

Ternion Cusp: An Unusual Variant of Talon's Cusp: A Case Report

Varsha Sharma¹, Abinash Mohapatra², Anandamoy Bagchi³

ABSTRACT

Background: Teeth are hard mineralized anatomical components of the dentofacial skeleton that are developed during the gestation period by odontogenesis. This dental development comprises five stages viz. initiation, proliferation, histodifferentiation, morphodifferentiation, and apposition. Excitation to the dental organ during morphodifferentiation is responsible for the formation of a talon cusp, which manifests as a cusp-like structure of hard tissue projecting from the cingulum to a varying measurable length toward the incisal edge of maxillary and mandibular anterior teeth. Various literature has reported that it comprises enamel, dentine, and an inconsistent amount of pulp tissue. Old literature suggests its occurrence in primary and permanent teeth and mostly on the palatal aspect of teeth as one cusp; therefore, known as a talon cusp (eagle's talon).

Case description: An exceptional case of three cusped structures projecting from the palatal side of a maxillary central incisor is thus reported. The rare occurrence of an atypical talon cusp with three well-defined mamelon-like cusps on the palatal surface of the permanent maxillary central incisor is coined as ternion cusp, meaning "three" by authors. Its occurrence is reperused as attrition of the teeth in the opposite arch. Selective or retruded contact position (RCP) was done, followed by topical fluoride application was rendered.

Conclusion: Managing and treating these exceptional cusps depends upon their size, present complications, and patient compliance.

Keywords: Retruded contact position, Talon cusp, Three-cusped structure/ternion, Topical fluoride.

International Journal of Clinical Pediatric Dentistry (2022): 10.5005/jp-journals-10005-2476

INTRODUCTION

Tooth development or odontogenesis initiates during the 4th week of intrauterine life. The life cycle of a tooth from growth to emergence in the oral cavity undergoes various physiological milestones of development viz initiation, proliferation, histodifferentiation, morphodifferentiation, and apposition.¹ Disturbance in odontogenesis may be reflected in tooth morphology and observed during the routine dental checkup in children; this includes wide variation in shape, size, and form. One amongst such unusual dental anomalies showing up as an additional protection-like structure elevated from the cingulum to the incisal edge was first described by Mitchell² and thereafter was named as talon cusp by Mellor and Ripa³ due to its congruity to an eagle's talon. It was believed that it may have resulted due to an excess layering during morphodifferentiation of odontogenesis or as a consequence of outward pleating of inner enamel epithelial cells and transient focal hyperplasia of the peripheral cells of the mesenchymal dental papilla.^{4,5} The occurrence is generally seen in 1–6% of the population, chiefly in permanent dentition.⁶ Few prevalence studies done represent Mexican (0.6%), Jordanian (2.4%), Hungarian (2.5%), and Malaysian (5.2%),^{6–10} parts of the population with talon cusp. Some of the prevalence of talon cusp among the Indian population had shown 0.58% in South India and 2.95% in North Indian populations.^{11,12}

This odontogenic divergence has multiple interpretations; prominent additional cusp-like structure, exaggerated cingula, cusp-like hyperplasia, accessory cusp, and supernumerary cusp.^{13–18} It has been defined as a supernumerary accessory talon-shaped cusp projecting from the lingual or buccal surface of the crown of a tooth and extending for at least half the distance from the cemento-enamel junction to the incisal edge.¹⁶ There is a

^{1–3}Department of Pedodontics and Preventive Dentistry, Kalinga Institute of Dental Sciences, Kalinga Institute of Industrial Technology (KIIT) (Deemed to be University), Bhubaneswar, Odisha, India

Corresponding Author: Abinash Mohapatra, Department of Pedodontics and Preventive Dentistry, Kalinga Institute of Dental Sciences, Kalinga Institute of Industrial Technology (KIIT) (Deemed to be University), Bhubaneswar, Odisha, India, Phone: +91 9437214000, e-mail: abinashpedo@gmail.com

How to cite this article: Sharma V, Mohapatra A, Bagchi A. Ternion Cusp: An Unusual Variant of Talon's Cusp: A Case Report. *Int J Clin Pediatr Dent* 2022;15(6):784–788.

Source of support: Nil

Conflict of interest: None

Patient consent statement: The author(s) have obtained written informed consent from the patient's parents/legal guardians for publication of the case report details and related images.

wide alteration in the size and shape of this exception; in order to have an indicative criterion, it has been classified into three types by Hattab et al.⁵

- Type 1: Talon—a morphologically well-delineated additional cusp that prominently projects from the palatal (or facial) surface of a primary or permanent anterior tooth and extends at least half the distance from the cemento-enamel junction to the incisal edge.
- Type 2: Semi talon—an additional cusp of a millimeter or more extending less than half the distance from the cemento-enamel junction to the incisal edge. It may blend with the palatal surface or stand away from the rest of the crown.

- Type 3: Trace talon—enlarged or prominent cingula and its variations, that is, conical, bifid, or tubercle-like.

Usually, a huge talon cusp may protrude with connectivity to the incisal edge of the tooth to give the tooth cap—a “T” or “Y” shape.¹⁹ The permanent dentition is affected more recurrently than the primary dentition, and the deviation is more common in males than in females. The lateral incisors are the most frequently involved, followed by central incisors and the canines.^{15,20,21} The causes of talon’s cusp is not much documented; however, it appears to have both genetic and environmental association. Recently, a few reports have described the occurrence of talon cusps on both labial/buccal and palatal aspects of the same tooth,¹⁶ which has led to a minor refinement of the definition..

The present case report is for better clinical diagnosis and different treatment methods to achieve proper occlusion and better patient compliance.

CASE DESCRIPTION

A 12-year-old boy visited the Department of Pedodontics and Preventive Dentistry, Kalinga Institute of Dental Sciences, Bhubaneswar, Odisha, India, with a chief complaint of food lodgment in the upper front teeth region for 2 years. He also complained of a loose tooth in the lower left back teeth region. The patient was found to be cooperative in a dental setting. His medical history was uneventful, and his family history did not disclose any evidence of hereditary dental structural divergence. He brushed his teeth once daily with non-fluoridated toothpaste.

After informed consent from the patient’s mother, a clinical examination was performed. An extraoral evaluation revealed a normal facial appearance. An intraoral evaluation revealed a mixed dentition stage with bilateral Angle’s class 1 molar relationship. Hard tissue examination showed the teeth present were (Fédération Dentaire Internationale notation) 16, 55, 54, 53, 12, 11, 21, 22, 63, 64, 65, 26, 36, 75, 32, 31, 41, 42, 83, 84, 85, and 46.

Other findings revealed the presence of deep dentinal caries in relation to 64 and 36. Grade II mobility was present in relation to 75, 84, and 85 (with stainless steel crown) and erupting 33 and 34. There was food lodgment on the palatal aspect of 11 and 21 behind well-defined three-cusped structures (Fig. 1), which was initially presumptively diagnosed as supernumerary teeth or mesiodens without any evidence of carious processes.



Fig. 1: Intraoral clinical photograph revealing food lodgment behind three cusped structures in central incisors

Further, the radiological investigation revealed that this structure was in the appearance of a “WV” producing enhanced radiopacity in the tooth crown resembling cusps originating from the cervical third of the teeth, which differentiated it from supernumerary tooth/mesiodens (Fig. 2). It seemed to represent atypical variant talon (one) cusp in case of incisors. Here authors decided to name this unusual presentation of talon cusp with three cusps as “ternion.” Consequently, it was observed that the size of the divergence had created an occlusal hindrance and premature contact with the antagonist tooth 31 (Fig. 3). Elastomeric (Coltene President Putty Super Soft and light body) impression was registered, and study models were prepared for treatment planning the full mouth rehabilitation (Fig. 4).

Digital radiograph elicited no pulpal extension into the three extra cusps (Fig. 2). Soft tissue examination was unremarkable.

Treatment Plan

Based on clinical and radiographic examination, the following treatment was planned:

- Emergency phase: Extraction of exfoliating 75.
- Preventive phase: Oral prophylaxis and fluoride [Biodinamica, Brazil—Frutti Fluor—1.23% acidulated phosphate fluoride (AFP)] application.
- Immediate phase: Extraction of exfoliating teeth 84 and 85 (root reabsorption confirmed in orthopantomogram (Fig. 5).
- Restorative phase: Intermediate restoration in relation to 64 and 36. For ternions—periodic coronoplasty/RCP in a 6–8 week time period to trigger the deposition of reparative dentin and for pulp protection,⁵ along with the use of topical fluoride to reduce the risk of caries and/or sensitivity. Thus, creating a cingulum-like structure mimicking the natural tooth morphology.
- Maintenance phase: Sealing of the fissures in relation to ternions postoperatively, if required.
- Follow up: Every 3 months for a period of 1 year.

Treatment Rendered

Informed consent was procured from the child’s mother for the treatment plan and procedure.

- Oral prophylaxis and topical fluoride application were done using Biodinamica, Brazil (manufacturer)—Frutti Fluor—1.23% AFP gel for 1 minute, followed by an extraction of 75.

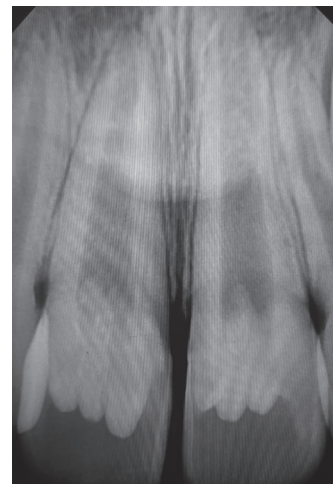


Fig. 2: Radio visio graph reveals well-defined three cusped structures extending from cemento-enamel junction to the middle one-third of the clinical crown

- After 3 days, on the second visit—zinc oxide eugenol cement (intermediate restorative material) with PDPulpotec[®] cement as indirect pulp capping agent was placed in relation to 64 and 36, periodic coronoplasty/RCP for ternions and later extraction of 84 and 85 under local anesthesia was done.
- On the third visit (after 4 weeks), composite (3M Espe Z350) restoration in relation to 36 (Fig. 6), periodic coronoplasty/RCP of ternions was redone (Fig. 7) followed by fluoride application. Erupting 34, 35, 44, and 45 were appreciable (Fig. 6).

DISCUSSION

The motivation of this article is to report a case of an atypical variant of dens evaginatus (talon cusp)²² in a 12-year-old boy, which serves as the first documentation in the literature. This rare occurrence of atypical talon's cusp with three very well-defined mamelon-like cusps on the palatal side of the permanent maxillary central incisor was termed a ternion cusp, meaning ternary or triplet.



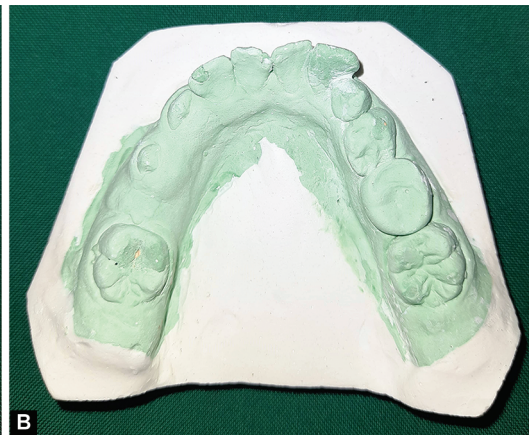
Fig. 3: Occlusal interference on mandibular right central incisor



Fig. 6: Postcoronoplasty/RCP in relation to 11 and 21



A



B

Figs 4A and B: (A) Study model—maxilla (ternion cusps in relation to 11 and 21 palatally; (B) Study model—mandible (after immediate treatment phase)

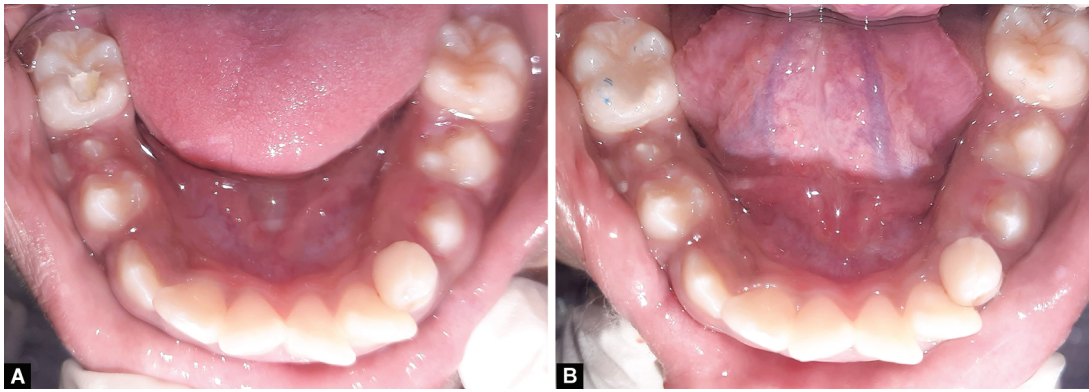


A



B

Figs 5A and B: Preoperative orthopantomogram



Figs 7A and B: (A) Intact temporary restoration after 4 weeks in relation to 36; (B) Final composite restoration in relation to 36

Other possible treatment modalities apart from the present case can be pulpectomy or root canal treatment followed by anterior jacket crowns, depending on size, shape, and location.²³ Prompt diagnosis and appropriate preventive treatment are important with various methods of diagnosis, treatment options, and recognition of this morphological change among dental professionals to differentiate clinically with different morphological changes such as compound odontoma/mesiodens.²⁴ Such recognition is suggested to keep away from inessential surgical intervention, execute treatments for caries prevention, correct malocclusions, prevent periodontal complications or irritation to the soft tissues during speech or mastication, improve esthetic issues, oral health, and patient better quality of life.²⁵ Severe consequences such as infraocclusion of the antagonist's tooth, trauma from occlusion (TFO), and temporomandibular joint pain can occur due to occlusal interference.²⁶ Pulp necrosis as a sequela of the revelation of the dentine-pulp complex after severe attrition or fracture of enamel can occur.^{22,27}

In the present case report, the cusps were well-defined and protruded from the cervical third to the middle third of both the tooth. Thereby developing occlusal hindrance, which might cause attrition of the tip of the ternions as well as the opposing mandibular incisors, gingival recession due to TFO, and mobility of the mandibular central incisor. So, sequential RCP of the ternion followed by fluoride application was rendered for improved occlusion and for creating a cingulum-like structure for self-cleaning and reduced food lodgement. Talon cusp is usually asymptomatic but may cause difficulty in maintaining hygiene which had been reported in the present case; esthetics may cause occlusal interferences, lead to carious developmental grooves during speech, and mastication irritation to the tongue, nursing difficulty or fracture of cusp leading to pulp involvement.²⁸

CONCLUSION

Early knowledge of different variations and occurrences can help pediatric dentists and dental practitioners to plan proper preventive and therapeutic treatments to improve prognosis and minimize future complications.

Clinical Significance

In the present case report, we discussed unusual variations of talon cusp, which will assist oral diagnosticians and forensic experts in proper identification and planning different treatment.

ACKNOWLEDGMENTS

Written consent was obtained from the child's parents for publication of the same.

REFERENCES

1. Shafer's Textbook of oral pathology – 6th Edition
2. Mitchell WH. Letter to the editor. *Dent Cosmos* 1892;34:1036.
3. Mellor JK, Ripa LW. Talon Cusp: A clinically significant anomaly. *Oral Surg* 1971;29(2):225–228. DOI: 10.1016/0030-4220(70)90089-7
4. Tratman EK. An unrecorded form of simplest type of the dilated composite odontome. *Br Dent J* 1949;86(11):271–275.
5. 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(5):368–376. DOI: 10.5005/jp-journals-10015-1263
6. Neville BW, Damm DD, Allen CM, et al. *Abnormalities of Teeth. Oral and Maxillofacial Pathology*. 2nd ed. New Delhi, Saunders 2004;77–78.
7. Sedano HO, Carreon Freyre I, Garza de la Garza ML, et al. Clinical orodontal abnormalities in Mexican children. *Oral Surg Oral Med Oral Pathol* 1989;68(3):300–301. DOI: 10.1016/0030-4220(89)90215-6
8. Hamasha AM, Safadi RA. Prevalence of talon cusps in Jordanian permanent teeth: a radiographic study. *BMC Oral Health* 2010;10(1):6. DOI: 10.1186/1472-6831-10-6
9. Mavrodisz K, Rozsa N, Budai M, et al. Prevalence of accessory tooth cusps in a contemporary and ancestral Hungarian population. *Eur J Orthod* 2007;29(2):166–169. DOI: 10.1093/ejo/cjl084
10. Rusmah, Meon. Talon cusp in Malaysia. *Aus Dent J* 1991;36:11–14. DOI: 10.1111/j.1834-7819.1991.tb00801.x
11. Prabhu RV, Rao PK, Veena KM, et al. Prevalence of talon cusp in Indian population. *J Clin Exp Dent* 2012;4(1):e23–e27. DOI: 10.4317/jced.50650
12. Patil SR, Maheshwari S, Khandelwal S. Prevalence of talon cusp in the North Indian population. *J Cranio-Maxillary Dis* 2013;2(2):114–119. DOI: 10.4103/2278-9588.121841
13. Mader CL. Talon cusp. *J Am Dent Ass* 1981;103(2):244–246. DOI: 10.14219/jada.archive.1981.0264
14. Davis JM, Law DB, Lewis TM. *An Atlas of Pedodontics*. 2nd edition. Philadelphia: W.B. Saunders Co; 1981:62.
15. Davis PJ, Brook AH. The presentation of talon cusp: diagnosis, clinical features, associations and possible aetiology. *Brit Dent J* 1986;160(3):84–88. DOI: 10.1038/sj.bdj.4805774
16. Chen RJ, Chen HS. Talon cusp in primary dentition. *Oral Surg Oral Med Oral Pathol* 1986;62(1):67–72. DOI: 10.1016/0030-4220(86)90072-1
17. Jowharji N, Noonan RG, Tylka JA. An unusual case of dental anomaly: a "facial" talon cusp. *J Dent Child* 1992;59(2):156–158.
18. Danker E, Harari D, Rotstein I. Dens evaginatus of anterior teeth; literature review and radiographic survey of 15,000 teeth. *Oral*

- Surg Oral Med Oral Pathol Oral Radiol Endod 1996;81(4):472–476. DOI: 10.1016/s1079-2104(96)80027-8
19. King NM, Tsai JS, Wong HM. Morphological and numerical characteristics of the Southern Chinese dentitions. Part I: anomalies in the permanent dentition. *Open Anthropol J* 2010;3(2):54–64. DOI: 10.2174/1874912701003020071
 20. Cubukcu CE, Sonmez A, Gultekin V. Labial and palatal talon cusps on geminated tooth associated with dental root shape abnormality: a case report. *J Clin Pediatr Dent* 2006;31(1):21–24. DOI: 10.17796/jcpd.31.1.a5101676k6714351
 21. Kayalibay H, Uzanis M, Akalin A. The treatment of a fusion between the maxillary central incisor and supernumerary tooth: report of a case. *J Clin Pediatr Dent* 1996;20(3):237–240.
 22. Ferraz JAB, de Carvalho Junior JR, Saquy PC, et al. Dental anomaly: dens evaginatus (talon cusp). *Braz Dent J* 2001;12(2):132–134.
 23. Thakur S, Gupta R, Thakur NS, et al. Facial talon cusp on permanent maxillary canine: a rare dental anomaly. *Eur J Gen Dent* 2013;2(3):324–327. DOI: 10.4103/2278-9626.116004
 24. Thirumalaisamy E, Baskaran P, Jeyanthi K, et al. Talon cusp in fused teeth: a rare concomitant occurrence. *J Oral Maxillofac Pathol* 2012;16(3):411–413. DOI: 10.4103/0973-029X.102503
 25. Richardson DS, Knudson KG. Talon cusp. *J Am Dent Ass* 1985;110(1):60–62. DOI: 10.14219/jada.archive.1985.0288
 26. Hattab FN, Yassin OM, Al-Nimri KS. Talon cusp: clinical significance and management with reference to aetiology. *Quint Int* 1995;26(2):115–120.
 27. Shay JC. Dens evaginatus: case report of a successful treatment. *J Endod* 1987;10(7):324–332. DOI: 10.1016/S0099-2399(84)80188-0
 28. Yoon N, Chussid S. Dental management of a talon cusp on a primary incisor. *Pediatr Dent* 2007;29(1):51–55.