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A Two Years of Clinical and Radiographical Follow Up Post Enucleation of Radicular Cyst (Case Report)

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Abstract **Case Report**

This case report highlights cystic lesion associated with a root tip located at the socket of previously extracted tooth which was left after extraction. In this case study we will highlight the follow up of bone healing process of 24 months duration. In addition to that the consequences of the condition which led to formation of the cystic lesion in this patient, with description of miss management leading to unfortunately unavoidable treatment which is extraction of the anterior teeth. Frequent assessment of the patient clinically and radiographically after the surgical removal of the cystic lesion have been done for 2 years duration. In conclusion this young patient could be treated in other way to prevent the teeth extraction and to avoid surgery.

Keywords: Radicular cyst, radiographic, periapical, extraction, follow up.

INTRODUCTION

Odontogenic cysts affecting the jaws are of different features and characteristics, with regard to the followings, male to female ratio, site (maxilla mandible), location (anterior posterior) and the clinical manifestations. Large cysts show swelling buccally and more rarely lingually or palatally. This swelling is due to expansion of the buccal cortical plate, which becomes thinned and may demonstrate a crackling sound (crepitus).

One of the most common odontogenic cystic lesions of inflammatory origin is radicular cyst. The majority of this type of cysts are asymptomatic, especially those small in size. They are discovered accidentally after radiographic examination, unless they are suppurated, where upon pain as well as other symptoms occur (Fragiskos D. 2007).

As an inflammatory cyst, radicular cyst usually happens after the necrosis of the pulp following dental trauma or caries. The stimulation and proliferation of an epithelial residues cell or rest of Malassez in the periodontal ligament results in radicular cyst formation (Penumatsa V. *et al.*, 2013).

Residual cysts happen when tooth is extracted and all or part of radicular cyst is left behind as its name implies, is a radicular, lateral periodontal, dentigerous or any other cyst that has persisted after its associated tooth has been lost.

The location of the cyst is usually at root apices of offending tooth. Patient remains asymptomatic and usually becomes aware of the cyst when a swelling becomes clinically obvious. The approach for the management of the cyst, is enucleation and for the cyst with a large and extensive size marsupialization, decompression, and surgical enucleation may be required (Nik Rozainah *et al.*, 2020, Tsesis Igor *et al.*, 2020, Neville BW. *et al.*, 2015).

This case scenario presents patient with radicular cyst associated with a root tip located at previously extracted tooth socket which was left after extraction.

CASE REPORT

A 19-year-old man was referred to the oral surgery specialist clinic, at Faculty of Dentistry at IIUM regarding a considerable pus discharging at the edentulous area of his upper left anterior labial mucosa for about 1 year duration which sometime associated

with pain and swelling on the labial area of the permanent left maxillary central and lateral incisor.

CASE HISTORY

Eight years before, patient was involved with bicycle accident in which there was a fracture on 21. No treatment had been done at that time. Later, after 2-3 months, patient claim there was pain and swelling on both permanent left maxillary central and lateral incisor and patient underwent root canal treatment for both teeth at Kemaman Hospital Malaysia. Five years later, patient claim that there was pus discharge at that area of maxillary central and lateral incisors and the teeth were discoloured. Both teeth then being extracted by dental officer due to failure of RCT. The patient claim that the extraction was easy for the left lateral incisor due to the mobility of the tooth while extraction of the central incisor was quite difficult and took long time to be extracted. Three months after the extraction of the teeth, patient observed recurrence of pus discharge coming out from the labial mucosa adjacent to the mentioned teeth.

Upon intraoral examination a fluctuant swelling, about 1×1 cm seen on the labial mucosa extended from the area between maxillary left central and lateral incisors. The swelling was soft, fixed, non-tender, and had a light yellowish colour, with a sinus tract in the middle (Figure 1, A & B). During the examination of the swollen area, pus came out through the sinus tract. Other than this intraorally no abnormality detected. Patient is fit and healthy with no medical illness.

Figure 1 (A): Before palpation

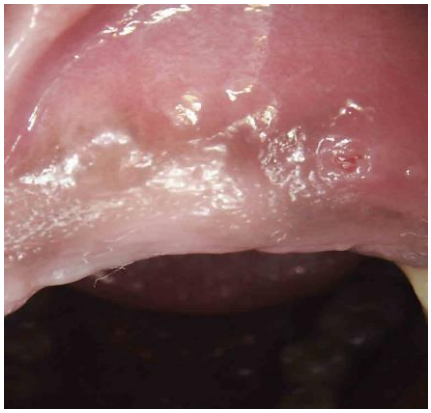


Figure 1 (B): After palpation

The patient sent for intraoral periapical radiograph which showed a well-defined unilocular rounded radiolucency with the radiopaque object /material resembling piece of the root which was left during the difficult extraction at the area of the maxillary left central incisor (Figure 2).

A

B

Figure 2 (A): Showing; a well-defined radiolucency a well-defined radiolucency at the area of extracted tooth, (B): Periapical radiograph one week after the surgery

The differential diagnosis was (a) residual / radicular cyst (b) periapical granuloma (c) chronic abscess secondary to foreign body.

The treatment options were explained to the patient, and he agreed to undergo surgery to enucleate the cystic lesion and to remove the radiopaque object (the left tip of the root) seen in the periapical radiograph.

Surgical Procedures and Outcome

Verbal and written consent was obtained from the patient to start with the periapical surgery to remove the cystic lesion.

The patient rinsed his mouth with chlorhexidine 0.12% then swabbing of the lips and perioral area was done, after that dripping including the head and the chest of the patient was performed. The operating site was anaesthetized with 2% mepivacaine epinephrine (1:100 000). A three-sided flap using blade number 15, from the region of distal of maxillary right central incisor to the mesial of the maxillary left canine was performed, and a mucoperiosteal flap was raised (Figure 3 A & B). Enucleation was done, and the remnant root tip was removed.

Figure 3 (A): Surgical procedure

Figure 3 (B): Root tip arrow

Wound debridement was done and suturing of the field was performed using 3.0 black silk suture. The patient was prescribed with Acetaminophen Paracetamol tab.1g. orally to be taken three times daily 5/7 Mefanemic acid tab.500mg. Three times 5/7, and Arcoxia tab.90mg 1/7. The specimen was sent for histopathological examination.

The patient came after one week of surgery for review and suture removal, with no complaint, and the soft tissue healing was good with mild inflammation at the edges the sutures the patient prescribed with chlorhexidine mouth wash 0.12% for five days.

At the same visit the patient sent for, periapical radiographic examination which showed the radiolucent lesion free of the root tip as seen in fig. 2B.

Histopathological Examination

Microscopically the specimen shows dens fibrous cystic walls lined partially by variable thickness of non- keratinized stratified squamous epithelium a diffuse infiltration of chronic inflammatory cells is present. Interpretation: maxillary left central and lateral incisor area corelation with clinical history would be consistent with radicular cyst (fig.4 A & B). The diagnosis was confirmed as a radicular cyst. Three months later the patient called for construction of a temporary partial denture and for radiographic assessment.

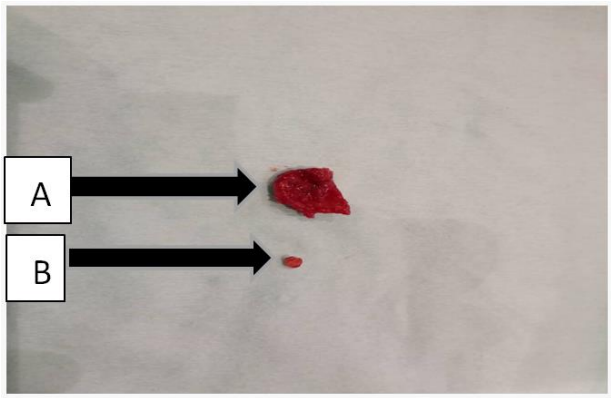
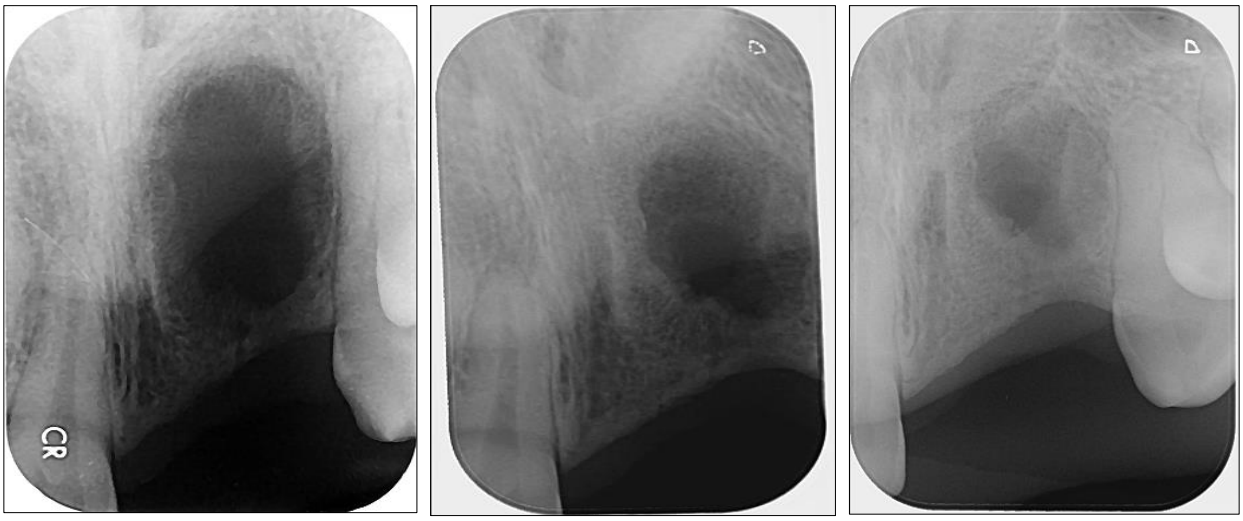


Figure 4 (A & B): Specimen for histopathological examination, A cyst lining, B: root tip.

Postoperative radiographic evaluation at the 6th month, 1 & 2-year interval showed evidence of periapical bone repair figure (6A, B & C), showed bone formation and a small area of incomplete healing or healing by scar after one year of surgery at the periapical area of the maxillary lateral incisor was noted, while the cavity almost totally filled with a new bone after the second year of surgery.

A B

Figure 5 (A & B): A, Clinical photos showing the complete healing and B, the construction of the temporary partial denture



A B C

Fig. 6: A, Six months after surgery B, One year after surgery C, Two years after surgery

DISCUSSIONS

The radicular cyst is an inflammatory cyst type which is reported more common than developmental cysts (Monteiro L. *et al.,* 2020, Kambalimath H. *et al.,* 2014 Savithri V. *et al.,* 2020).

Stimulation by inflammation of the epithelium at the apex of a necrotic tooth can lead to formation of a true epithelium-lined cyst, or periapical cyst. The inflammatory restraint appears to increase the production of keratinocyte growth factor by periodontal stroma cells, leading to increased proliferation of normally quiescent epithelium in the area (Neville BW. *et al.,* 2015). Localization of the radicular cyst is anterior maxilla mainly associated with incisors and canine, with regard to gender the prevalence of male to female ratio is 1.35:1, 1.6:1 in different studies (Kambalimath H. *et al.,* 2014, Koju S. *et al.,* 2019).

Radiographically radicular cyst appearance is documented as a radiolucent, well-defined cortical border.

Periapical cysts occur in patients mainly over a widespread age range, the third and fourth decades of life are mostly affected (Kolari Vinayakrishna *et al.,* 2019). Such cysts rarely to develop in association with primary teeth; however cysts associated with deciduous teeth mainly occur in the mandible (Rohan Jagtap *et al.,* 2021).

According to the research done by it looks that the cyst dentigerous on many Indonesian populations at the age of 21-30 years, and women more than in men.

In general, the clinical findings of radicular cyst may include tenderness, pain, swelling, and drainage all mentioned signs and symptoms were observed in this case study. Although, many periapical

cysts are asymptomatic and discovered incidentally during routine radiographic examination, which mimic developmental lateral periodontal cysts (Shear M *et al.*, 2007).

In this case scenario we will highlight on the consequences of the treatment of this patient and how a simple mistreatment may lead to such condition which affect the patient in three aspects which are aesthetic, economic, and time.

The patient presented with past dental history of localized trauma to the upper anterior teeth, which was unsuccessfully treated by the root canal treatment and not been followed up properly.

The failure of root canal treatment could be corrected by redo or by apical surgery (apicoectomy). If the redo has poor prognosis, so should go for surgery, to avoid the extraction of the anterior teeth especially in this young patient. On the other hand, the extraction was unsuccessful which led to the formation of the residual cyst.

In the present case study pulpal necrosis and microbial infection, resulted from a history of dental trauma, it is speculated that, the development of the radicular cyst started when the epithelial cell rests of Malassez at the periapical area were stimulated from a continuous microbial infection from the pulp.

After that the cells then continue to undergo proliferation and multiplication which later trigger an inflammatory process to release many IL-17 cytokines and M1 macrophages that mediate the attraction of neutrophils to the site. These ultimately encourage the lesion's growth. There is proof that osteoprotegerin and receptor activator of nuclear factor kappa-B ligand, two bone-resorbing substances, play a part in the cystic enlargement (Franca GM. *et al.*, 2019, Chen SY. *et al.*, 2019, Tekkesin MS. *et al.*, 2011, Parmar PD. *et al.*, 2018).

Recent research suggested that viruses play a role in etiopathogeneses of radicular cysts, study done by Mohammed Amjed *et al.*, stated a strongly correlated presence of Human Cytomegalovirus and Human Papilloma virus in the odontogenic epithelium of radicular cysts. However, a proposed role of these viruses in the pathogenesis of RC needs further investigations (Mohammed Alsaegh *et al.*, 2021).

Regarding pain management for the patient in this study the best means to reduce pain and infection is to remove the source of infection as fast as possible, which is in agreement with previous studies (Swathi Pai *et al.*, 2018), removal of the cystic lesion without the removal of the root tip wouldn't give a successful result and the infection will recure.

The patient in this study presented with the condition where the cyst had eroded labial and palatal bone surface. Radiographic examination helps in the assessment of the lesion and draws a plan for management, although CBCT would be more helpful in planning of surgery. The apical area of the maxillary left central and lateral incisors; the patient displayed practically full bone development during a 24-month postoperative assessment.

We should highlight that we haven't use any bone graft to the defective bone area after the enucleation of the radicular cyst and the bone formation was seen perfectly after the first six-month postoperatively, taking in consideration the age of the patient and the size of the lesion, which might not give a similar results treating patient in fourth decade of life or above, when bone grafts is indicated to act as a foundation for the growth of new bone and gradually resorb to make room for the replacement of old bone with new bone, which is dependent not only on the extent of the lesion but also on the process of bone creation at this age. The soft tissue healing was satisfactory, and our patient had no more complaints.

CONCLUSIONS

The source of infection should be removed to prevent the development of cystic lesions, periapical granuloma, or chronic recurrent abscess secondary to foreign body reaction as a complication of extraction. Incomplete extraction of teeth, especially the infected ones, leads to complications of various aspects, which are simply to be prevented.

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Conflicts of Interest: There are no conflicts of interest.

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