Primljen / Received on: 21. 01. 2025.
Revidiran / Revised on: 23. 10. 2025.
Prihvaćen / Accepted on: 27. 10. 2025.

KRATKO SAOPŠTENJE
SHORT COMMUNICATION
doi: 10.5937/asn41-56185

DILACERACIJA KRUNE ZUBA: PRIKAZ SLUČAJA SA PREGLEDOM ETIOLOGIJE I UPRAVLJANJA LEČENJEM

DILACERATION OF THE CROWN: A CASE REPORT WITH OVERVIEW OF ETIOLOGY AND MANAGEMENT

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Sažetak

Osnove problema*: Impakcija odnosno retencija stalnih gornjih sekutića, koja predstavlja relativno retku pojavu u stomatološkoj praksi, može u značajnoj meri uticati na govor, žvakanje i estetski izgled lica obolelih. Deca su posebno podložna dentalnim traumama, naročito u toku prve dve godine života. Dilaceracije su najčešće posledica povrede mlečnih zuba; ređe se javljaju u predelu krune nego u predelu korena, i to uglavnom na maksilarnim i mandibularnim sekutićima. Terapija obično podrazumeva hirurško otkrivanje zuba, za kojim sledi ortodontska trakcija ili ekstrakcija impaktiranog zuba.*
Metoda rada*: U ovom radu predstavljen je slučaj dilaceracije krune maksilarnog stalnog centralnog sekutića, s posebnim osvrtom na etiologiju i pridružene kliničke karakteristike.*
Rezultati*: Ovaj slučaj ističe važnost individualizovanog tretmana, gde su hirurško vađenje i naknadna rehabilitacija bili neophodni zbog nepovoljnog položaja i ugla impaktnog zuba.*
Zaključak*: Uspešno lečenje zahteva multidisciplinarni pristup koji uključuje pedodontiste, ortodonte, parodontologe, hirurge i protetičare.*

Ključne reči: *dilaceracija krune, dilaceracija zuba, dobro zdravlje i blagostanje, maksilarni centralni sekutić, mlečna denticija, trajna denticija, povreda zuba*

Abstract

Basis of the problem: *Impaction of maxillary permanent incisors, a relatively uncommon event in dental practice, can significantly influence speech, chewing, and facial appearance in affected patients. Children are particularly susceptible to dental trauma, especially during the first two years of life. Dilacerations are often caused by trauma to a primary tooth. Dilaceration in the crown is less common than in the root and occurs more frequently in the maxillary and mandibular incisors. Typically, treatment involves surgical exposure of the tooth, followed by orthodontic traction or extraction.*
Methods of work*: Here, we present a case of crown dilaceration of the maxillary permanent central incisor, along with an update on the etiology and other associated features.*
Results*: This case highlights the importance of individualized treatment, where surgical extraction and subsequent rehabilitation were necessary due to the unfavourable position and angulation of the impacted tooth.*
Conclusion*: Successful management requires a multidisciplinary approach involving pedodontists, orthodontists, periodontists, surgeons, and prosthodontists.*

Key words: *crown dilaceration, dilaceration of tooth, good health and well-being, maxillary central incisor, primary dentition; permanent dentition, trauma*

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Introduction

The most common effects of primary tooth trauma on the development of permanent teeth are enamel discoloration, enamel hypoplasia, coronal dilaceration, root dilaceration, odontoma-like abnormalities, and eruption changes. The term dilaceration (Latin: dilacerare = to tear up) was first coined in 1848 by Tomes. Dilaceration can develop anywhere along the tooth's length, including the crown, the cement-enamel junction, the root, and the root apex. Approximately fifty percent of crown-dilacerated teeth become impacted, with the remainder erupting normally or in a labiolingual direction. Dilaceration can occur in both dentitions. The International Classification of Diseases (ICD-9th revision-clinical modification) classified dilaceration under the ICD-9-CM 520.4(a) code[1–5]. The impaction of the maxillary central incisor is multifactorial. Tooth deformities or dilacerations can cause a failure of eruption. Although uncommon, maxillary permanent central incisor impaction presents a significant challenge for patients and specialists due to the location of the central incisors; their absence has a substantial impact on a person's facial aesthetics, function, phonetics, and psychology. Crown dilacerations are classified into three types based on their eruption status: completely impacted, partially erupted, and fully erupted. Treatment choices differ based on this; in most cases, surgical exposure of the tooth is followed by orthodontic traction or extraction of the tooth[6–9]. Here, we present an instance of left maxillary permanent central incisor crown dilaceration with labial angulation, along with a brief update on its occurrence, causes, and management.

Case Presentation

A 17-year-old girl presented to the dental clinic with an aesthetic concern related to a missing tooth in the maxillary anterior region. She was otherwise healthy, with no significant family history of systemic disorders. Regarding her dental history, her mother recalled an injury at the age of 2 to 2.5 years, when she had sustained an injury to the maxillary anterior region, resulting in the avulsion of her deciduous teeth. Then, the trauma was not regarded as significant because it involved primary teeth. During intraoral examination, a missing permanent maxillary central incisor (FDI tooth number 21) was noted.

The crown was palpable near the base of the labial frenum in an angled position, with the incisal edge directed toward the vestibule and the cervical portion aligned with the marginal gingiva of adjacent teeth. This raised the suspicion of an impacted tooth, prompting radiographic evaluation. A periapical radiograph (Radiovisiography—RVG) confirmed the presence of an impacted central incisor (Figure 1a). Given the history of primary tooth trauma and its long-term effects, a diagnosis of crown dilaceration was established. To gain a precise assessment of the tooth’s position and its relation to surrounding anatomical structures, cone-beam computed tomography (CBCT) was recommended. CBCT imaging revealed a severely dilacerated tooth with nearly a 90-degree angulation (Figure 1b). After consultation with an orthodontist, extraction was advised due to the unfavourable angulation and position of the tooth.

A treatment plan was formulated involving the administration of local anaesthesia with adrenaline (1:200,000). A trapezoidal mucoperiosteal flap was elevated to expose the crown (Figure 1c, d). As the tooth was immobile, guttering of the bone was performed using a 701-fissure bur. The tooth was subsequently extracted (Figure 1e), and the flap was closed using 3-0 silk sutures (Figure 1f). Postoperative follow-up demonstrated satisfactory healing (Figure 1g).

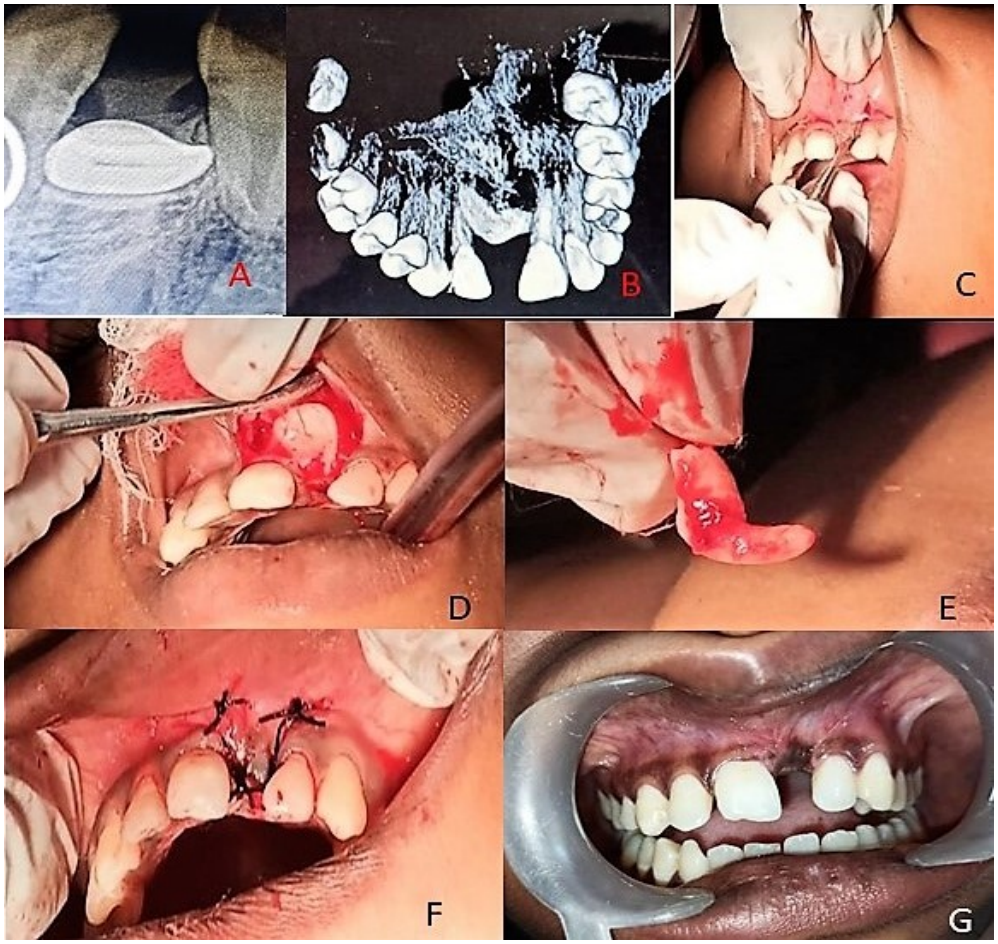

Figure 1. Cone beam computed tomography (CBCT) image of an impacted left permanent maxillary central incisor showing a severely dilacerated tooth with a nearly 90-degree angulation (A) and the curvature elevation of a full-thickness trapezoidal flap extending from the mesial aspect of 11 to the mesial aspect of 22 (B, C). The 3-0 sutures were used to close the flap (D), the dilacerated crown of a maxillary central incisor was surgically removed (F), and 10 days after surgery, there was complete healing (F).

Discussion

The tooth is considered impacted if it fails to reach the occlusal plane within the expected age of eruption, especially when its contralateral counterpart has fully erupted for at least six months and the root development is complete[10]. Compared to root dilacerations, crown dilacerations are less frequent, and the most common condition affecting maxillary permanent incisors is palatally angulated crowns. Permanent mandibular incisors typically exhibit labial angulation[4,9,10]. In the present case, the maxillary permanent incisor crown dilaceration was labially angulated.

Prevalence of Crown Dilaceration

Many studies have investigated the frequency of tooth impaction. Impacted maxillary central incisors occur at a rate of 0.03%–2.1%, which is lower than that reported for permanent canines[11]. Teeth with dilacerated crowns in the mandible erupt in approximately 75% of cases, whereas maxillary teeth with crown dilaceration frequently remain unerupted[12,13]. In a survey of 15,987 samples, 320 unerupted permanent incisors were identified, of which 29 (around 9%) were maxillary central incisors with crown dilaceration[14]. This contrasts with findings from a recent study by Mushtaq Bhat[15], which reported no cases of central or lateral incisor impaction, consistent with other research[16]. The prevalence of tooth impaction varies significantly among different populations and ethnic groups and is influenced by factors such as age, timing of tooth eruption, and radiographic criteria[17].

Gender Predilection for Dilaceration

While some studies report no significant gender predilection for dilaceration[1], other studies have documented a higher prevalence of unerupted maxillary central incisors in males compared to females, suggesting a possible involvement of sex chromosomes in the etiology of tooth eruption disturbances. Conversely, in another retrospective study, impaction of the permanent maxillary central incisor was observed more frequently in females than in males[14,19,26].

Table1. Causes of crown dilaceration

Crown dilaceration		
Probable factors	**Observations**	**Confounding factors**
Delayed eruption can be divided into two categories A) Genetic factors[1]	Supernumerary teeth, cleft lip/palate, odontoma, aberrant tooth/tissue ratio, cleidocranial dysostosis, generalized delayed eruption, and gingival fibromatosis, and many other factors	Hereditary causes affecting eruption
B) Environmental factors[1]	Trauma, early extraction/loss of primary teeth (with/without space loss), retained primary teeth, cystic formation, endocrine disorders, bone disease, and many other conditions	External influences affecting the eruption
Prevalence of dental trauma[20,21]	4% to 33% population prevalence; ~30% of children (aged 7) experience trauma to one primary incisor.	Among them, approximately 40% of children visit a dentist for dental trauma
Influencing factors on trauma effects[3,21,22]	Type of trauma (intensity and direction), child's age at the time of trauma, relationship between primary tooth apices and permanent tooth buds, and developmental stage of root formation	Modulates the severity and nature of damage to permanent successors
Common trauma types causing dilaceration[1,9,21,23]	Avulsion, invasive luxation	These injuries to primary teeth often cause dilaceration in permanent successors
Common permanent successor sequelae[1,9,21,23]	Enamel discoloration, hypoplasia, root and crown dilacerations, and odontoma	Crown dilacerations are more common in maxillary and mandibular incisors due to the close primary tooth location
Incidence of crown dilacerations among trauma sequelae[1,2,4,23–25]	The incidence of crown dilacerations is about 3% to 9%	Severe injury to the primary tooth and or the tooth region
Cause of dilaceration[4]	Mainly attributed to trauma to the primary teeth	Dilaceration in permanent teeth is uncommon relative to primary tooth trauma incidence
B) Idiopathic/Non-traumatic crown dilaceration[2,4,25]	a) Sometimes trauma is not reported. b) Early childhood injuries may be unnoticed or forgotten (parental recall limitations) c) No evident history of injury	The primary cause may be ectopic tooth germ growth rather than trauma

Although the exact cause of dilaceration remains uncertain and is still debated among researchers, trauma to the primary tooth is considered the most plausible explanation. Many cases of dilaceration are associated with a history of trauma to the primary tooth, but this is not universal. Additionally, the occurrence of dilaceration in permanent successor teeth is relatively uncommon and appears disproportionate to the frequency of primary tooth injuries (Table 1)[4].

Pathophysiology of Crown Dilaceration

Several theories have been proposed in the literature regarding the pathophysiology of crown dilaceration. This condition often results from the intrusion or avulsion of a primary incisor when a child is around two years of age, a critical time when about half of the permanent successor's crown is already formed. Trauma to the primary predecessor can cause non-axial displacement of the developing hard tissue portion of the crown at an angle relative to its longitudinal axis. This displacement involves the enamel epithelium and the mineralized portion of the tooth relative to the dental papilla and cervical loops, leading to dilaceration. Specifically, the permanent tooth crown may twist lingually over the dental papilla after the primary tooth's apex invades the partially developed follicle. The enamel epithelium, misplaced from its normal position, may become activated in the new location, resulting in abnormal enamel morphology that can protrude into the pulp canal or externally at the crown-root junction, causing notable deformities[2,3,5,21,25–28].

Impacted Central Incisor Tooth and Pathology

Impacted teeth can lead to various pathological conditions and thus require

appropriate management. Several pathologies associated with unerupted or impacted permanent incisors are well documented, including[29–33]:

a) Enlarged follicle or cystic changes, such as odontogenic cysts or tumors

b) Root resorption and premature exfoliation of adjacent teeth

c) Ectopic eruption, displacement, or rotation of the impacted incisor itself or of adjacent teeth and structures.

The exact cause of crown dilaceration—whether idiopathic or traumatic—affecting the permanent maxillary central incisor is not fully understood. In the present case, the tooth was impacted, and the patient had a history of dental trauma at the age of 2.0–2.5 years, during which she suffered an avulsion of the primary maxillary central incisor.

Conventional radiographs provide a two-dimensional image of three-dimensional structures, which limits their ability to clearly visualize complex dental morphology, especially in the anterior teeth. This limitation can be addressed by using cone beam computed tomography (CBCT), which is particularly valuable in cases involving severe crown dilacerations. CBCT plays a crucial role in clinical practice for the detection of impacted maxillary central incisors and in formulating precise treatment plans. CBCT offers a detailed qualitative evaluation of dental and osseous structures, morphological alterations, and the three-dimensional positioning of unerupted teeth relative to adjacent anatomical structures. Clinical guidelines from the Royal College of Surgeons of England (Royal College of Surgeons of England) and the American Academy of Pediatric Dentistry (AAPD) are to be followed as a general principle during the radiographic assessment of unerupted permanent incisors[2,13,33–36].

In this case, CBCT showed the impacted central incisor's crown oriented labially, with the cingulum being the first structure exposed during flap elevation. The root's long axis was positioned palatally, forming a 90-degree angle at the cementoenamel junction with the crown. The tooth had complete root formation. This precise CBCT information was crucial for planning treatment.

Table 2. Management options for dilaceration

Depending upon the eruption status	**Treatment options**	**Keynotes**
Eruption status Totally impacted[8,24,26,37–39]	Surgical exposure with or without orthodontic traction; aesthetic periodontal surgery	High success rates reported
Partially erupted[8,24]	Surgical extrusion	Multidisciplinary options are used to bring the tooth into the correct position
Fully erupted[8,24]	Buccal and/or palatal contouring and composite resin restoration (if crown-root angle is minimal)	A conservative approach is preferred if the deviation is mild
Treatment options		**Keynotes**
General management[26,37–9]	Multidisciplinary approach involving pediatric dentistry, orthodontics, periodontics, surgery, and prosthodontics	Treatment success is influenced by the degree of dilaceration, vertical tooth position, and root maturity
Orthodontic-surgical	Surgical exposure followed by orthodontic traction or extraction	Treatment based on impaction type and severity; extraction is considered when angulation/position is unfavourable

For the present case, the opinion of an orthodontist was obtained, and it came to the consensus that the tooth needed surgical extraction. The tooth's unusual angulation and position rendered extraction the only viable option, followed by rehabilitation to restore both function and aesthetics (Table 2).

Conclusion

Dilacerations are believed to be caused by trauma to the primary tooth, but not all cases of dilaceration result from dental trauma. Successful management requires a multidisciplinary approach involving pedodontists, orthodontists, periodontists, surgeons, and prosthodontists. Treatment success depends on factors like degree of dilaceration, tooth position, and root maturity, and other factors such as the patient's age, cost, and convenience should also be considered to ensure rational and patient-centred treatment planning. This case highlights the importance of individualized treatment, where surgical extraction and subsequent rehabilitation were necessary due to the unfavourable position and angulation of the impacted tooth.

***Conflicts of Interest*:** No conflict of interest.

Financial Support: None.

LITERATURA/REFERENCES

1. Walia PS, Rohilla AK, Choudhary S, Kaur R. Review of Dilaceration of Maxillary Central Incisor: A Multidisciplinary Challenge. Int J Clin Pediatr Dent. 2016;9(1):90-98
2. Andreasen JO., Andreasen FM., Andreasen L. Injuries to Developing Teeth. In: Andreasen JO., Flores MT., editors; Textbook and color atlas of traumatic injuries to the teeth. Oxford: Blackwell Munksgaard; 2007. pp. 542–576.
3. Caeiro-Villasenín L, Serna-Muñoz C, Pérez-Silva A, Vicente-Hernández A, Poza-Pascual A, Ortiz-Ruiz AJ. Developmental dental defects in permanent teeth resulting from trauma in primary dentition: A Systematic Review. Int. J. Environ. Res. Public Health. 2022;19(2):754-66.
4. Topouzelis N, Tsaousoglou P, Pisoka V, Zouloumis L. Dilaceration of maxillary central incisor: a literature review. Dent Traumatol. 2010; 26 (5): 427– 33.
5. Nowak AJ, Slayton RL. Trauma to primary teeth: setting a steady management course for the office. Contemporary Pediatr 2002; 11:99.
6. Mockutė G, Klimaitė G, Smailienė D. The Morphology of Impacted Maxillary Central Incisors: A Systematic Review. Medicina. 2022; 58(4):462.
7. Muthumani T, Rajasekaran M, Veerabahu M, Indra R. Interdisciplinary management of impacted maxillary central incisor with dilacerated crown. J Endod. 2011;37(2):269-271.
8. Calişkan MK, Tekin U. Surgical extrusion of a partially erupted and crown dilacerated incisor. Dent Traumatol. 2008; 24(2):228–30.
9. de Amorim CS, Americano GCA, Moliterno LFM, de Marsillac MWS, Andrade MRTC, Campos V. Frequency of crown and root dilaceration of permanent incisors after dental trauma to their predecessor teeth. Dent Traumatol. 2018;34(6):401-405.
10. Žarovienė A, Grinkevičienė D, Trakinienė G, Smailienė D. Post-Treatment Status of Impacted Maxillary Central Incisors following Surgical-Orthodontic Treatment: A Systematic Review. Medicina (Kaunas). 2021 30;57(8):783.
11. Al-Zoubi H, Alharbi AA, Ferguson DJ, Zafar MS. Frequency of impacted teeth and categorization of impacted canines: a retrospective radiographic study using orthopantomograms. Eur. J. Dent. 2017;11:117–21
12. Von Gool AV. Injury to the permanent tooth germ after trauma to the deciduous predecessor. Oral Surg Oral Med Oral Pathol. 1973; 35 (1): 2– 12.

13. Andlaw RJ, Rock WP A manual of Pedodontics.3rd ed Churchill Livingstone.pp145–6.
14. Tan C, Ekambaram M, Yiu CKY. Prevalence, characteristic features, and complications associated with the occurrence of unerupted permanent incisors. PLoS One. 2018;13(6):e0199501.
15. Bhat M, Hamid R, Mir A. Prevalence of impacted teeth in adult patients: A radiographic study. Int J Appl Dent Sci 2019;5(1):10-12.
16. Alamri A, Alshahrani N, Al-Madani A, Shahin S, Nazir M. Prevalence of impacted teeth in Saudi patients attending dental clinics in the eastern province of Saudi Arabia: A Radiographic Retrospective Study. Sci. World J. 2020; 2020(1):8104904.
17. Abhishek D, Shalini G, Shilpy S, Gundeep S, Ashish L. Management of Hidden Crown Dilaceration and Hypoplasia in Newly Erupted Permanent Incisors- Early Intervention and Prevention. J Dent Oral Biol. 2017; 2(14): 1087.
18. Lygidakis NN, Chatzidimitriou K, Theologie-Lygidakis N, Lygidakis NA. Evaluation of a treatment protocol for unerupted maxillary central incisors: retrospective clinical study of 46 children. Eur Arch Paediatr Dent. 2015;16(2):153-164.
19. Marek I, Janková A, Starosta M, Novosad M, Kučera J. Comparison of spontaneous eruption and modified closed eruption technique with palatal traction in alignment of impacted maxillary central incisor teeth. Prog Orthod. 2023;24(1):17.
20. Mendoza-Mendoza A., Iglesias-Linares A., Yañez-Vico R.M., Abalos-Labruzzi C. Prevalence and Complications of Trauma to the Primary Dentition in a Subpopulation of Spanish Children in Southern Europe. Dent. Traumatol. 2015;31:144–149.
21. Lenzi M.M., da Silva Fidalgo T.K., Luiz R.R., Maia L.C. Trauma in Primary Teeth and Its Effect on the Development of Permanent Successors: A Controlled Study. Acta. Odontol. Scand. 2019;77:76–81.
22. Tsurumachi T, Hirano Y, Hira A, Aida Y, Ogiso B. Developmental disturbance of a mandibular central incisor following trauma to the primary predecessor. J Oral Sci. 2015;57 (2): 157– 60.
23. Folmer AM, Lauridsen E, Henriksen JS, Hermann NV. Sequelae in Permanent Dentition After Traumatic Dental Injury in the Primary Dentition-A Retrospective Cohort Study. Int J Paediatr Dent. 2025;35(5):878-887.
24. Bolhari B, Pirmoazen S, Taftian E, Dehghan S. A Case Report of Dilacerated Crown of a Permanent Mandibular Central Incisor. J Dent (Tehran). 2016 ;13(6):448-452.
25. Bletsa A, Bessonova MV, Iden O. Using Cone-beam CT in Diagnosis and Management of Severe Dilaceration Following Trauma in Primary Teeth: A Case Report. Int J Clin Pediatr Dent. 2020;13(Suppl 1):S110-S114.
26. Mellara Tde S, Nelson-Filho P, Queiroz AM, Santamaria Júnior M, Silva RA, Silva LA. Crown dilaceration in permanent teeth after trauma to the primary predecessors: report of three cases. Braz Dent J. 2012;23(5):591-6.
27. da Costa VPP, Almeida FV, Demarco GT, da Motta MGLS, Langlois CO, Silva AER, Goettems ML. Impact of Traumatic Injuries to Primary Teeth on the Development of Permanent Dentition: Findings From a Retrospective Cohort. Dent Traumatol. 2025;25.
28. Flores MT, Onetto JE. How does orofacial trauma in children affect the developing dentition? Long-term treatment and associated complications. Dent Traumatol. 2019 ;35(6):312-323.
29. Frost, Hersh, Levin, editors. Fonseca Oral and Maxillofacial Surgery. Vol. 1. Philadelphia: Saunders; 2000. Management of impacted teeth; pp. 245–280.
30. Pawar SR, Kshirsagar RA, Purkayastha RS, Joshi S. Adenomatoid Odontogenic Tumor Mimicking a Dentigerous Cyst in Maxilla. Int J Clin Pediatr Dent. 2022;15(6):770-73.
31. Desai RS, Vanaki SS, Puranik RS, Tegginamani AS. Dentigerous cyst associated with permanent central incisor: A rare entity. J Indian Soc Pedod Prev Dent. 2005; 23:49-50.
32. Kalaskar RR, Kalaskar AR. Multidisciplinary management of impacted central incisors due to supernumerary teeth and an associated dentigerous cyst. Contemp Clin Dent. 2011;2(1):53-8.
33. Shanthala BM. McDonald and Avery's Dentistry for the Child and Adolescent: Jeffrey A Dean. Second South Asia Edition 2019.
34. Jeremias F, Fragelli CM, Mastrantonio SD, Dos Santos-Pinto L, Dos Santos-Pinto A, Pansani CA. Cone-beam computed tomography as a surgical guide to impacted anterior teeth. Dent Res J (Isfahan). 2016;13(1):85-89.
35. Hui J, Niu Y, Jin R, Yang X, Wang J, Pan H, et al. An analysis of clinical and imaging features of unilateral impacted maxillary central incisors: a cross-sectional study. Am. J. Orthod. Dentofac. Orthop. 2022; 161: e96–e104.
36. Seehra, J., Yaqoob, O., Patel, S., O'Neill, J., Bryant, C., Noar, J., Morris, D., & Cobourne, M. T. National clinical guidelines for the management of unerupted maxillary incisors in children. Br. Dent. J. 2018;224(10): 779-85.
37. Yuqi Peng, Zhaohao Zhen, Huanhuan Qiu, Meimei Li, Huacui Xiong, Ke Chen. The design and clinical application of a new appliance to treat impacted maxillary central incisors. Journal of Clinical Pediatric Dentistry. 2023. 47(2);40-49.
38. Muthumani T, Rajasekaran M, Veerabahu M, Indra R. Interdisciplinary management of impacted maxillary central incisor with dilacerated crown. J Endod. 2011;37(2):269-271.
39. Shi X, Sun X, Wang X, et al. The effect of the root dilaceration on the treatment duration and prognosis of unilateral impacted immature maxillary central incisors. Am J Orthod Dentofacial Orthop. 2023;163(1):79-86.