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Case Report

Apicoectomy of palatal root in upper 1st molar to remove endodontic instrument: Rare case report

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ABSTRACT

A wide range of accidents might happen during the treatment of the root canal system, where the instrument breakage is one of the most unpleasant occurrences. Several techniques have been developed to facilitate the removal of the broken instruments. The aim of this article is to present the surgical removal of a broken endodontic file from the periapical region of the palatal root of a maxillary first molar depicting importance of radiographs.

1. Introduction

Instrument when fracture during root canal therapy (RCT) is a troublesome incident that can interfere with efficient cleaning and shaping of root canal or act as an irritant to periapical tissues especially when some part of the separated fragment over extends from root apex.[1–3] The most common causes of instrument separation include, a) Improper or excessive use, b) Inherent physical properties, c) inadequate access, d) root canal anatomy, e) possible manufacturing defects.[1,4] The prognosis of endodontic treatment of a tooth with a broken instrument in canal, depends on stage of instrumentation prior to instrument separation, pretreatment pulpal or peri radicular tissue status and whether or not fractured file can be removed or bypassed.[5] Every attempt should be made for removing fragment or bypassing it followed by adequate cleaning and shaping and incorporating it into final canal obturation.

Most of stainless-steel instruments fail because of excessive torque and NiTi rotary files usually fracture because of torsional stress and cyclic loading. Fractured instrument may itself not cause treatment failure. However, remaining fragment in root canal can hinder proper preparation of root canal space.[6] Broken separated instrument when retained might produce corrosion products in canal and thereby leads to endodontic failure.[7]

Recently, it has been suggested that removal should always be attempted.[8] Fragment only being retained when nonsurgical removal has been unsuccessful.[9] The rationale is (as previously stated)that unless obstruction in the canal is removed allowing complete chemo mechanical disinfection of root canal system , outcome will be significantlyreduced.[10,11] Furthermore, it has been reported that in presence of a periapical lesion, endodontic treatment is compromised by procedural errors such as a fractured instrument demonstrated reduced healing.[10,12] Obviously,

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removal should improve working length control assuming there is minimal canal aberration and facilitate effective obturation of root canal system.[13] Successful removal of fragment from tooth also provides psychological benefits to patient and avoids the risk of medico-legal action.

When orthograde retrieval of a broken instrument, especially those extending beyond apex, is not possible, minor surgical procedure is done to remove this source of infection becomes crucial.[14,15] Apicoectomy consists of surgical removal of apical portion of tooth. It is indicated in several clinical situations: periapical lesions persistent to conventional treatment, perforations, fractured instruments, apical delta removal and external absorption presence.[16–18]

Aim of this case report is to describe a surgical procedure to resect an infected root containing a separated instrument. In this clinical case, chosen treatment was apicoectomy as our treatment plan.

2. Case Report

A 52-year-old female was referred to our clinic with chief complaint of mild pain and intermediate discomfort since 6 months in upper right region of face. There was no relevant medical history while dental history as stated by the patient revealed root canal treatment was done 2 years back i.r.t 16 and relief on taking inflammatory medicine.

Clinical and radiographical examination revealed that the separated endodontic instrument was in the palatal root canal located apical 1/3rd extending to periapical region. The intraoral periapical radiograph confirmed the fixed position of the instrument was close to the sinus. (Figure 1)

Fig. 1: Radiograph showing separated endodontic instrument in palatal root.

Patient was informed regarding the unfortunate but complication happened during previous endodontic treatment and now other treatment option were given to patient. Other treatment option included extraction followed by implant. However, tooth was in good health in terms of coronal structure and periodontal health so, apicoectomy was planned.

So, noble/unusual treatment modality was discussed with patient wherein it was proposed to resect 1/3 rd portion of palatal root of upper 1st molar by removing that part along with separated endodontic instrument.

Procedure was performed under greater palatine nerve block and infiltrate on buccal aspect i.r.t 5, 6, 7 teeth of affected side. A crevicular incision was given on palatal gingiva from canine to second molar, mucoperiosteal flap was raised. A bony window was prepared i.r.t 16 at the calculated length. (Figure 2)

Fig. 2: Preparation of bony window with bur.

The instrument was visualized and removed, the root end and endodontic instrument were removed as a single entity in order to avoid any risk of instrument projection into the sinus. (Figure 3a,b)

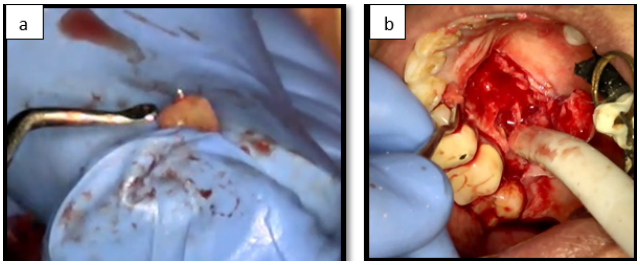

Fig. 3: a: Removal of root end with broken endodontic instrument; **b:** Opened flap at the time of removal of broken endodontic instrument and root apex.

The root end and instrument were inspected which revealed no cracks on root and instrument retracted was k file. The successful removal of separated instrument with

root apex was done.

The root end was treated with minimal invasive method. Then it was dried with paper point and root end filling was adapted, after curettage and irrigation with normal saline flap was closed with suture placement (Figure 4a,b)

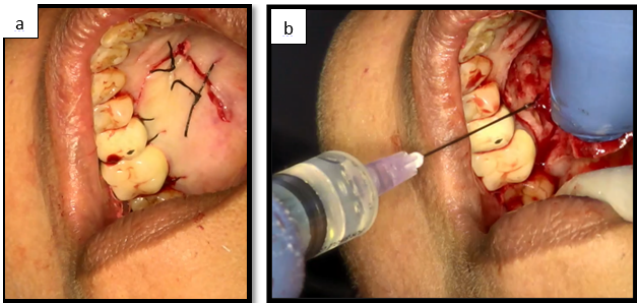

Fig. 4: a: Flap closure with suture placement; **b:** irrigation with normal saline

Patient was prescribed with post operative antibiotics, analgesics coverage with instructions to maintain proper oral hygiene. Patient was very kin to give us chance to help him overcome his pain and discomfort. Patient was then recalled after 7 days for suture removal. After 1 month patient was recall for examination, the right maxillary first molar was asymptomatic with progressive regeneration of the periapical bone. (Figure 5)

Fig. 5: Follow up X-ray

3. Discussion

Apicoectomy is surgical procedure of removal of root apex. This procedure is carried out in case of endodontic mishaps leading to instrument separation into the canal specially in apical portion of root. In the present case we will discuss about one such case where endodontic file was separated into the apical portion of palatal root of maxillary molar. After radiographic findings, it was found that instrument was in close proximity to the sinus so a decision was made to perform apicoectomy as the tooth was healthy so we excluded other treatment options like extraction followed by implant placement.

Endodontic procedural errors, such as a) under-filling, b) over-filling, c) fractured instruments, d) root perforations and ledges, e) increase the risk of post-treatment disease largely as a result of the inability to eliminate intra-radicular microorganisms from the infected root canal.[19]

When an instrument fractures during root canal preparation, there are three basic approaches to deal with problem: (i) Remove it; (ii) bypass and seal it within the root canal; or (iii) block the root canal with it.[20,21] In present case surgically remove of the broken endodontic instrument opting for apicoectomy as separated file was in close proximity to the sinus and could be pushed in an attempt to carry other approaches.

A thorough history, clinical examination, and good quality periapical radiographs are essential for pre-operative diagnosis of teeth scheduled to undergo apical surgery.[22] Herein, case presented owing to the risk of instrument projection into the sinus as revealed by the radiograph.

Removal of fractured instruments from root canal system is often difficult and, if not removed, it reduces the success in retreatment cases. Furthermore, prognosis is determined by position of fractured instrument in root canal, stage of endodontic treatment during which the fracture occurs, and presence of preoperative periapical radiolucency.[23–25] In this case as visualized root was neither cracked nor fractured.

Prognosis is poorest when the instrument fracture occurs near apex in early stages of endodontic treatment, particularly in the presence of a peri-apical pathology.[24,26] If timely diagnosis and treatment would not have been done it could have led to pathology.

In the present case radiograph helped in assessing the exact position of separated instrument, instrument and apical portion of root was removed as a single entity in order to prevent any further projection of instrument into the sinus. The apicoectomy was successfully performed with no post operative healing events.

4. Conclusion

Precise location of the fractured segment was predicted and removed with the aid of radiographic assessment and tooth was successfully treated without any complications.

5. Conflict o f Interest

The authors have stated explicitly that there are no conflicts of interest in connection with this article.

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None

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