INFLUENCE OF TALON CUSP IN OCCLUSAL PLANNING FOR A PIER ABUTMENT

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ABSTRACT Developmental disturbance of the teeth and associated structures may present clinically in a very mild or severe form. An extra cusp may sometimes look innocuous but clinically may impact the entire occlusal scheme if present on a critical tooth surface. Talons cusps are basically a form of dens evaginatus that are present on palatal surfaces of anterior teeth. This article describes a case of a talon cusp on a deciduous maxillary canine in permanent dentition, whose anatomical features were not distinct. The patient also had a pier abutment on the same side. The missing teeth were rehabilitated by fabricating a fixed-movable bridge in relation to the pier abutment in two different sections. The influence of the talon cusp on existing occlusion was minimal, although occlusal influences of such abnormality have been discussed.

KEYWORDS occlusion, abutment, metal ceramic, nonrigid connector, fixed partial denture

Introduction

A talon on cusp of a natural tooth is a developmental anomaly in nature. It basically means that there is an extra cusp on an already fully or partially developed tooth cusp. The talon cusp is usually smaller than the parent cusp in such cases. It was reported in 1892 AD,[1] but later named Talon cusp.[2] It was named talon, as it resembles the eagle talon (claw). Dens evaginatus is the scientific term given to such a condition. Based on the evidence, it has been reported to occur between 0.06 (Mexican) to 7.7% (North Indian). Comprehensive studies on developmental dental anomalies in the Arab population lack specific data on the incidence of talon cusp in the Arab population. [3] Depending upon the tooth involved, its extension varies. It has been, however, reported to be associated with cementoenamel junctions from where it may extend to the incisal edge. [4] With aetiology still not clear, it is believed to occur during the morphodifferentiation stage of development, in which enamel forming cells (inner enamel epithelium) bulges outwards in the form of focal hyperplasia.[5] Based on the extension, it has been classified as type 1 (at least half distance), type 2 (less than half distance), type 3 (enlarged prominent single like a cone) from the CEJ to the incisal edge. [6] Histologically, it may contain enamel, dentine and pulp.[7] Male predominance in occurrence is established.[8] It has been postulated that genetic and environmental factors have a key role in such development.[9] Among the three different types of dentition (deciduous, mixed and permanent), it is predominantly found in permanent (75%) teeth, with the majority being in the maxillary arch. [7] Clinically, they are observed to cause problems in masticatory functions, esthetics and difficulty in diagnosis. [10]

When present on the occlusal surfaces, they pose problems establishing occlusal schemes on dental prostheses. A pier abutment has been defined as an intermediate abutment (natural tooth) that is located between two abutments or two edentulous spaces and may serve as a support for a fixed or a removable partial denture. [11] Restoring both edentulous spaces simultaneously with a single prosthetic design has been shown to result in marginal leakage, debonding, and/or secondary caries. [12,13] Ideal approach mentioned in textbooks and journals is using a non-rigid connector that permits micromovements between two sections of a fixed partial denture. [14]

We present a case of a dental patient who presented with unusual anatomy of permanent maxillary canine, talon cusp on
retained maxillary right canine, a pier abutment situation on the same side of the arch.

Case report

An adult male patient aging 32 years, presented to the undergraduate clinical fixed course (SDS 541/542) with the chief complaint of poor dental/facial esthetics and inability to masticate because of loss of upper teeth. Patient social, medical and drug history did not reveal any negative findings that would have impacted the treatment outcome of the prosthetic treatment. Extraoral examination revealed normal features for all parameters, while intraoral examination revealed a Kennedy class 3 modification 1 partial edentulous space on the right side of the maxillary arch (Fig 1A). Maxillary right side deciduous canine was retained and a talon cusp (type 3). The permanent canine had erupted but lacked morphological features considered normal (Fig 1B). When checking on the occlusion, it was observed that patient was able to close all teeth in centric, while during eccentric movements, there was no interference in the posterior arches (Fig 1C, D). Diagnosis and treatment planning started by making diagnostic impressions with irreversible hydrocolloid (CA 37; Cavex, Haarlem, Holland).

A diagnostic mounting on a semi-adjustable articulator (Whip Mix series 3000; Elite Dental Services, Inc, Orlando, Fla). Different treatment plans were made based on occlusal analysis and data collected from the patient. An implant-supported two single crowns were the first choice, a fixed-movable bridge as the second choice and a removable partial denture as the last choice. After thorough patient education regarding the advantages and disadvantages of each treatment option, informed consent was obtained from the fixed movable bridge in relation to the missing teeth.

A fixed movable bridge was planned in two different sections. First, the anterior segment involving canine and second premolar was prepared (Fig 2B), followed by temporization and metal trial (Fig 2B). After the porcelain trial, the anterior segment was cemented in place (Fig 2C). In the second half of the fabrication of the fixed-movable bridge, the maxillary right second molar was prepared. After impression making and die preparations, a two-unit wax pattern was fabricated with an occlusal rest on the mesial side of the pattern (Fig 3A). This rest was prepared to be supported by the second premolar on which the distal rest seat was prepared to accommodate the rest. The combined assembly, thus, constituted a non-rigid connector. After doing the metal trial procedure for the second section, the feldspathic porcelain was fused to the metal (Fig 3B) and later cemented in the mouth (Fig 3C and D). Excess cement was removed after the cement was set. The patient was instructed regarding the oral hygiene maintenance with the prosthesis and was put on a follow-up protocol (1 week, 1 month, 6 months and every year). During his follow up visits (Fig 4), he was extremely satisfied with the prosthesis outcome (esthetic and mastication).

Discussion

Complete treatment of a case having a talon cusp on a deciduous canine complex by a pier abutment partial edentulous situation has been described in this report. The deciduous tooth was not extracted since it resulted in a more complex esthetic situation. The decision to not extract the deciduous tooth still resulted in a rare but less complex and unexplored esthetic situation. The maxillary arch on the right side has two canines (one deciduous retained and the other permanent). Posterior placement of an extra tooth did impair esthetics. The patient was educated about sudden changes of facial are very catchy to the observer. With his informed, educated consent, the existing natural anterior
Reports on deciduous teeth are scarce in the literature, although it is associated with deciduous dentition in prevalence studies. The deciduous canine, in this case, was short, which is why there was no interference in occlusion as a result of a talon on a cusp.

Nevertheless, at the same time, there was no canine guidance on the side of the talon. This was because the mandibular canine did not contact the maxillary deciduous canine during protrusion or lateral excursion. In case the talon would have been present on a permanent canine, and the same canine would have been at its right place, then the palatal talon would result in occlusal problems. Talon cusp on the cingulum of an anterior tooth will change the anterior guidance of the occlusion. Depending on the size, shape and extent, it will impair the protective mechanism of mutual protection in natural dentition. A convex surface of a talon will prevent the functioning of anterior guidance more than a straight or a concave surface. Lateral extensions of the talon may not cause much impairment since the lateral surface will have reduced convexity as it moves laterally. While one encounters a talon cusp, the extent of the overjet and overbite must be analysed clinically.

With decreased overjet and overbite, the impact of the talon cusp on existing occlusion is high. Chances of developing a temporomandibular joint problem (pain, masticatory muscle spasm, disk derangement) have been considered high if there is any occlusal interference in the centric. [17] A talon with a convex surface on anterior teeth may displace the mandible posteriorly during occlusion. [18] Posterior displacement of the condyle compresses the retrodiskal tissues which contain nerves and vessels. Chronic posterior displacement ultimately gives rise to degeneration of the disc since there is always a protective mechanism within temporo mandibular joint to avoid such interference. This usually takes place at the cost of mandibular movement which has to be altered to avoid interference resulting in temporo mandibular joint disorder. Other less common but significant occlusal problems associated with a large talon on the anterior tooth are impaired aesthetics and accidental fracture of the cusp. Besides, the anatomy of a talon on the lingual surface of any tooth will be a potential site for caries development. In such cases, pits and fissures attached to a talon should be sealed. [19] In cases where a large talon is present, and there is evidence of pulp tissue, one must do endodontic treatment of the tooth or even go for extraction. [19]

The use of a precision attachment and a semi-precision attachment has been advised to overcome the problem of pier abutments. A semi-precision attachment can be fabricated by the laboratory technician during the wax pattern fabrication. [20]

Conclusion

The talon cusp of a natural tooth poses problems in natural as well as artificial occlusion. Its prevalence among the Saudi population has not been distinctively investigated, for which qualitative and quantitative studies are recommended. Existing overjet and overbite is essential clinical parameters that define their impact on occlusion.

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Conflict of interest

There are no conflicts of interest to declare by any of the authors of this study.

References

1. Mitchell WH: Letter to the editor. Dental Cosmos 1892, 34:1036.
2. Mellor JK, Ripa LW: Talon cusp: a clinically significant anomaly. Oral Surg 1971, 29:225-228
3. Vani NV, Saleh SM, Tubaigy FM, Idris AM. Prevalence of developmental dental anomalies among adult population of Jazan, Saudi Arabia, The Saudi Journal for Dental Research, 2016;7(1): 29-33,
4. Sedano HO, Carreon Freyre I, Garza de la Garza ML, Gomar Franco CM, Grimaldo Hernandez C, Hernandez Montayo ME et al. clinical orodental abnormalities in Mexican children. Oral Surg Oral Med Oral Pathol, 68(3): 300–11, 1989.
5. Mallineni SK, Panampally GK, Chen Y, Tian T. Mandibular talon cusps: A Systematic review and data analysis. J Clin Exp Dent. 2014 Oct 1;6(4):e408-13.
6. Chawla HS, Tiwari A, Gopalkrishna NS. Talon cusp – a prevalence study. J Indian Soc Pedod Prev Dent; 1(1): 28–34, 1983.
7. Jowharji N, Noonan RG, Tylka JA: An unusual case of dental anomaly. A “facial” talon cusp. J Dent Child 1992, 59:156-158.
8. Hattab FN, Yassin OM, Al-Nimri KS: Talon cusp in the permanent dentition associated with other dental anomalies: Review of literature and reports of seven cases. J Dent Child 1996, 63:368-376.
9. Shafer WG, Hine MK, Levy BM: A textbook of oral pathology. 3rd edition. Philadelphia: W.B. Saunders Co; 1974:38.
10. Hattab FN, Hazza’a AM: An unusual case of talon cusp on geminated tooth. J Can Dent Ass 2001, 67:263-266.

11. The glossary of prosthodontic terms. J Prosthet Dent 2005;94:10-92.

12. Botelho MG, Dyson JE. Long-span, fixed-movable, resin-bonded fixed partial dentures: A retrospective, preliminary clinical investigation. Int J Prosthodont 2005;18:371-6.

13. Mattoo KA, Jain S. Managing a case of sensitive abutment situations through use of a Fixed Movable Prosthesis – A clinical report. Journal of Medical Science and Clinical Research 2014;2(7):1858-63

14. Gaba N, Mattoo K. Converting a removable prosthetic option into fixed by using custom made non rigid connector. WebmedCentral DENTISTRY 2014;5(9):WMC004695

15. Mader CL: Mandibular talon cusp. J Am Dent Ass 1982, 105:651-653.

16. Abbott PV. Labial and palatal “talon cusp” on the same tooth: A case report. Oral Surg Oral Med Oral Pathol Oral teeth. Radio Oral Endod. 1998; 86: 726-730.

17. Sanu OO: Talon cusps in two siblings. J Med med Sc 2001, 3:35-38

18. Hattab FN, Yassin OM, Al-Nimri KS: Talon cusp: clinical significance and management with reference to aetiology. Quint Int 1995, 26:115-120

19. Oredugba FA. Mandibular facial talon cusp: case report. BMC Oral Health. 2005 Dec 8;5:9.

20. Mattoo K, Brar A, Goswami R. Elucidating the problem of pier abutment through the use of a fixed movable prosthesis – A Clinical case report. International Journal of Dental Sciences and Research 2014; 2(6):154-157