preference for the maxilla over the mandible, and males have a higher frequency than females[10,11]. The most often affected teeth are the maxillary lateral incisors in the permanent dentition and the maxillary central incisors in the main dentition.[4,7]

Classification

Hattab and colleagues[12] suggested a classification scheme for these irregular cusps based on their degree of development and extension:

Type I is a "true talon," a morphologically well-delineated cusp that projects at least half way from the cemento-enamel junction to the incisal edge. Type II is a "semi talon," a morphologically well-delineated cusp that projects at least half way from the cemento-enamel junction to the incisal edge length of 1 mm or more but extends less than half the distance between the cementoenamel junction and the incisal tip. The additional cusp in Type III is called a "trace talon" since it is inflated and conspicuous, stretches less than half way from the cemento-enamel junction to the incisal tip. A "trace-talon," or expanded and prominent cingulum, is Type III.

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Clinical features

Both sexes have been confirmed to have talon cusps, which may be unilateral or bilateral. According to previous accounts of talon cusps in the main dentition, the cusps are all found on the maxillary central incisors. If the phenomenon is unilateral, it would be more on the left side. There have been many reported clinical cases of predominantly facial talon cusps, 75 % of which were found in permanent dentition, including the latest study[13]. The palatal or lingual surfaces of the anterior teeth normally have talon cusps. Vertical cristae (rugae adamantineae) on the facial side of the teeth are an unusual variation often used on the maxillary incisor[14]. A ridge of enamel that crosses the middle of the vestibular surface of the tooth in a cervical-incisal direction, as in the case mentioned in this article, is a distinguishing feature of Rugae adamantineae. If the appearance of a talon cusp is related to issues like impaired esthetics, occlusal intervention, tooth displacement, caries, periodontal complications, or inflammation of the soft tissues during speech or mastication, a talon cusp is not always an indicator for dental care. Based on the size and form of the infected tooth, as well as the complications created by the swollen cusp, the clinical treatment of this anomaly can vary greatly[15–18]. A talon cusp is normally asymptomatic, and it's often discovered by chance during a routine dental exam. Where a talon cusp is symptomatic, it normally causes issues with occlusion, voice, and appearance.

Caries susceptibility, occlusal intervention, and impaired esthetics are the most common issues associated with a talon cusp. Conservative recovery approaches should be used under the constraints of these issues. In such cases, a comprehensive clinical and radiographic review is needed for effective diagnosis and treatment planning. Talon cusps can cause issues such as compromised esthetics and occlusal interference, which can result in accidental cusp fracture, displacement of the affected tooth, caries developmental grooves, food stagnation, tongue and lip irritation, speech problems, dental sensitivity, breastfeeding issues, temporomandibular joint pain, and periodontal problems due to excessive occlusion.

The cosmetic, diagnostic, functional, and pathological problems of talon cusp are all present. A tooth with a broad talon cusp has an unattractive look[13,15,17]. If the talon cusp is not fully erupted, it can appear on radiograph as a compound odontome or a supernumerary tooth, contributing to a misdiagnosis. Occlusal interference, tooth displacement, lip and tongue trauma, and voice disorders are also examples of functional issues. Carious involvement in deep grooves causes periapical pathology, and is a pathological complication. Traumatic occlusion, accidental cusp fracturing, and even tooth displacement may all be caused by irregular occlusal forces. Pulp toxicity and periapical pathology may result from extreme attrition of these cusps.

Radiographic features

A talon cusp occurs radiographically as a "V"-shaped radiopaque structure. A radiopaque "V"-shaped form is superimposed on a regular picture of a tooth's crown. The shape and size of the cusp, as well as the angle of the radiograph, will alter this appearance. It normally occurs on radiographs as true talon or semi talon, or tubercle-like, as in trace talon, arising from the cervical third of the root and superimposed over the crown of the tooth. In mandibular cases, the point of the 'V' is reversed. The shape and scale of the cusp, as well as the angle at which the radiograph is taken, affect the appearance. Enamel, dentine, and varying quantities of pulp tissue make up this structure.[11] Because of its superimposition over the main pulp chamber, determining the degree of pulp extension into the cusp is challenging. Big talon cusps, it has been proposed, are more likely to contain pulp tissue.[19]

Photographs are insufficient to explain the intricate morphology of the crown of such an anomaly due to the two-dimensional limitations of radiographs. However, due to the advancement of cone-beam computed tomography (CBCT), successful diagnosis and care are now possible. The use of CBCT has become more popular in a variety of dental specialties. CBCT was created to produce an undistorted three-dimensional (3-D) recreation of the maxillofacial skeleton as well as three-dimensional photographs of the teeth and their underlying tissues.[13] CBCT scans are useful for learning about dental pathology and planning care[19].

Management

Depending on the individual appearance and complexities, talon cusp management may be

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traditional or progressive. Since small talon cusps are asymptomatic, there is no need for therapy. Easy prophylactic steps such as fissure sealing or composite repair should be used in situations where deep developmental grooves are present. To minimize exposure and promote reparative dentine production in the case of occlusal interference, the bulk of the cusp is progressively and regularly diminished with topical fluoride treatment. In certain cases, a complete reduction of the cusp is needed, followed by root canal operation.[20]

No treatment,[21] sequential grinding,[19] pit and fissure sealants, pulp therapy, restorative treatment, absolute crown coverage, and replacement of the infected tooth are all options for treating talon cusps. Since a talon cusp on an unerupted tooth may be misinterpreted radiographically as a supernumerary tooth, compound odontoma, or dens in dente, a definitive diagnosis of a talon cusp cannot be made based solely on radiographic results.[22]

Just a few cases of facial talon cusps treated fully were documented in the literature. After removing a mandibular left central incisor with a talon cusp for esthetic purposes, McNamara and colleagues used orthodontics to close a space.[23] With a maxillary right permanent central incisor, de Sousa and colleagues performed an esthetic reconstruction during root canal surgery.[24] Gradual cuspal grinding and resin-based composite reconstruction of a facial talon cusp on a maxillary permanent left central incisor were used in a case recorded by Glavina and Skrinjaric.[25] Another case recorded by Kulkarni and colleagues included the reduction of a talon cusp every 45 days, followed by the application of fluoride varnish for 9 months.[26]

A talon cusp is made up of regular enamel and dentin, with the possibility of pulpal extension. Place, form, scale, function, and number are all clinical variants of the talon cusp. Based on whether or not pulpal extensions are present, different care regimens have been used to cure talon cusps. Pulpotomy may be achieved using calcium hydroxide or mineral trioxide aggregate content if there is pulpal expansion[27]. No pulpal extension was found in this situation, and these materials were not used.[28]

Small talon cusps are normally asymptomatic, and there is no need for therapy. Wide talon cusps, as in our situation, may, however, create issues for the patient. The dentist's diagnosis and recovery preparation are also complicated.[29] Treatment for talon cusps is based on whether the cusp is similar to the pulp or contains pulp which requires a thorough clinical review.[30]

Conclusion

Talon cusp is a serious dental anomaly, since it can make diagnosis and recovery preparation difficult for clinicians. The scale, presenting problems, and patient cooperation both affect how talon cusp is handled and treated. Early talon cusp diagnosis aims to prevent local problems including caries, periodontal disease, and malocclusion. Talon cusp may occur in the presence of other systemic diseases or dental abnormalities. Clinicians must be mindful of developmental anomalies, their differences, health conditions, and medical options for their management at all times. Selective cusp is one of the management choices. Depending on the severity of the complications present, various management options include selective cuspal grinding of accessory cusps and application of fluoride as a desensitizing agent, complete reduction of cusp followed by root canal treatment, and complete reduction of cusp followed by root canal treatment.

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Conflict of interest

No conflicts of interest.

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