

Maxillary Dentigerous Cyst and Supernumerary Tooth. Is it a Frequent Association?

Beatriz González Navarro¹, Enric Jané Salas², Ivette Teixidor Olmo¹, Aura Font i Muñoz¹, Inma Juarez Escalona³, José López-López²

¹DDS, Dentist, Student of the Master's Degree in Medicine, Surgery and Oral Implantology, Barcelona University, Spain. ²MD, DDS, PhD, Doctor Specialist in Stomatology, Professor of Oral Pathology, Barcelona University, Spain. ³MD, DDS, Doctor, Specialist in Oral and Maxillofacial Surgery (University Hospital of Bellvitge), Lecturer of the Master's Degree in Medicine, Surgery and Oral Implantology, Barcelona University, Spain.

Abstract

Dentigerous cysts, also known as follicular cysts, are a relatively common pathology in our field. They are associated with unerupted or semi-erupted teeth and are usually not related to supernumerary teeth.

Objective: To describe a dentigerous cyst case associated to a supernumerary tooth.

Case-report: A large-sized dentigerous cyst is described, associated with a supernumerary tooth, affecting the whole maxillary anterior area. Appropriate treatment consists of performing root canals and a Partsch II procedure with a cystectomy, extracting the unerupted teeth, carrying out an apicoectomy and retro-filling the affected teeth. The defect is filled with a bone xenograft. Possible therapeutic alternatives and the connection between the dentigerous cysts and supernumerary teeth are considered in the discussion.

Key Words: *Dentigerous Cyst, Supernumerary Teeth, Treatment*

Introduction

Dentigerous or follicular Cysts (DC) are cysts that involve an odontogenic epithelial origin and are due to developmental alterations. They are the most frequent type (10%) after radicular cysts (25%) and are linked to cases of unerupted teeth. The origin of this type of cyst lies in the reduced epithelium, as a result of a cystic degeneration of the remaining enamel organ, generating a fluid accumulation caused by the degeneration of epithelial cells, as is identified by means of exudation between the crown and the epithelium [1]. These cysts are generally found by chance after a routine X-ray and are rarely related to supernumerary teeth [2,3]. They are most commonly identified associated with mandibular third molars and maxillary canines. These cysts normally appear in young adults, between 20 and 30 years of age [4]. Stafne [5] was the first to describe dentigerous cysts associated with supernumerary teeth, registering an incidence of 5.5% in 200 dentigerous cysts.

There are several ways to treat this condition, ranging from marsupialisation to the complete exeresis, including the unerupted tooth [4].

We are presenting a dentigerous cyst in the upper maxillary region of a 23-year-old male, associated with a supernumerary tooth with a slow and asymptomatic growth rate. We shall review the relevant literature.

Case Report

A 23-year-old Caucasian male goes to the Dental Hospital of the Universitat de Barcelona (University of Barcelona) for assessment of an asymptomatic tumour that has been evolving during two months with slow growth rate in the vestibular maxillary region. The patient has no pathological history, toxic habits or known allergies.

Extraoral examination reveals protrusion of the upper lip (*Figure 1a*), bilaterally erasing the nasolabial fold. There is an ill-defined intraoral nodular lesion at the bottom of the vestibular maxillary region, spanning from the mesial region of the upper right central

incisor to the distal of upper left canine (*Figure 1b*). It is a fluctuating lesion on palpation with a slightly blue colour and is painless. Both upper central incisors, and upper lateral incisors, and upper left canine (12, 11, 21, 22 and 23) did not present any alteration in terms of colour, their percussion was negative and their vitality tests were positive. Upper right canine (13) did not show any variation in terms of colour, though it reflected positive percussion and negative vitality results. In turn, radicular remains were observed in upper right first molar, upper left first premolar, lower left and right first molars (16, 24, 36, 46).

The remaining examination provided neither other substantial details nor additional clinical data of interest.

An orthopantomography (*Figure 1c*) was performed, which showed a radiolucent image spanning from the distal of upper right canine to the distal of upper left central incisor, and two images compatible with supernumerary teeth. One included the aforementioned lesion near the upper right lateral incisor and the other appeared in the palatine region, near teeth upper left central and lateral incisor. A Computerized Tomography (CT) of the upper maxillary region reveals a large-sized lesion (*Figure 2*) spanning from the right maxillary canine to the left maxillary canine, including the dental tips of teeth 13, 12, 11, 21, 22 and 23 and measuring approximately 60×30 mm. The existence of two supernumerary teeth is thus confirmed. There is a bulging on both corticals and the vestibular cortical is destroyed around both maxillary central incisors, upper left lateral incisor and left maxillary canine (11, 21, 22 and 23). A 4 mm-diameter periapical lesion in the upper left first premolar was also observed.

All teeth affected by the lesion (from 13 to 23) were endodontically treated prior to surgery and a full thickness trapezoidal flap was performed from number upper right first premolar to the upper left first premolar. A cystectomy was carried out (with unerupted supernumeraries) (*Figure 3*) and the subsequent apicoectomy of teeth numbers 11, 21 and 22. The remaining apicoectomies were suspended, as the tips were not exposed. Retrograde filling with MTA® (Mineral

Corresponding author: José López-López, Bellvitge University Campus, Department of Odontostomatology, Pabellón de Gobierno 2^a Planta, C/ FeixaLlarga s/n, 08907 - L'Hospitalet de Llobregat, Barcelona, Spain, Tel: +34-606457362; e-mail: jl.lopez@ub.edu

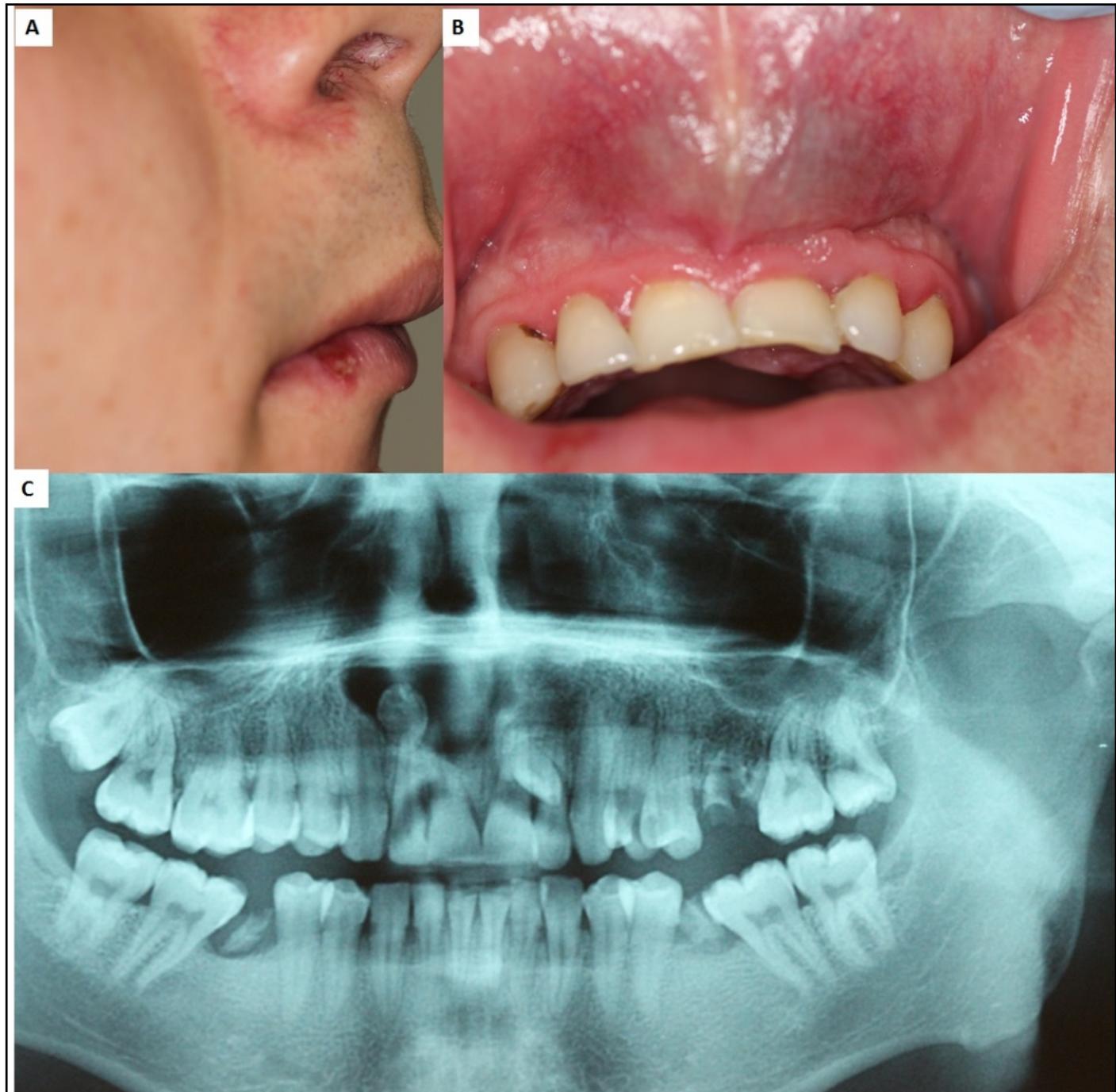


Figure 1. (A) Extraoral view of the lesion. A tumour-like lesion in the vestibular anterior area of the upper maxillary region can be observed, therefore erasing the nasolabial angle.

(B) Intraoral view of the lesion. An ill-defined nodular lesion at the bottom of the vestibular, in the anterior area of the upper maxillary region, covering from the distal of number 11 to the mesial of number 23 can be observed.

(C) Orthopantomography. It shows a cystic lesion with two structures inside, compatible with internal supernumerary teeth.

Trioxide Aggregate: calcium, phosphate and silica) (Pro Root MTA; Dentsply Spain and Portugal) took place after the apicoectomies. Bio-Oss® 2gr (Geistlich Switzerland) was used for cavity filling caused by the cyst enucleation, and the defect was covered with a 25x25 mm reabsorbable membrane (BioGide, Geistlich Switzerland), placed in the upper-right area of the lesion in order to protect the nostril floor. Subsequently, the palatal exodontia of the left supernumerary tooth was performed along with the extraction of number 24, with curettage of the periapical lesion. Finally, the flap was sutured with 4-0 silk. After surgery, tooth number 22 was lost, therefore palatal splinting was carried out from 13 to 23. The material obtained during surgery was fixed in formalin at 10% and was sent to the Pathologic Anatomy service in order to proceed with

its study. The dentigerous or follicular cyst diagnosis was confirmed: the analysed fragments displayed a fibrocellular connective tissue wall with mixed inflammatory infiltrate foci (lymphoplasmacytic and polymorphonuclear), foamy macrophages accumulations, haemorrhagic areas and regions containing hemosiderin. Several fragments were coated with a non-keratinised flat polystratified epithelium (*Figure 4*).

Regular post-operative follow-ups revealed a favourable clinical and radiological evolution of the procedure (*Figures 5-7*).

Discussion

Supernumerary teeth are normally found in the maxillary anterior region and may cause disorders in dental eruption or alterations in the



Figure 2. Computerized tomography. (Top image) A perforation of the vestibular cortical with a supernumerary inside the cystic lesion is observed. (Bottom image) There are 2 supernumerary teeth in the lateral incisors area of the palatal.

neighbouring teeth [6,7]. These teeth appear in less than 1% of the general population. Developmental abnormalities and hyperactivity of the dental plate is the most accepted theory in order to explain their formation [8].

Dentigerous cysts are the second most common odontogenic cysts appearing in the jaws, after radicular cysts [1,9]. Association between dentigerous cysts and supernumerary teeth is an unusual pathology [1,4,6,8,10]. Jiang et al.'s [6] literature review spanning from 1988 to 2011 discloses the publication of 16 cases of dentigerous cysts associated to supernumerary teeth in the premaxilla. The mentioned predominance of follicular cysts associated to supernumerary teeth varies between 1 and 9.9% [6,7,11]. Likewise, a retrospective study conducted by Zhang et al. [4] shows that only 11 (1%) out of 2082 dentigerous cysts were related to an impacted supernumerary tooth, however, the connection with third molars (98%), was the most common situation. As we have already discussed, Stafne [5] found that 5.5% of supernumerary teeth developed dentigerous cysts. On the other hand, Hurlen and Humerfelt [12] found a correlation of 7% and Asaumi et al. [13] stated that dentigerous cysts associated to

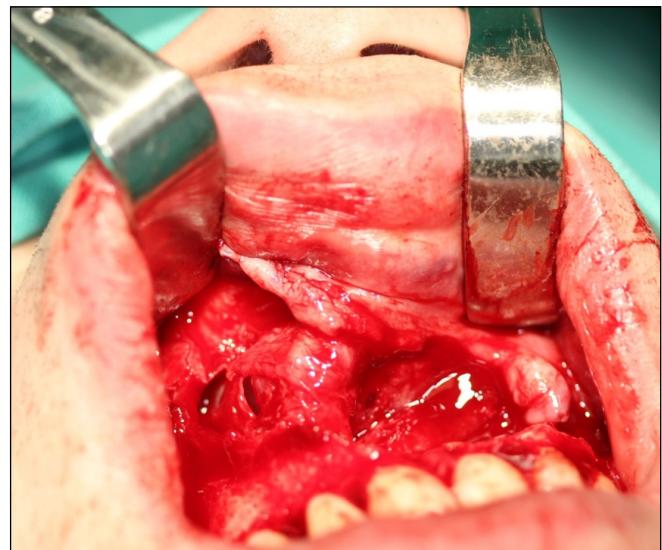


Figure 3. Surgical image of the cystectomy and curettage of the cavity.

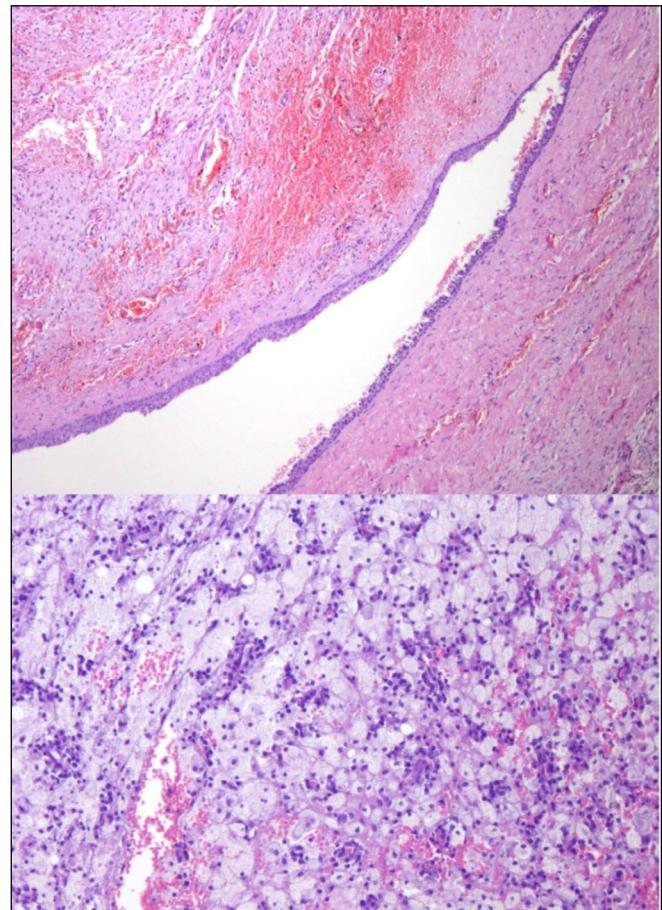


Figure 4. Histopathological study. Fibrocellular connective tissue wall with mixed inflammatory infiltrate, lymphoplasmacytic and polymorphonuclear foci. Foamy macrophages accumulations, haemorrhagic regions and areas containing hemosiderin. Some bone spicules may be observed. Several fragments are coated with a non-keratinised flat polystratified epithelium, generally thin with thickened foci.

supernumerary teeth account for 11% of the cases. A study by Lin et al. [14] showed that the connection between dentigerous cysts and supernumerary teeth was of 13%.

Dentigerous cysts have odontogenic epithelial origin and they affect the crown of unerupted teeth. These cysts appear after the tooth crown is totally formed, and are caused by the accumulation of liquid between the reduced epithelium of the enamel organ and the crown of the underlying tooth that is already formed [1,15].

Dentigerous cysts are most frequently found in individuals in

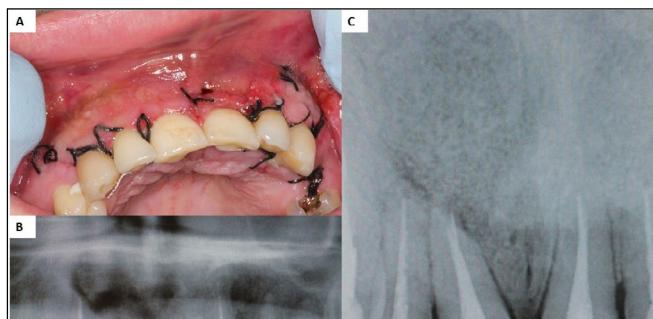


Figure 5. Post-operative follow-ups. (A) Healing one week after surgery. (B) Orthopantomography two weeks after surgery. (C) Periapical X-ray two weeks after surgery.

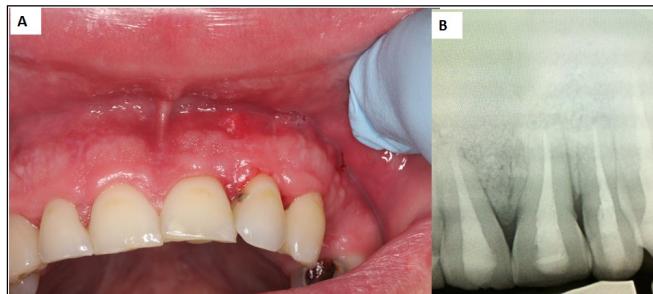


Figure 6. (A) Post-operative follow-ups. (B) Periapical X-ray two months after surgery.

the age group between twenty and forty years old, as occurs in the case of this study (the patient was 23 years old). This is probably due to the fact that individuals in this age group are more commonly diagnosed with these lesions [4,6,14,15].

The panoramic X-ray reveals the location of the cyst and enables us to carry out a presumptive diagnosis [6]. The maxillary CT, however, portrays the dimension of the lesion and allows us to assess the bone cortical affection as well as that of the neighbouring teeth [10]. The final diagnosis is made according to the histological analysis of the lesion, where non-keratinised stratified epithelium, mixed inflammatory infiltrate (acute and chronic), hemosiderin, haemorrhage, and cholesterol crystals [14,17], as occurs in our case, are observed.

Concerning treatment, the root canal procedure performed on the affected teeth (from number 13 to 23) prior to the cyst enucleation, due to the loss of the vascular support these teeth suffer during the cystic curettage, is indicated and the relevant literature reviewed supports this decision [18,19].

We base ourselves on the article published by Gómez et al. [20], when performing an apicoectomy, cavities and their respective fillings, wherein it is stated that a periapical retaining cavity is an unavoidable and essential practice, as it enables a minimum resection of the tip and facilitates the insertion of the retrograde sealing material. Although different materials can be used to perform the retro-filling (silver amalgam, IRM, SuperEba, gutta-percha), in our case we employ MTA® (Mineral Trioxide Aggregate: calcium, phosphate and silica) (ProRoot MTA; Dentsply Spain and Portugal), as it is the best performing material concerning waterproofing and



Figure 7. (A and B) Computerized tomography two months after surgery.

biocompatibility [20].

Finally, there is a certain degree of controversy as to whether the remaining cavity should be filled or not with bone grafts. Some authors are against filling the cavity and argue that, with the blood clot, it is possible to regenerate bone, also reducing the chances of encountering complications during treatment [21-23]. Other authors state that the cystic cavity should not be filled, except in cases where the lesion is small in size [9]. In other cases, as in the present study, authors recommend using bone grafts to fill the cavity, whether with autologous grafts [18,24], allografts [25], or xenografts [26].

Table 1 shows different authors criteria with regard to root canals, apicoectomies and retro-filling materials, enucleation resulting cavity's filling or not, and which alternative obtains the best results [16,18,19,21,22,27-29].

Conclusion

Based on the explanation of this particular case and the literature that has been reviewed, we can conclude the following:

- 1) The association between a dentigerous cyst and a maxillary supernumerary tooth is unusual.
- 2) In order to carry out a suspected diagnosis, we will base ourselves on the clinical picture of the patient and the results obtained by means of a panoramic X-ray to establish the lesion.
- 3) A CT would be necessary should we wish to assess the neighbouring teeth's affection appropriately.
- 4) The histopathologic study of the surgically removed piece will determine the confirmed diagnosis.
- 5) From a therapeutic point of view, we agree with most authors on the belief that root canal treatment on every tooth involved in the case is necessary prior to surgery. It allows carrying out apicoectomies by retro-filling in order to seal the root canal.

References

1. Vega Llauradó A, Ayuso Montero R, Teixidor Olmo I, Salas Enric J, Marí Roig A, López López J. Opciones terapéuticas en quistes odontogénicos. Revision. *Avances en Odontoestomatología*. 2013; **29**: 81-93.
2. Sumer M, Bas B, Yildiz L. Inferior alveolar nerve paresthesia caused by a dentigerous cyst associated with three teeth. *Medicina Oral, Patología Oral y Cirugía Bucal*. 2007; **12**: 388-390.
3. Ertas U, Yavuz MS. Interesting eruption of 4 teeth associated with a large dentigerous cyst in mandible by only marsupialization. *Journal of Oral and Maxillofacial Surgery*. 2003; **61**: 728-730.
4. Zhang LL, Yang R, Zhang L, Li W, MacDonald-Jankowski

- D, Poh CF. Dentigerous cyst: a retrospective clinicopathological analysis of 2082 dentigerous cysts in British Columbia, Canada. *International Journal of Oral and Maxillofacial Surgery*. 2010; **39**: 878-882.
5. Stafne EC. Supernumerary upper central incisor. *Dental Cosmos*. 1931; **73**: 976-980.
 6. Jiang Q, Xu GZ, Yang C, Yu CQ, He DM, Zhang ZY. Dentigerous cysts associated with impacted supernumerary teeth in the anterior maxilla. *Experimental and Therapeutic Medicine*. 2011; **2**: 805-809.
 7. John T, Gunashekhar M, Koshy M. Dentigerous Cyst Associated With Supernumerary Teeth: A Report Of Three Cases. *Journal of Clinical and Diagnostic Research*. 2010; **4**: 2601-2606.
 8. Shun Y. Dentigerous cyst associated with an impacted anterior maxillary supernumerary tooth. *Journal of Dentistry for Children* (Chicago). 2008; **75**: 104-107.
 9. Manor E, Kachko L, Puterman MB, Szabo G, Bodner L. Cystic lesions of the jaws. A Clinicopathological study of 322 cases and review of the literature. *International Journal of Medical Sciences*. 2012; **9**: 20-26.
 10. Kim KS, Mun SK. Extensive dentigerous cyst associated with a mesiodens: CT findings. *Ear, Nose and Throat Journal*. 2013; **92**: E6-E8.
 11. Gulses A, Karacayli U, Koymen R. Dentigerous cyst associated with inverted and fused supernumerary teeth in a child: a case report. *Oral Health and Dental Management in the Black Sea Countries*. 2009; **1**: 38-41.
 12. Hurlen B, Humerfelt D. Characteristics of premaxillary hyperdontia. A radiographic study. *Acta Odontologica Scandinavica*. 1985; **43**: 75-81.
 13. Asaumi JI, Shibata Y, Yanagi Y. Radiographic examination of mesiodens and their associated complications. *Dento Maxillo Facial Radiology*. 2004; **33**: 125-127.
 14. Lin HP, Wang YP, Chen HM, Cheng SJ, Sun A, Chiang CP. A clinicopathological study of 338 dentigerous cysts. *Journal of Oral Pathology & Medicine*. 2013; **42**: 462-467.
 15. Prabhakar V, VirkSandhu S. Nonsyndromic bilateral maxillary dentigerous cysts: Review of literature and report of an unusual case. *International Journal of Pediatric Otorhinolaryngology*. 2010; **5**: 5-8.
 16. Bhalla M, Datta P, Sharma S, Rohini C, Bhalla D. Dentigerous cyst involving mesiodens: a case report in 11 year child. *Indian Journal of Dental Education*. 2012; **1**: 29-33.
 17. Mohan KR, Natarajan B, Mani S, Sahuthullah YA, Kannan AV, Doraiswamy H. An infected dentigerous cyst associated with an impacted permanent maxillary canine, inverted mesiodens and impacted supernumerary teeth. *Journal of Pharmacy and Bioallied Sciences*. 2013; **5**: S135-138.
 18. Scolozzi P, Lombardi T, Ritcher M. Upper lip swelling caused by a large dentigerous cyst. *European Archives of Oto-Rhino-Laryngology*. 2005; **262**: 246-249.
 19. Torres-Lagares D, Segura-Egea JJ, Rodriguez-Caballero A, Llamas-Carreras JM, Gutierrez-Perez JL. Treatment of a large maxillary cyst with marsupialization, decompression, surgical endodontic therapy and enucleation. *Journal of Canadian Dental Association*. 2011; **77**: b87.
 20. Gómez V, Giner J, Maniega L, Gaite JJ, Castro A, Ruiz JA, Montesdeoca N. Apicectomía quirúrgica: propuesta de un protocolo basado en la evidencia. *Revista Española de Cirugía Oral y Maxilofacial*. 2011; **33**: 61-66.
 21. Ahmed HM, Al Rayes MH, Saini D. Management and prognosis of teeth with trauma induced crown fractures and large periapical cyst like lesions following apical surgery with and without retrograde filling. *Journal of Conservative Dentistry*. 2012; **15**: 77-79.
 22. Dinkar AD, Dawasaz AA, Shenov S. Dentigerous cyst associated with multiple mesiodens: a case report. *Journal of Indian Society of Pedodontics and Preventive Dentistry*. 2007; **25**: 56-59.
 23. Ettil T, Gosau M, Sader R, Reichert TE. Jaw cysts- filling or no filling after enucleation? A review. *Journal of Cranio-Maxillo-Facial Surgery*. 2012; **40**: 485-493.
 24. Kreidler JF, Raubenheimer EJ, Van Heerden WF. A retrospective analysis of 367 cystic lesions of the jaw-the Ulm experience. *Journal of Cranio-Maxillo-Facial Surgery*. 1993; **21**: 339-341.
 25. Bodner L. Effect of decalcified freeze-dried bone allograft on the healing of the jaw defects after cyst enucleation. *Journal of Oral and Maxillofacial Surgery*. 1996; **54**: 1282-1286.
 26. Horowitz I, Bodner L. Use of xenograft bone with aspirated bone marrow for treatment of cystic defect of the jaws. *Head & Neck*. 1989; **11**: 516-523.
 27. VosoughHosseini S, Moradzadeh M, Lofti M, AlaAghbali A, Fattah S. Dentigerous cyst associated with a mesiodens: a case report. *Journal of Dental Research, Dental Clinics, Dental Prospects*. 2012; **5**: 76-78.
 28. Khambete N, Kumar R, Risbud M, Kale L, Sodhi S. Dentigerous cyst associated with an impacted mesiodens: report of 2 cases. *Imaging Science in Dentistry*. 2012; **42**: 255-260.
 29. Patel K, Patel N, Venkataraman K. Management of a dentigerous cyst associated with inverted and fused mesiodens: a rare case report. *Journal of International Oral Health*. 2013; **5**: 73-77.