CASE REPORT

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A suspect of large dentigerous cyst associated with impacted canine evaluated by CBCT: a case report in a young patient

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ABSTRACT

Objectives: This case report aims to describe a large radiolucent lesion associated with an impacted canine in a young patient from CBCT radiographs.

Case Report: A 12-year-old boy was referred for CBCT examination to the Dentomaxillofacial Radiology unit at the Universitas Padjadjaran Dental Hospital with swelling on the right side of the face and a gingival lump on the upper right region suspected as an unerupted canine. The CBCT examination results showed an ectopic impacted tooth 13 and a large hypodense/radiolucent lesion with a well-defined and corticated border located on the coronal of tooth 13, expanding into the maxillary sinus and nasal cavity.

Conclusion: Based on the CBCT result in terms of location and radiographic features, this extensive radiolucent lesion led to a suspect radiodiagnosis of the dentigerous cyst within a young patient. However, histology examination is still required to establish a definitive diagnosis.

Keywords: *Impacted canine, odontogenic cyst, dentigerous cyst, CBCT*
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INTRODUCTION

Tooth impaction is a common dental condition ranging from 0.8–3.6% of the general population. An impacted tooth is defined as a tooth that fails to erupt after the normal development pattern is complete[1] while a normal tooth erupts when half to three-quarters of its final root length has developed. The etiology of tooth impaction is multifactorial. In the literature, the most commonly reported etiological factors related to tooth impaction can be divided into three different groups: systemic, local, and genetic.[2]

Delayed tooth eruption or the presence of impacted teeth can cause fluid accumulation in the epithelial layer of tooth enamel. A dentigerous cyst, one of the odontogenic cysts, can occure from the accumulated fluid up between the epithelium and the crown of the tooth. This cyst usually occurs in the first and third decades of life and can be found in children and adolescents during the mixed dentition period.

A dentigerous cyst form around and covers the crown of an unerupted tooth, attached from the crown to the upper root within the cemento-enamel junction (CEJ). This cyst may be cause by a developmental abnormality or inflammatory. Although dentigerous cysts are mild, they can lead to severe complications if left untreated.[3] They usually present in the second and fourth decades of life but are uncommon in childhood as they exclusively occur in the secondary dentition. They're also known as follicular cysts which is normal development of the tooth. The incidence of dentigerous cysts has been reported as 1.44 in every 100 unerupted teeth.[4] Dentigerous cysts constitute of 20% from all odontogenic cyst 20% of all odontogenic cysts, developing during during 10 to 30 years, with the most predisposition to male (3:2).[5]

A dentigerous cyst has the propensity to displace and resorb adjacent teeth. It commonly displaces the associated tooth in an apical direction. The degree of displacement may be considerable. Maxillary third molars or cuspids may be pushed to the floor of the orbit, and mandibular third molars may be moved to the condylar or coronoid regions or to the inferior cortex of the mandible. The floor of the maxillary antrum may be displaced as the cyst invaginates the antrum, or a cyst may displace the inferior alveolar nerve canal in an inferior direction. This slow-growing cyst often expands the outer cortical boundary of the involved jaw. This cyst that invaginates the sinus can drain and collapse with new bone formation at the periphery[6] Dentigerous cysts in the maxillary sinus are easy to detect radiographically due to their opacity. In these cases, panoramic radiography is a suitable method to be used in distinguishing the existence of this lesion. Nevertheless,

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Computed Tomography (CT) scan can also help to detect bony structures and understand the definite size or content of the lesions which extent into the maxillary sinus.[7]

Cone Beam Computerized Tomography (CBCT) radiographic examination is one of the supporting examination options for oral surgeons. This modality offers wide three-dimensional imaging of a mineralized view of maxillofacial tissue, with minimum distortion and a much lower radiation dose than conventional CT. CBCT is the right method to assist diagnosis, this radiographic technique provides greater visualization from multiplanar which accommodates the user to detect the abnormality with its surrounding associatinganatomy.[8]

CASE REPORT

A 12-year-old boy came to Dental hospital Universitas Padjadjaran with a lump in the gums, the upper right canine did not erupt and there was swelling on the right side of the face (Figure 1). From the subjective and objective examination, the patient was reffered for CBCT radiograph examination. From the results of the CBCT examination (Figure 2), it was seen that tooth 13 was impacted with a large radiolucent, clear, and well-defined hypodense/radiolucent lesion located at the coronal epicenter of tooth 13. The lesion extends superiorly suppressing the right orbital cavity, anteriorly depressing the nasal cavity/ suitable nasal turbinate, and posteriorly extending to maxillary sinus dextra. Although this lesion does not resorb the root of the tooth, it could be seen this lesion makes an expansion of the maxillary dextra bone, displacement of tooth 13 to the apical direction, get into the sinus until the right sinus cavity is filled with fluid.

While the internal density of the lesion indicates a fluid/fatty tissue, there is a discontinuity in the floor of the right maxillary sinus and suspected that the cyst fluid can come out of the lesion and enter the sinus as seen in Figure 4. As shown in the density graph, a line was drawn 9.99 mm across from the lesion to the sinus showing a distinct grayscale distribution with a density peak in the middle. This indicates that there is a cortical boundary that separates the lesion from the sinus cavity. The second density graph of a 5.16 mm line transverse from the apical level of the lesion showing the same grayscale distribution. This indicates a discontinuity in the sinus floor in the apical region of tooth 13.

The extension of the lesion superiorly depresses the nasal cavity/nasal turbinate (blue arrow) and the extension of the lesion posteriorly depresses the maxillary sinus (red arrow) as shown in the

Figure 1. Extraoral examination (left) and intraoral examination (right) of the patient

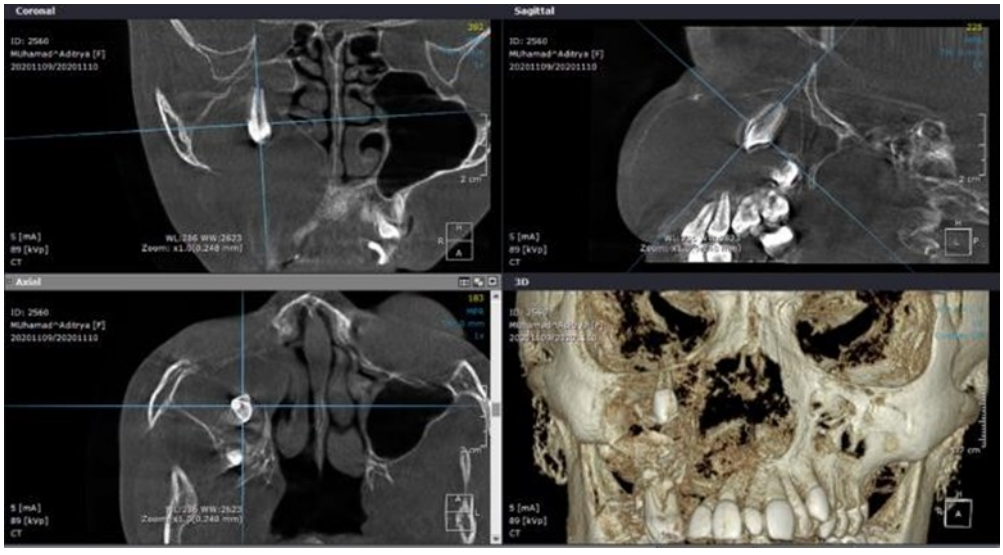

Figure 2. Multiplanar (MPR) view of the impacted tooth 13 with a radiolucent large lesion surrounding the tooth

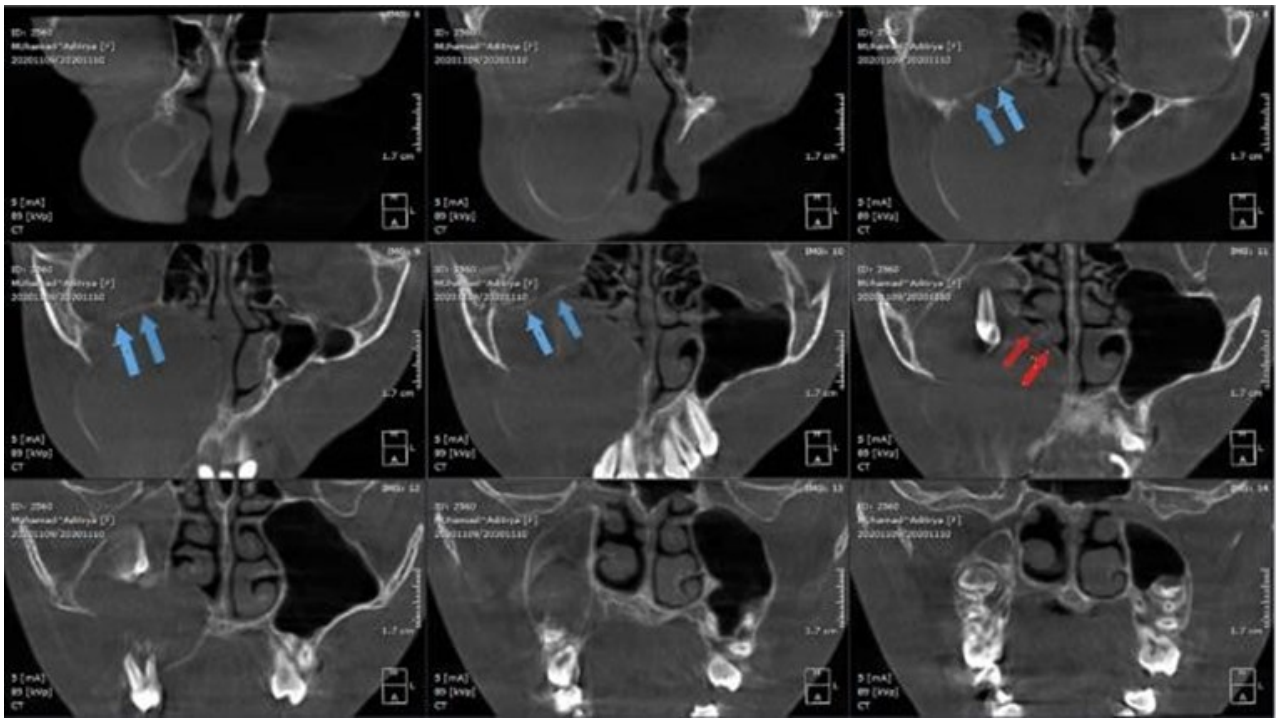

Figure 3. The reformatted coronal slicing view shows the extension of the lesion to the orbital floor and suppressing nasal concha pointed by blue arrow and red arrow respectively

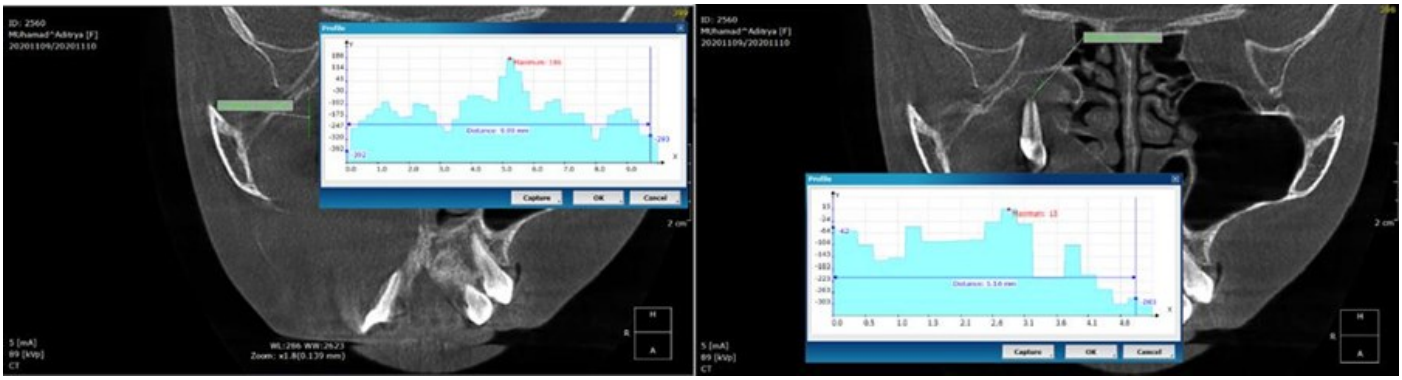

Figure 4. The density profile from reformatted coronal may give information on the relationship between the lesion and maxillary sinus cavity

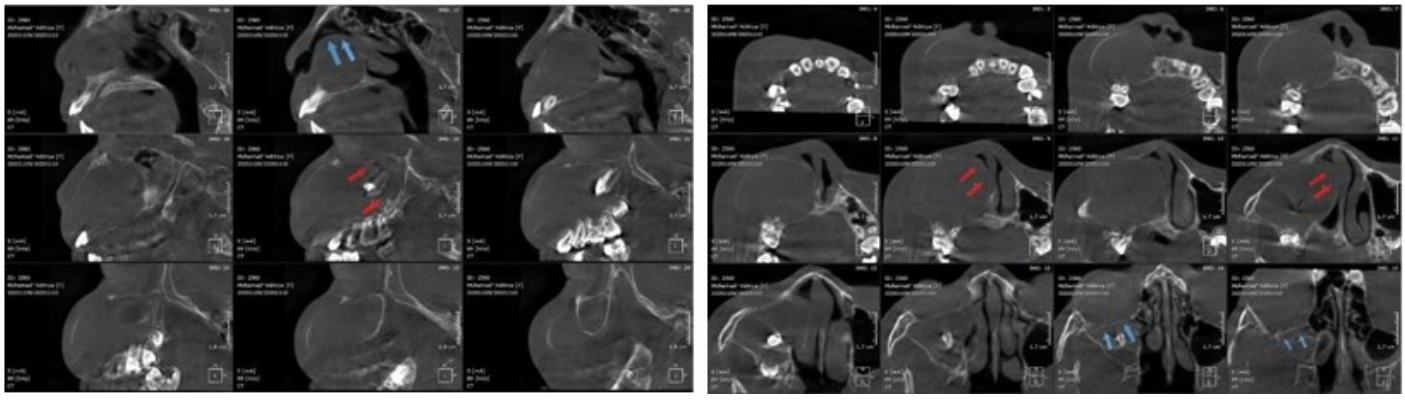

Figure 5. Reformated sagittal slicing view (left) and axial slicing view (right) of the lesion. The arrow appointed the extension of the lesion

sagittal slicing view picture (Figure 5). In the axial slicing view picture showing the extension of the lesion superiorly is in contact with the orbital cavity (blue arrow) and the extension of the lesion to anteromedial depresses the nasal cavity/nasal turbinate (red arrow). Based on the location and characteristics of the lesion, the lesion indicates an odontogenic cyst.

DISCUSSION

The second-highest incidence of impaction occurs in the canine, behind the third molar. It turns out that the prevalence of the impacted maxillary canine is actually low, ranging from 0.92 to 2.2% of the population, with a ratio of 2:1 more prevalent in females.[18] While the exact cause of the unerupted impacted maxillary canine remains unknown, there is strong evidence that multiple broad and complex mechanisms are involved, including genetic, systemic (such as endocrine disorders, febrile conditions, and/or irradiation), and local factors. Numerous local factors, including discrepancies in tooth size and arch length, failure of the primary canine root to resorb, prolonged retention or early loss of the primary canine, ankylosis of the permanent canine, cyst or neoplasm, dilaceration of the root, absence of the maxillary lateral incisor, variation in lateral incisor root size (peg-shaped lateral incisor), and variation in the timing of lateral incisor root, are considered to play critical roles in canine impaction.[9,19] In this case, we failed to determine the closest etiology because the anamnesis was not complete.

In this case, an impacted tooth 13 was seen with a large, well-defined hypodense/radiolucent lesion located at the coronal epicenter of tooth 13. The eruption of the canines occurred between the ages of 10 and 12 years. Abnormal tooth eruption, caused by impaction, can cause dentigerous cysts to occur.[10] Fluid transudes through the capillary walls as a result of impacted teeth. The cyst expands as a result of hydrostatic pressure separating the follicle from the crown. This cyst's expansion is linked to epithelial proliferation, resorption factors, and increased fluid osmolality.[11] Dentigerous cysts are more common in the second and third decades of life. This cyst is relatively uncommon in the first decade of life.[20] For this reason, when it comes to diagnosis in young patients, it is usually difficult to state a definitive diagnosis without a pathological and radiographic diagnosis.

A dentigerous cyst is a developmental cyst that rarely produces pain unless it creates a problem in a surrounding structure. A dentigerous cyst appears radiographically as a radiolucent symmetrical, unilocular, well-defined, cortical mass that surrounds the crown of an unerupted (impacted) tooth. Because of its slow and regular development, the dentigerous cyst has a well-defined sclerotic boundary, a well-defined cortex, and a thin radiopaque border. This cyst's radiographic appearance must be recognized from the typical appearance of the circum-coronal follicular area around the erupting tooth. In some circumstances, a radiolucent region may appear lateral to the crown of the tooth, especially if the

Table 1. The differentiating features of the differential diagnosis[15]

ODONTOGENIC LESION	DECADE OF LIFE	GENDER	PREDOMINANT REGION	PREDOMINANT LOCATION	IMAGING CHARACTERISTICS
Odontogenic keratocyst	3rd	M>F	Mandible	Posterior	Unilocular osteolytic lesion that has minimal buccolingual enlargement, few septa, and growth along the length of the bone
Dentigerous cysts	2nd-3rd	M>F	Mandible	Posterior	Unilocular osteolytic lesion without septa that surrounds the crown of an impacted tooth.
Ameloblastomas	3rd-5th	M>F	Mandible	Posterior	Multilocular osteolytic lesion with thick septa, root resorption and buccolingual expansion
Radicular cysts	3rd-5th	M~F	None	None	Unilocular osteolytic lesion around the apex of a non-vital tooth

cyst is quite big in size or if the tooth's location has changed from its original position.[12,21] A pericoronal space of 2.5 mm or greater might be regarded as the minimal distance for a probable precystic lesion to be diagnosed. A dental follicle and a tiny dentigerous cyst are not distinguishable, but a radiolucent appearance of 3-4 mm or more suggests the establishment of a cyst.[21]

The dentigerous cyst has the capacity to grow and destroy medullary bone while also causing jaw expansion. The dentigerous cyst presses and resorbs the neighboring teeth. The cyst usually starts in one tooth, but it can spread to a few neighboring teeth if it grows large enough. This may cause the tooth to shift far from its natural position, particularly in the case of upper jaw cysts.[5] The shifting of the impaction and the dentigerous cyst itself may cause damage to the surrounding tissue. Impacted teeth in the maxillary sinus or on the maxillary sinus roof beneath the orbital floor may induce sinus blockage and chronic sinusitis. When the maxillary sinus cyst becomes symptomatic, the patient will experience sinusitis symptoms such as swelling, facial pain, headache, and nasolacrimal duct obstruction.[5] The superior anterior alveolar nerve innervates the anterior palatal area of the tooth. The impaction position at the orbital floor may injure the infraorbital nerve, causing pain or paresthesia; this injury must also be avoided throughout the procedure. [5] The angular branch of the facial vein is also related with the position of the impaction below the orbital floor. Abscess formation or infection following surgery could spread through this vein and the ophthalmic vein, producing cavernous sinus thrombosis.[8] In the event of infection, the dentigerous cyst may become symptomatic and have ill-defined margins on radiographs.[14]

Dentigerous cysts had odontogenic keratocysts and ameloblastoma as the differential diagnoses. Ameloblastomas and odontogenic keratocysts are more aggressive than dentigerous cysts and require different therapy. Ameloblastomas are benign odontogenic tumors that usually require a wide surgical resection[16] whereas dentigerous cysts are usually treated with enucleation and curettage. Odontogenic keratocysts are benign cysts with a high rate of recurrence. They are best treated surgically through enucleation, marsupialization, decompression, or marginal resection.[13]

Dentigerous cysts are incredibly rare in pediatric patients, and an undetected and untreated dentigerous cyst in the first decade of life with mixed dentition can lead to serious complications. However, children have a better prognosis than adults because they have a stronger ability to repair skeletal structures; consequently, a thorough and timely review of the patient history with clinical and radiographic examination would aid in early diagnosis and therapy.[13] Various treatment options for dentigerous cysts in children have also been addressed, including complete enucleation of these lesions with exodontia of the affected teeth, as well as other conservative options such as marsupialization, decompression with or without traction of the tooth to its correct position in the arch. Now that the issues surrounding cystic enucleation have been studied, it is suggested that a more cautious approach that minimizes patient injury should be considered.[17]

CONCLUSION

A large radiolucent lesion linked with an impacted tooth could lead to the diagnosis of a cyst or tumor. A dentigerous cyst was suspected in this case report based on the CBCT findings in terms of location and radiographic characteristics. However, histology examination is still required to make a definitive diagnosis.

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FOOTNOTES

All authors have no potential conflict of interest to declare for this article. Informed consent was obtained from the patient for being included in this case report.

REFERENCES

1. Vinereanu A, Bratu A, Didilescu A, Munteanu A. Management of large inflammatory dentigerous cysts adapted to the general condition of the patient: Two case reports. Exp Ther Med. 2021 May 12;22(1):750.
2. Thompson LDR. Dentigerous cyst [Internet]. Woodland Hills,California; 2018. Available from: www.entjournal.com
3. Bhardwaj B, Sharma S, Chitlangia P, Agarwal P, Bhamboo A, Rastogi K. Mandibular Dentigerous Cyst in a 10-Year-Old Child. Int J Clin Pediatr Dent. 2016;9(3):281–4.
4. Mckinney SL, Lukes SM. Dentigerous cyst in a young child: a case report. Vol. 55, Can J Dent Hyg. 2021.
5. Hutomo FR, Pratiwi ES, Kalanjati VP, Rizqiawan A. Case report: Dentigerous Cyst and Canine Impaction at the Orbital Floor. Folia Medica Indonesiana. 2019 Oct 3;55(3):234.
6. Mhsake S. Text Book of Oral Pathology : Chapter 16. Cysts of the orofacial region. Vol. 1. india; 2015. 323–329 p.
7. Jones J, Gaillard F. Dentigerous cyst. In: Radiopaedia.org. Radiopaedia.org; 2008.
8. Weiss R, Read-Fuller A. Cone Beam Computed Tomography in Oral and Maxillofacial Surgery: An Evidence-Based Review. Dent J (Basel). 2019 May 2;7(2).
9. M Shetty R, Dixit U. Dentigerous Cyst of Inflammatory Origin. Int J Clin Pediatr Dent. 2010;3(3):195–8.
10. Arjona-Amo M, Serrera-Figallo MA, Hernández-Guisado JM, Gutiérrez-Pérez JL, Torres-Lagares D. Conservative management of dentigerous cysts in children. J Clin Exp Dent. 2015 Dec;7(5):e671-4.
11. Thambi N, Anjana G, Sunil EA, Manjooran T, Nair A, Jaleel D. Nidhu Thambi et al Inflamed Dentigerous Cyst: A Case Report and Review 1. Review Oral Maxillofac Pathol J. 2016;7(2):744–7.
12. Borghesi A, Nardi C, Giannitto C, Tironi A, Maroldi R, di Bartolomeo F, et al. Odontogenic keratocyst: imaging features of a benign lesion with an aggressive behaviour. Insights Imaging. 2018 Oct;9(5):883–97.
13. Kumar R, Singh R, Pandey R, Mohammad S, Ram H. Inflammatory dentigerous cyst in a ten-year-old child. Natl J Maxillofac Surg. 2012;3(1):80.
14. Kaczor-Urbanowicz K, Zadurska M, Czochrowska E. Impacted Teeth: An Interdisciplinary Perspective. Advances in Clinical and Experimental Medicine. 2016;25(3):575–85.

15. Onay O, Suslu AE, Yilmaz T. Huge Dentigerous Cyst in the Maxillary Sinus: A Rare Case in Childhood. Turk Arch Otorhinolaryngol. 2019 May 10;57(1):54–6.
16. White SC, Pharoah MJ. White and Pharoah's Oral Radiology. Edisi 7. Misouri, Canada; Elsevier Mosby: 2014. p.338.
17. Monika APW, Renwi Astuti E, Mulyani WM. The quality of the lollipops use in the making of the anterior upper teeth periapical radiography of in paediatric patients. EurAsian Journal of BioSciences Eurasia J Biosci. 2020;14:4049-53.
18. Hamada Y, Timothius CJC, Shin D, John V. Canine impaction – A review of the prevalence, etiology, diagnosis and treatment. Seminars in Orthodontics. 2019;25(2):117-23.
19. Cruz RM. Orthodontic traction of impacted canines: Concepts and clinical application. Dental Press J Orthod. 2019 Jan-Feb;24(1):74-87.
20. Ghandour L, Bahmad HF, Bou-Assi S. Conservative Treatment of Dentigerous Cyst by Marsupialization in a Young Female Patient: A Case Report and Review of the Literature. Case Rep Dent. 2018 Jun 28;2018:7621363.
21. Ahmed J, Nath M, Sujir N, Ongole R, Shenoy N. Correlation of Pericoronal Radiolucency Around Impacted Mandibular Third Molars Using CBCT with Histopathological Diagnosis: A Prospective Study. The Open Dent Journal. 2022;16(Suppl 4, M3): e187421062111121.