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TRETMAN STALNOG CENTRALNOG SEKUTIČA SA TALONOVOM KVRŽICOM: SLUČAJ POGREŠNE DIJAGNOZE I ODLOŽENOG LEČENJA

MANAGEMENT OF A PERMANENT MAXILLARY CENTRAL INCISOR WITH A TALON CUSP: A CASE OF MISDIAGNOSIS AND TREATMENT DELAY

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Sažetak

Uvod: Prisustvo talon kvržice je važno za diferencijalnu dijagnozu jer se može pomešati sa drugim dentalnim anomalijama, kao što je fuzija zuba. Pogrešna dijagnoza može dovesti do odloženog ili neodgovarajućeg lečenja, što može izazvati dalje komplikacije.

Prikaz slučaja: Zdrava 7-godišnja devojčica je upućena oralnom hirurgu na lečenje zbog strukture nalik zubu u prednjoj maksilarnoj regiji. Dijagnostikovana je fuzija desnog maksilarnog centralnog sekutića sa meziodensom, ali je konačni tretman odložen dok se razvoj korena ne završi. Na snimku kompjuterizovane tomografije sa konusnim snopom (CBCT), napravljenom na kontrolnom pregledu dve godine kasnije, uočena anatomija zuba nije odgovarala početnoj dijagnozi. Pacijentkinja je prvo upućena na endodontsku terapiju, a kasnije, sa napunjenih 11 godina, na Univerzitetku stomatološku kliniku. Desni maksilarni centralni sekutić je imao izraženu, dobro omeđenu akcesornu kvržicu na palatinalnoj površini koja se protezala do nivoa incizalne ivice, na prvi pogled, nalik na spojeni meziodens. Dodatna kvržica je stvorila okluzalnu interferenciju sa labijalnim pomeranjem zahvaćenog zuba, što je rezultiralo kompromitovanom dentalnom estetikom i povećanim rizikom od traume zuba.

Rezultati: Postavljena je dijagnoza palatinalne kvržice sa rogom pulpe prema unutra. Shodno tome, rog pulpe je skoro potpuno eliminisan u četiri posete u periodu od šest meseci, dajući kruni normalnu morfoloiju. Ovaj tretman omogućio je adekvatan prostor za ortodontsku retrakciju zuba.

Zaključak: Stomatolozi bi trebalo da budu svesni kliničkih karakteristika talonove kvržice i njenog radiografskog izgleda da bi postavili tačnu dijagnozu i pružili odgovarajući tretman.

Ključne reči: Talonova kvržica, dentalna morfoloija, dentalna anomalija, stalni maksilarni sekutić, diferencijalna dijagnoza

Abstract

Background: The presence of talon cusp is important for differential diagnosis as it can be confused with other dental anomalies, such as fusion of teeth. Misdiagnosis can lead to delayed or inappropriate treatment, which may cause further complications.

Case presentation: A healthy 7-year-old girl was previously referred to an oral surgeon to be treated for an extra tooth-like structure in the maxillary anterior region. Fusion of the right maxillary central incisor with a mesiodens was diagnosed, but definitive treatment was deferred until root development was complete. On a cone-beam computed tomography (CBCT) scan, made at a follow-up two years later, the observed tooth anatomy did not match the initial diagnosis. The patient was referred first to an endodontic office and later to the University Dental Clinic, where she was examined at the age of 11 years. The right maxillary central incisor exhibited a pronounced, well-demarcated accessory cusp on the palatal surface extending to the level of the incisal edge, on first sight, resembling a fused mesiodens. The accessory cusp had created occlusal interference with labial displacement of the affected tooth, resulting in compromised dental esthetics and an increased risk for dental trauma.

Results: A diagnosis of free true palatal talon with a pulp horn inside was made. Accordingly, the talon cusp was almost completely eliminated in four visits over a period of six months, giving the crown a normal morphology. This allowed adequate space for orthodontic retraction of the tooth.

Conclusion: Dentists should be aware of the clinical features of talon cusp and its radiographic appearance to make an accurate diagnosis and provide appropriate treatment.

Key words: talon cusp, dental morphology, dental anomaly, permanent maxillary incisor, differential diagnosis

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Introduction

Talon cusp is a developmental anomaly which takes the form of an additional cusp or ridge on the lingual or labial surface of primary or permanent anterior teeth. Some authors consider talon cusp as a subset of *dens evaginatus*^{1,4}; however, histological structure, geographic distribution, and lack of association with its counterpart on posterior teeth, mainly premolars, favor a hypothesis that they are independent clinical entities^{5,6}. A recent meta-analytic study estimated that it affects 1,67% of the current world population⁷. The anomaly most frequently occurs on the palatal aspect of the permanent maxillary incisors^{1,8}. In the permanent dentition, the talon cusp shows a preference for expression in lateral rather than central maxillary incisors whereas the reverse is true for the primary dentition^{1,5,6,9-12}. Talon cusp may occur bilaterally with variable expressivity, but unilateral occurrence is predominant^{6,13}. The co-existence of labial and lingual talon cusps on the same tooth has also been observed in a small number of cases¹⁴⁻¹⁸. Epidemiological studies indicate either no sex predilection^{1,6,8,13} or higher prevalence in females⁵. The etiology is multifactorial, combining both genetic and environmental factors¹⁹. Talon cusp's clinical implications are variable and include compromised dental esthetics, tongue irritation during speech and mastication, breast-feeding problems, advanced attrition, occlusal interference, displacement of the affected tooth with a tendency to dental traumatism, and caries lesions in developmental grooves delineating the cusp^{2,20-24}. Moreover, talon cusp may occur as an isolated anomaly or coexist with numerous other dental anomalies and syndromes^{3,7,8,10,17,19,20,25-27}. Noteworthy, in affected children, the frequency of supernumerary teeth in the anterior maxilla is higher⁵. Thus, treating children with talon cusp often requires a multidisciplinary approach. In light of the mentioned facts, it is not surprising that there has been a sustained research interest in this clinical entity. A case of talon cusp reported here is unique in that it shows how misdiagnosis results in treatment delay and increased clinical complications.

Case Presentation

A 7-year-old Caucasian girl was initially referred to an oral surgeon to be treated for an extra tooth-like structure in the maxillary anterior region. Based on clinical examination and periapical radiography, fusion of the right maxillary central incisor with a mesiodens was

diagnosed, but definitive treatment was deferred until root development was complete. A cone-beam computed tomography (CBCT) scan, made at a follow-up examination two years later, showed that the additional structure was part of the central incisor itself and not a supernumerary tooth. The patient was referred to an endodontist who subsequently diagnosed the talon cusp and proposed reshaping the tooth with the final objective of facilitating tooth alignment. With this opinion, the patient returned to her dentist, who then decided for referral to the University Dental Clinic. Multiple referrals and adverse medical conditions during the covid-19 pandemic additionally increased the treatment delay.

When attending the University Dental Clinic, the patient was 11 years old and her chief complaint was an unsightly dental appearance. Her medical and family history was unremarkable. Intraoral examination revealed labial displacement of the right maxillary central incisor (Figure 1A), which exhibited a protrusion in the form of a pointed cusp (width 3.8 mm, length 7.6 mm) on the palatal surface, extending from the cingulum portion to the level of the incisal edge (Figure 1B). In occlusion, the cusp was in contact with the mandibular central incisor. The affected tooth was noticeably broader than its antimere. The maximum mesio-distal diameter of the crown was 8.9 mm compared to 7.8 mm for the normal left central incisor; however, both values are within the range of 7.5 mm to 9.8 mm, recently reported for a sample of morphologically normal maxillary central incisors extracted from Slovene dental patients²⁸. All maxillary incisors responded adequately to cold and electric stimulation. Clinical and radiographical examination confirmed the diagnosis of unilateral talon cusp. According to the classification system recently proposed by Decaup et al.⁷, it was further specified as a free true palatal talon, corresponding to a palatally located additional free cusp extending more than half the length from the cemento-enamel junction to the incisal edge. Re-examination of the CBCT scan revealed a pulp horn inside the talon (Figure 2).

A Class II molar relationship (full-cusp on the left side and half-cusp on the right side) with an increased overjet was diagnosed. Upon cephalometric analysis, the increased overjet was judged to be mainly dental in origin since the orthognathic positions of both jaws. More in detail, a clear discrepancy in the inclination of the right and left maxillary central incisors was measured, with the left central incisor

showing a mild degree of proclination (5° above the normal value), while the right maxillary incisor was severely proclined (11° above the normal value). Therefore, the elimination of the talon cusp was necessary to allow for orthodontic repositioning of the tooth. The treatment objectives included preserving pulpal vitality and meeting esthetic and occlusal requirements. A two-phase management involving gradual grinding of the talon cusp and orthodontic therapy was proposed to the patient and her parents. The informed consent was obtained, and the patient was scheduled for the first selective grinding procedure after one week.

The first step in each appointment was the fabrication of a palatal matrix from silicone impression material (Exaflex Putty, GC America, Alsip, Illinois, USA). The impression material was formed to cover the palatal and incisal aspects of the affected tooth and two adjacent incisors. The matrix was cut in a labiolingual direction at the maximum height of the talon cusp and used to assess the amount of cusp reduction (Figure 3A). In each visit, around 1.5 mm of tissue was removed from the

palatal surface of the cusp using water-cooled flame-shaped and conical diamond burs in a high-speed handpiece. In four visits separated by successive intervals of one, two, and three months, the talon cusp was completely removed without exposing the pulp (Figures 3B and 3C). In the last two visits, the procedure was carried under infiltration anesthesia using mepivacaine hydrochloride and levonordefrin 1:20,000 injection (Scandonest 2% L, Septodont, Saint-Maur-des-Fossés, France). After each grinding, a protective varnish (Cervitec F, Ivoclar Vivadent, Schaan, Liechtenstein) was applied to the palatal surface, and the advice to use desensitizing toothpaste was given. The only complaint reported by the patient was mild sensitivity to cold experienced between the appointments. The responses to cold and electric pulp vitality tests remained comparable to those obtained in the contralateral central incisor. At one-year recall, the tooth was clinically and radiographically without pathological findings. The patient was referred for orthodontic treatment.

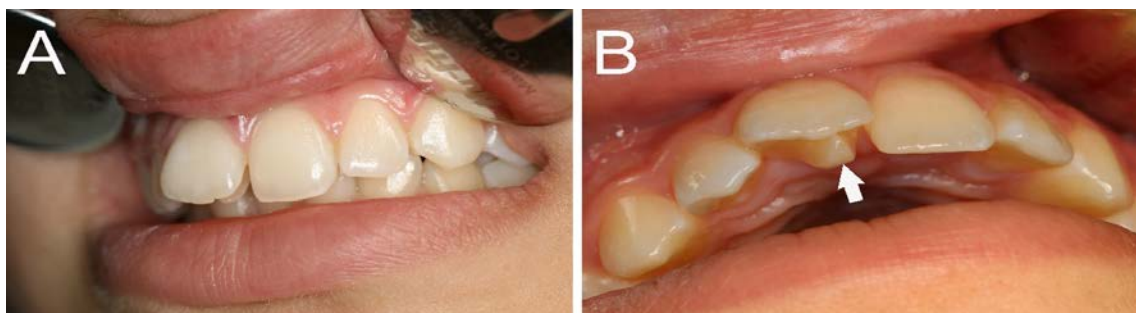


Figure 1. Maxillary anterior teeth from the left facial (A) and incisal aspects (B). The additional cusp is arrowed.

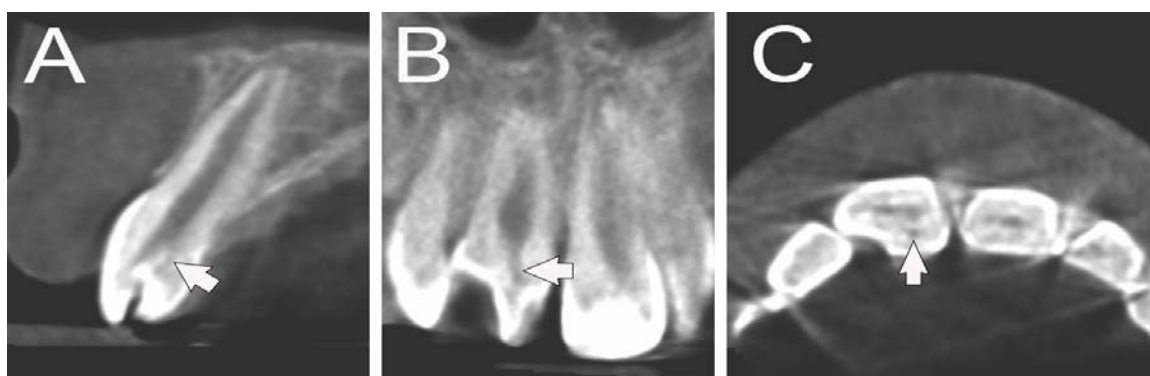


Figure 2. Cone-beam computed tomography images of the right maxillary central incisor: labiopapatal longitudinal section (A), mesiodistal longitudinal section (B), horizontal section of the crown (C). Arrows indicate a narrow extension of the pulp tissue from the pulp chamber into the cusp.



Figure 3. Palatal matrix in place before grinding (A). The amount of talon cusp reduction achieved after two (B) and four grinding sessions (C), respectively.

Discussion

A talon cusp on an unerupted maxillary incisor may mimic the radiographical appearance of a mesiodens or compound odontoma, making diagnosis challenging^{10, 21, 29}. Moreover, it was noted that on examination partially erupted incisor with a talon cusp gives the illusion of a supernumerary tooth erupting palatally, particularly when an isthmus of mucosa persists between the crown and the accessory cusp¹⁹. As described in the present case, such diagnostic errors indeed occur and can lead to delayed or even incorrect treatment, e.g., unnecessary surgical intervention.

The presence of talon cusp may or may not cause clinical problems. In patients with clinical problems, reduction or complete elimination of the talon cusp by grinding usually represents a key part of the overall treatment. However, this procedure carries a risk of pulp exposure because a horn of pulpal tissue is usually present inside the talon cusp. Thus, the talon cusp should be reduced gradually, over several months, with 4- to 8-week intervals between subsequent visits to allow time for the deposition of reparative dentin^{24, 30-32}. Moreover, grinding should not be accomplished from the cusp tip but from the palatal surface because this results in a much larger surface area of odontoblasts producing reparative dentin³¹. Application of a desensitizing agent after grinding has been recommended by virtually all authors. The amount of tissue removed from the cusp in one appointment should not exceed 1.5 mm^{25, 32}. The latest step forward is a recently proposed visual method for estimating the amount of cusp reduction achieved in each visit by using a custom matrix made from impression material³². In the present case, we opted for a gradual reduction of the cusp for 6

months, which allowed reparative dentin formation and pulp vitality to be retained. The above guidelines were taken into account because the pre-treatment CBCT scan clearly showed the pulp extension inside the talon cusp. The use of a custom matrix proved to be a simple and time-efficient method for tracing the amount of eliminated tissue. The patient was followed up for one year without any postoperative complications.

Histological investigations revealed that pulpal tissue is not always present in the talon cusp^{20, 33, 34}. In such cases, talon cusp reduction can be a one-visit procedure³⁵. However, the presence and extent of the extra pulp horn are difficult to assess on conventional dental radiographs because the talon cusp is superimposed over the image of the affected tooth crown^{19, 34, 36, 37}. In Turkish and Malaysian cohorts, periapical radiography revealed pulpal extension into the talon cusp in 17% and 36% of the affected teeth, respectively^{6, 8}. It appears that talon cusps which are separated from the palatal surface more likely contain pulpal tissue^{20-22, 34}. This is in line with findings from the present case report. Thus, gradual cusp reduction is recommended for preserving pulp integrity, except when the presence of pulp extension can be ruled out by CBCT examination or when the pulp is already irreversibly inflamed or necrotic as a result of untreated caries, trauma, or traumatic occlusion and subsequent endodontic therapy will be required³⁸.

In the present case, the main clinical problem associated with talon cusp was the labial displacement of the affected tooth, resulting in compromised esthetics and an increased risk of dental trauma. There is a tendency for spontaneous realignment of the affected tooth and/or its opponents after cusp reduction^{19, 39}; however, no improvement

was observed in our case due to lack of space in the upper dental arch. With the same treatment approach performed shortly after tooth eruption, there would probably be no need for complex orthodontic therapy. The reasons for the mesio-distal broadening of the affected central incisor remain elusive. Mays⁹ speculated that it could indicate an underlying formation of a double tooth. Alternatively, tooth crown broadening and talon cusp may be associated via a common developmental pathway linked with the aberrant hyperactivity of the anterior end of the dental lamina⁴⁰.

Conclusion

Dentists should be aware of the clinical features of talon cusp and its radiographic

appearance to make an accurate diagnosis and provide appropriate treatment. In this regard, the presence of a talon cusp should be included in the differential diagnosis of alterations associated with anterior teeth morphology and their eruption anomalies because early diagnosis and proper treatment plan might prevent the development of further clinical problems.

Disclosure of competing interest

The authors have none to declare.

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