

Joint surgical and endodontic treatment of a huge keratocyst lesion (18 months follow up)

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ABSTRACT

Odontogenic keratocyst is a locally aggressive developmental cyst that may appear in the mandibular third molar or canine region. It varies in size and as it widens it may interfere with the surrounding structures as teeth by compressing on their nerves and blood supply. Treatment is usually accomplished by enucleation, curettage and then bone grafting of the cystic space. Any non-vital tooth near

the cyst space region may extrude toxic substances from the dead pulp space. The interaction between the extruding irritants from the root canal space and the host defense results in activation of numerous inflammatory reactions which will not allow healing to the periapical region. Instrumenting and irrigating the root canal will remove all harmful microorganisms and leave a clean disinfected space. Obturating of the pulp space ensures blocking the space with inert or bioactive material that will enhance bone healing.

Key Words: Odontogenic keratocyst; Enucleation; Endodontics; Bone healing; Cyst; Obturation

INTRODUCTION

An odontogenic keratocyst is a rare and benign but locally aggressive developmental cyst (1). It originates from the odontogenic epithelium (dental lamina) in the alveolus left from tooth development stages. They are mainly thought to arise from rests of Serres (2).

Odontogenic keratocysts tend to grow in an anteroposterior direction within the medullary cavity of the bone without producing bone expansion (3).

There is no specific effective treatment for the treatment of odontogenic keratocysts (4). Most odontogenic keratocyst are treated by enucleation and curettage (5). Bone grafting may be used after the treatment of large odontogenic keratocyst to reduce the risk of pathological break (6).

Odontogenic keratocyst may vary in size and may compress the adjacent teeth affecting their vitality and blood supply. Pulp necrosis is a clinical diagnostic category indicating the death of cells and tissues in the pulp chamber of a tooth with or without bacterial invasion and it is often the result of many cases of dental trauma.

Debriding, irrigating and drying the necrotic root canal will ensure a favorable environment for obturation of the root canal space. Obturation is done by inert gutta-percha as a core material and sealer which is a film like creamy substance which may constitute bioactive material as mineral trioxide aggregate which promotes healing due to its high pH value.

CASE REPORT

Surgical protocol

In December 2018, a 32 years old male patient attended the oral and maxillofacial center in Alshaheed Ghazi Alhariri hospital/ Medical city/Baghdad/Iraq, complaining of pain, chin swelling, and intraoral fluid discharge. On clinical examination shows slight mobility of lower anterior teeth, swelling of the labial vestibule, tenderness, and fluctuation on palpation.

Panoramic X-ray and C.T. Scan (Figure 1) reveals an approximately 8 cm length and 2.5 cm height well defined radiolucent lesion extend from right to left molar regions including all the lower anterior teeth showing horizontally impacted lower left canine within the cystic lesion and with slight expansion and thinning of the cortical plate, aspiration shows keratin fluid content (Figure 2).

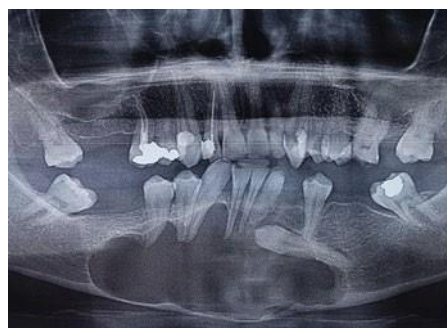


Figure 1) Before surgery. Mandibular canine impacted beneath the mandibular 2nd premolar with a huge odontogenic cyst in the mandibular anterior region

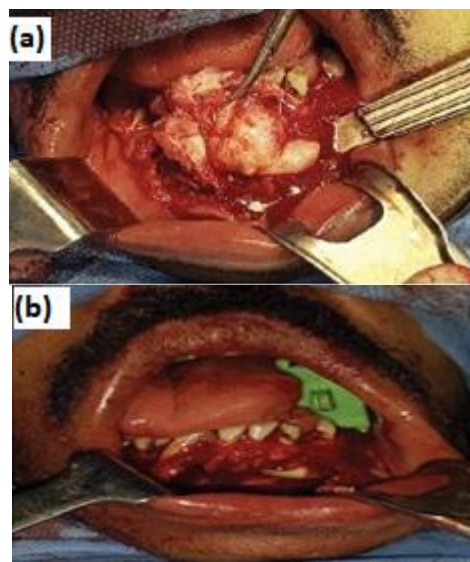


Figure 2) Surgical excision (a) After flap reflection the impacted canine revealed in the mandibular left region; (b) Surgical excision of the odontogenic keratocyst

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Under general anesthesia, surgical excision of the lesion through a three-sided intraoral incision extending from right 2nd molar to left 2nd molar of the lower jaw, their vertical incision on the intact bone and the horizontal incision including interdental papillae. Mucogingival flap was reflected subperiosteal with preservation of both mental nerves, thick lining cyst was completely excised with the removal of the impacted canine, peripheral osteotomy was done, and then a ribbon gauze soaked with Carnoy's solution was applied to a bony defect for three minutes followed by copious irrigation with normal saline (7).

Interrupted suturing was done, and removed one week later. The histopathological result was odontogenic keratocyst. After two weeks follow up shows good healing, then referring the patient to root canal specialist for root canal therapy of the lower anterior teeth (Figure 3).

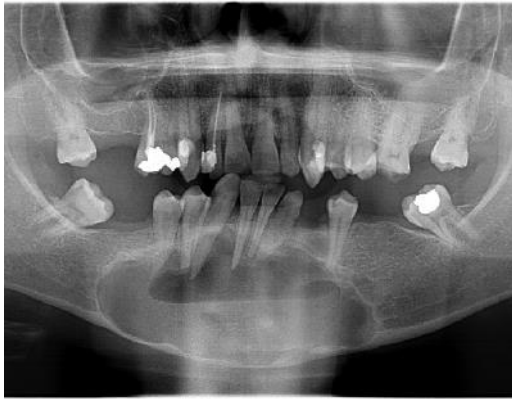


Figure 3) After removal of the canine and odontogenic cyst

Endodontic protocol

The patient attended the dental office referred to an oral maxillofacial surgeon. The patient operated in the mandibular anterior area. Cold vitality testing and electric pulp testing were done to the # 41, 42, 43, 44 and 31 teeth which were found to be non-vital.

The patient was referred for endodontic treatment for these teeth and follow up of the healing of the case.

PROCEDURE OF TREATMENT

First appointment

An access opening was performed to each tooth and remnants of the necrotic pulp were removed by a barbed broach. The pulp chamber and canal were filled with non-setting calcium hydroxide paste for 7 days and the access opening was closed with a ready-made temporary filling material.

Second appointment

The temporary filling material was removed by a high-speed handpiece and the calcium hydroxide paste was removed by a #15 K-file and then the pulp canal was washed with normal saline.

After calculating the working length of each tooth by an apex locator, root canal instrumentation was done by the WaveOne Gold system (Dentsply Sirona) starting by the Small file (D0=0.2) then Primary file (D0=0.25) and if needed Medium file (D0=0.35). Vigorous irrigation with 2 ml NaOCl solution and with a side vented needle and Endoactivator sonic vibration (Dentsply Sirona) was done between each use of the files. Then 2 ml of EDTA solution was used to irrigate the canals and kept for 1 minute in the canals.

After instrumentation, 5 ml of NaOCl solution with sonic vibration was done as the final irrigation. Finally, 5 ml of normal saline was used to irrigate the canals to remove any remnants of NaOCl. Complete dryness was done to the canals by sterile paper points.

The pulp chamber and canal were filled with non-setting calcium hydroxide paste for 7 days and the access opening was closed with a ready-made temporary filling material.

Third appointment

The temporary filling material was removed by a high-speed handpiece and the calcium hydroxide paste was removed by a #15 K-file and then the pulp canal was washed with normal saline.

The complete dryness of the canals was done by sterile paper points. MTA based sealer was inserted into the canal by a #15 K-file to pant the root canal walls. Thermafil gutta-percha cone (Dentsply Sirona) of sizes resembling the size of the instrumentation files were used to obturate the root canals completely.

Follow-up

The patient was instructed to visit the office for a routine panoramic x-ray every 6 months. After 18 months, the lesion shows signs of radiolucency around and inside the lesion with no history of any signs and symptoms in the region during this period. Healing of the lesion is evident underway with non-surgical endodontics with no need for bone augmentation in the lesion space (Figure 4).



Figure 4) After 18 months from endodontic treatment. Signs of radiographic radiolucent appearance around and inside the cyst space

DISCUSSION

Odontogenic keratocyst is commonly seen in the mandibular third molar and canine regions. If not removed they may spread antero posteriorly (3). It may affect the nerve and blood supply to the adjacent teeth rendering them non-vital. The contents of the necrotic pulp is harmful to the periapical region and will interfere in the healing of the surrounding structures of the tooth. After enucleation of the cyst bone grafting may be done to promote healing and bone formation in the cyst space (8).

Di Dio et al. showed that spontaneous bone regeneration was formed in all parts of the residual bony defects without the use of any filling material (9).

Routine endodontic treatment includes removal of debris in the pulp canals, irrigating, and then obturating them. After the endodontic obturation healing phase of the cyst, space begins with the formation of newly formed bone.

Çahskan found that endodontic treatment of teeth with periapical lesions have been reported to have a success rate of 85% (10). Amirabbas et al. present a case complete radiographic and clinical healing of the periapical lesion was observed after 20 months (11).

The present case showed that endodontic treatment interacted with the clean space previously filled by odontogenic keratocyst positively with the beginning of bone formation around and inside the space.

CONCLUSION

Healing of very large cysts can be done by removing the causative factors and promote healing by bone regeneration without bone grafting.

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