Acta Scientific Dental Sciences (ISSN: 2581-4893)

Volume 6 Issue 12 December 2022

Case Report

Intentional Replantation for the Treatment of a Lower Premolar with Periradicular Lesion

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DOI:10.31080/ASDS.2022.06.1518

Received: October 28, 2022

Published: November 17, 2022

Abstract

In some cases of intractable pulpal diseases, the conventional endodontic therapy and the surgical intervention may become unfeasible. Intentional replantation can be an alternative solution to consider in the absence of contraindications. The present case report describes the management of a right mandibular premolar with a periradicular lesion of endodontic origin due to instrument separation. The patient who was referred to our clinic complained of a fistula and swelling in addition to a cyst-like radiolucent image and instrument fractures in the first right mandibular premolar. Considering the proximity to the mental nerve, it was decided to intentionally replant the tooth. Gentle extraction was done, and the socket has been corrected to remove the granulomatous tissue then the endodontic treatment and the retrograde obturation with MTA have been performed extra orally before replantation. Finally, a semi-rigid splint was applied for 3 weeks. The described technique in this case report was successful after a follow-up of two years which confirmed a complete clinical and radiographic healing.

Keywords: Intentional Replantation; Endodontic Surgery; MTA; Periradicular Lesion

Introduction

Fracture of endodontic instruments within the root canal may hinder root canal procedures. Surgical techniques for the removal of the instrument have been recommended. However, they might result in undue loss of tooth structure and clinical implications such as root perforation. Thus, it is important to assess the risks versus benefits of the removal of a retained instrument and its impact on the prognosis of the tooth [1]. For years, we have had success with the procedure of replantation of teeth that had been traumatically avulsed. This success led us to use the technique of intentional replantation for the treatment of intractable pulpal disease as a standard procedure offered by our clinic [2]. Intentional replantation is a procedure in which an intentional tooth extraction is performed followed by reinsertion of the extracted tooth. It should be reserved as the last resort to save a tooth after other procedures have failed or would likely to fail. The main reason of failure in replanted teeth is root resorption, specifically ankylosis or replacement resorption [3]. Some writers consider that indications for replantation are few and should be limited to posterior teeth, when conventional endodontic therapy and surgical intervention become infeasible [4] because of the surrounding anatomic structures (proximity to the mental nerve or maxillary sinus) and lack of accessibility (repair of the radicular groove or extensive endodontic perforation and thick buccal bone) [5], when there is a broken instrument in the canal that cannot be bypassed or removed [6], A calcified canal that cannot be negotiated and in which an area of rarefaction is present, when there is a periapical lesion, a silver cone that cannot be removed so retreatment is necessary [7], Internal or external resorption that has perforated the apical portion of the root, When a root canal has been grossly overfilled and is irritating the periapical tissues, when the root canal is bifurcated as it approaches the root apex and cannot be negotiated [8]. IR is contraindicated in the presence of periodontal disease with mobility, furcation involvement, or gingival inflammation. IR should not be attempted when the roots of the tooth are long and curved and would fracture during extraction [6], When it's an extensively carious tooth, or with a loss of septal bone. A normal or near normal attachment apparatus is necessary for reattachment of the tooth after extraction and replantation [8].

The present case report describes the management of a right mandibular premolar with a periradicular lesion of endodontic origin due to instrument fracture in the apical third of the root canal.

Case report and clinical techniques

A 34-year-old male patient was admitted to our clinic referred by a colleague for the management of two separated endodontic instruments within the root canal of a right first mandibular premolar. There was no complain of pain and the patient was in good health. Clinical examination revealed an intra oral buccal swelling and a fistula. No tooth mobility or periodontal pocket were recorded. The Preoperative radiographic evaluation including three dimensional radiographic examination (Cone Beam Computed Tomography) revealed the presence of an important cystic radiolucent image with a rupture of the buccal cortical plate, thinning of both cortical plates, more in the buccal than the lingual, and two instruments separated in the apical third of the canal (Figure 1a,b,c,d).

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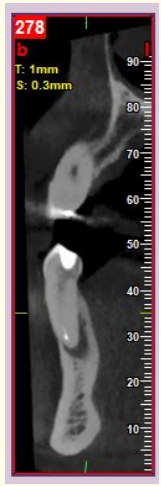
b



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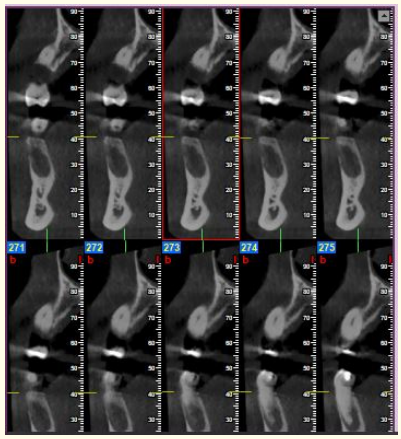

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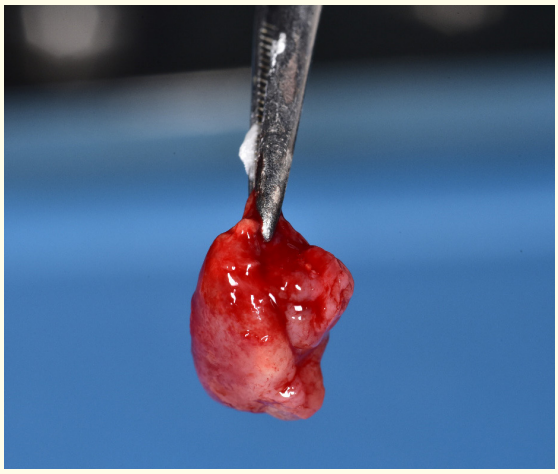
Figure 1: a: Preoperative periapical radiograph of tooth 44. b: Preoperative CBCT coronal image showing the precise location and axis of the instruments and a radiolucent apical image. c: Preoperative CBCT coronal images showing the extent of the lesion and the rupture and thinning of the corticale plates. d: Preoperative 3D CBCT image showing the cortical rupture and its distal position.

The premolar was located near the mental foramen, so apical surgery procedures can lead to neurosensory damage to the mental nerve. An attempt to perform a bypass of the separated instruments was first considered and performed, however, it was hindered by the delicate position of the instruments in the canal, leading to consider replantation and apicoectomy. Specific indications for intentional replantation include circumstances that may preclude close proximity to delicate anatomic structures. Considering the clinical situation, intentional replantation was planned after explaining the pros and cons of treatment to the patient and was scheduled after the completion of the root canal debridement and treatment with calcium hydroxide for one week.

After anesthesia, a sulcular incision was performed, followed by an atraumatic extraction to save the buccal/lingual cortical plates intact. For prevention of the damage to the cementum, elevator has not been used. Also, extraction forceps have been kept off the cementum above the cementoenamel junction. The socket has been curetted to remove the granulomatous tissue (Figure 2a). The buccal cortical plate was ruptured in the distal apical part (Figure 2b). The apical resection was done with an endo surgical burr, then the extraorally endodontic treatment was performed with a mechanized preparation, using the navigator Evo-System from MEDIN. The tooth was held with saline-soaked compress during manipulation. The root canal filling was performed with gutta cones and a bioceramic root canal sealer BioRoot ™ RCS from SEPTODONT, using the monocone technique (Figure 2c). A retrograde cavity has been prepared using ultrasonic instrumentation with a depth of 3mm. Root-end filling is completed with MTA (Figure 2d). The tooth is ready for replantation into its original socket (Figure 3a). True complete seating and adaptation is enhanced by requesting the patient to bite on a cotton roll. Sutures were done, then a semi-rigid splint for 3 weeks with composite and metal wire (Figure 3b). A very important concern in this procedure is the extraoral time which should be reduced as much as possible, in this case, the extraoral time was 20 minutes. In a second step, after 3weeks, the patient was asymptomatic, we proceeded to a clinical and radiological control, then the splint was taken off (Figure 3c, d). The control was done after 2 years, and the follow-up radiographic examination revealed a bone regeneration with no apical radiolucency or evidence of inflammatory or replacement resorption, which confirmed a complete healing (Figure 4a,b,c).

a



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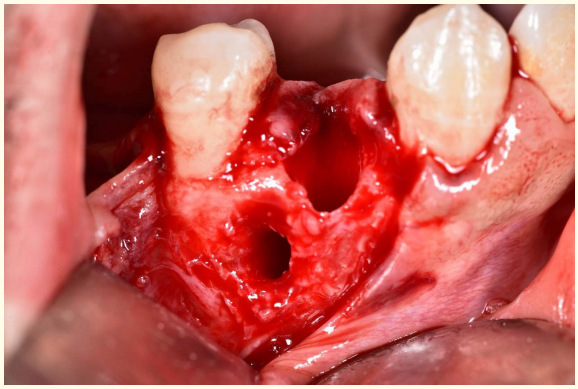

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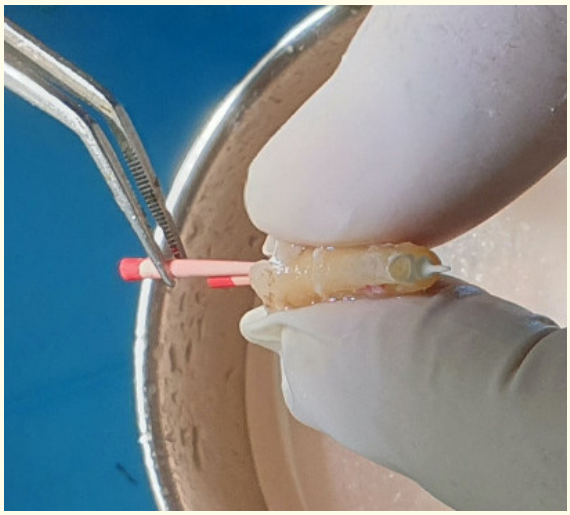

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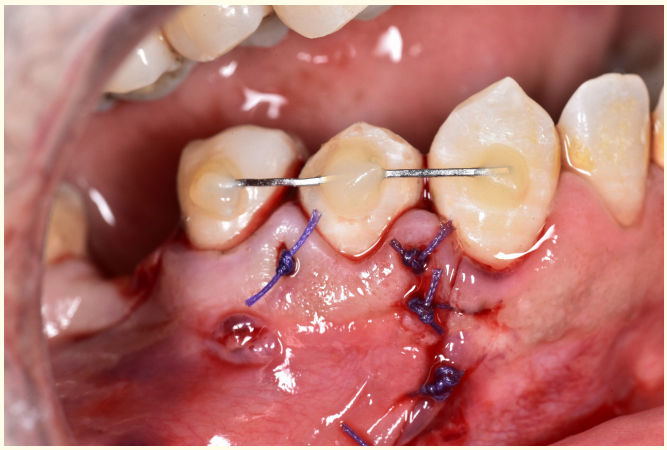
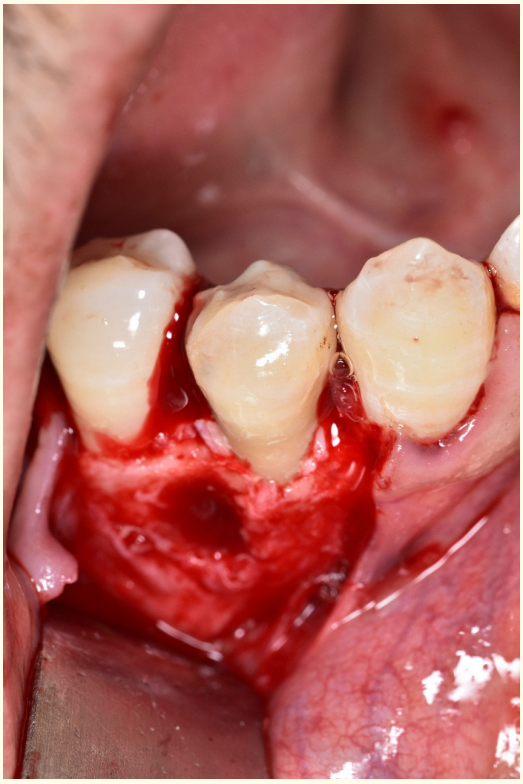


c

Figure 2: a: Granulomatous tissue removed after atraumatic extraction of the tooth.
b: Extraction socket site showing the thin and ruptured buccal cortical plate.
c: Extraoral root canal filling with gutta cones and bioceramic sealer.
d: Root-end filling with MTA

a

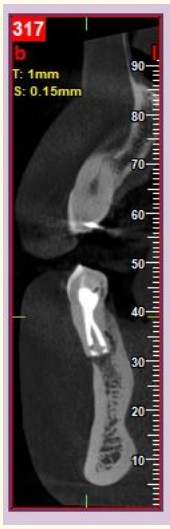


d

Figure 3: a: Postoperative buccal clinical view after replantation.
b: Sutures and Semi-rigid splint.
c: Periapical radiograph after 3 weeks showing the start of bone regeneration.
d: Buccal clinical view of the tooth after splint removal.

a

b



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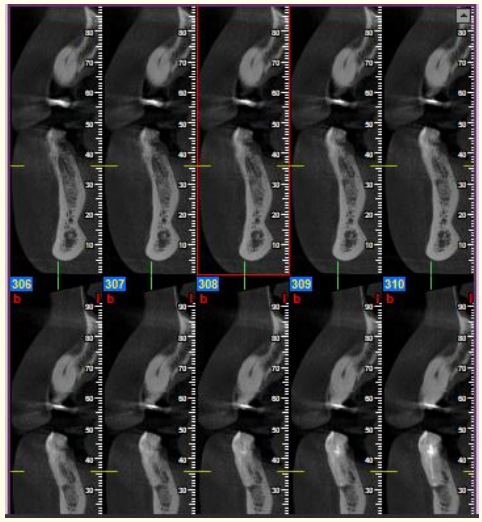

Figure 4: a: Periapical radiograph 2 years after the intervention showing significant bone regeneration.
b: CBCT coronal image 2 years follow-up.
c: CBCT coronal images 2 years follow-up showing a significant bone regeneration at the primary cystic site.

Discussion

Fracture or separation of endodontic instruments within the root canal is one of the procedural accidents that might affect the prognosis, when it compromises microbial control, increasing the risk of a poor outcome [1]. Performing a bypass of the instrument is one of the treatment protocols for removing obstructions that

have been described in the literature. Other modalities include non surgical techniques for the retrieval of the instrument, and surgical approaches for the removal of the entire portion of the root encompassing the instrument [1]. When the removal procedure might result in important loss of tooth structure and clinical implications, surgical approaches are considered, including intentional replantation, which is considered as the last modality for the treatment of apical periodontitis, pulpits and post-trauma, due to unfeasible non-surgical root canal treatment and periapical surgery [9]. Intentional replantation is defined as the intentional removal of a tooth and reinsertion into the extraction socket before or after proper endodontic treatment. Clinical studies evaluated the outcome of intentional replantation of at least 10 cases. Grossman [8], in 1966, replanted 50 teeth. The results in 45 teeth have been followed with radiographic checkup for 2 to 11 years, Of the 45 teeth, 9 have had to be removed, 8 because of eventual resorption of the roots and 1 because of discomfort. Emmertsen and Andreasen [10] in 1966, assessed 100 molars with periapical infections ,which were replanted after extraoral root-filling. The maximum observation period was thirteen years. 34% of the replanted molars showed no sign of resorption and healing of the periapical infection. The remaining cases showed either root resorption or lack of healing of the periapical inflammation. Kingsbury and Wiesenbaugh [2] , in 1971, treated 151 mandibular premolars and molars for intractable pulpal disease by intentional replantation. Only seven replanted teeth failed. Bender and Rossman [6], in 1993, reported 31 cases of intentional replantation with an overall success rate of 80.6% with six recorded failures. Criteria for successful IR were based on both clinical and radiographic evidence. If a patient complained of discomfort or tenderness to palpation or to percussion, if a sinus tract was present, or if there was a deep periodontal pocket, the case was classified as a failure. Raghoebar and Vissink,in 1999 [11], treated 39 patients with intentional replantation because conventional apicoectomy was not possible. One molar had to be removed because of pain and mobility and three molars had to be removed during the first year because of periodontal problems. Four molars showed periodontal problems or root resorption but are still in function and causing no obvious problems to the patients. Twenty-one molars (72%) were successfully treated. Abid [12], in 2010 assessed Twenty lower posterior teeth in twenty patients of different ages and genders. They were subjected to a standard surgical protocol for intentional replantation. This trial showed around 80% success rate over a 2 year follow up. Choi., *et al*. In 2014, [13], evaluated Two hundred and eighty-seven teeth treated by IR. Clinical outcomes between the cases with preoperative orthodontic extrusion for 2-3 week and those without extrusion were analysed. The overall survival rate was 95.1%. The survival rates were 91.2% for the teeth extracted without extrusion and 98.1% for those extracted with extrusion. Systematic reviews and meta-analyses of Torabinejad., *et al*. in 2015 [14] and Mainkar in 2017 [15] reported survival rates of approximately 90% for intentionally replanted teeth, demonstrating that it should be considered as a valid treatment option. When surgical/non-surgical root canal retreatment procedures have poor prognosis or they are not feasible, intentional replantation procedure is a reliable and cost-effective treatment (Mainkar 2017). Long-term success and survival rate enhancement of intentional replantation are likely dependent upon short extra oral time, reductions in pocket depth, type of tooth, number of operators, curettage of the tooth socket, root resection method, root-end preparation, type of root-end material filling, splinting, prescription of antibiotics, and the prevention of atraumatic tooth root damage [9,16].

To prevent tooth root damage, the tooth was held with saline-soaked compress during manipulation and elevator was not used during extraction. Messkoub [4] in 1991, to prevent the crushing of the periodontal membrane, avoided the use of elevation and rotation during the extraction. As soon as the tooth is out of its socket, it must be covered by sterile gauze, saturated with sterile saline solution [4,10,11,17]. Kratchman [18] in 1997 have recommended to limit the application of dental forceps to the crown of the tooth as a means to minimize trauma to PDL cells. A rubber band on the handles of the forceps may aid in securing this step. Bender., *et al*. [6]; in 1993, placed the tooth after extraction in a small beaker that contained normal physiologic saline solution. Jang., *et al*. [5], in 2016, used as an extraoral storage solution, either Hank's balanced salt solution (HBSS) or saline to keep the root surface moist and to supply essential ions to PDL cells.

Concerning the number of operators, there was one operator during the replantation procedure in this case. For Grossman (1966) [8], Raghoebar and Vissink [11] (1999), Messkoub (1991) [4], The technic is best performed by two dentists: One should concern himself with the extraction of the tooth, the other with the endodontic operation and replacement of the tooth in the socket.

Emmertsen., *et al*. [10], in 1996 reported that all replantations were performed by one of the authors (E.E.) during the period of years 1949-58. As long as extraoral time is respected intentional replantation procedure can be operated by one or two dentists.

In the case reported here, extraoral time was about 20 minutes. In the studies conducted by Hayashi., *et al*. [19] and Cho., *et al*. [20], extraoral time did not show significant effect on longevity and was not a significant factor. Grossman., *et al*. [21], in 1988, reported that studies of IR teeth versus replantation of accidentally avulsed teeth have shown that the survival time of replanted avulsed teeth is relatively short. This can be attributed to the time lost before the patient reaches the dentist. In IR cases, there is no loss of time. The time in which the tooth was kept out of the mouth for manipulation varied among studies. A lot of authors [10,22-25] reported that replantation should be completed in the shortest time possible. Teeth that are left out of the mouth for more than 30 minutes demonstrate resorption more frequently than do those removed for shorter periods. Cho., *et al*. [16] reported that extraoral time exceeding 15 minutes significantly increased the occurrence of ankyloses, and Jang., *et al*. [5] found that extraoral time greater than 15 minutes and use of slow setting MTA resulted in significantly lower survival of intentionally replanted teeth with a C-shaped canal. In fact, the lower the extra alveolar time of the extracted tooth, the better the chances of success. The half hour dry alveolar extra time is the gold standard for the replantation, until one hour the cells of the periodontal ligament are alive and the prognosis of the immediate preimplantation is adequate, at the time of 2 hours, the cells of the periodontal ligament are already necrotic and the replantation performed under these conditions leads to resorption by substitution [26]. All these studies lead us to consider that one of the factors contributing in the success of this case, is the respect of the recommended extra-alveolar time, although, it would have been less time consuming if the root canal obturation at the level of the obstruction was performed before replantation, in order to reduce eventual risk of compromising.

The socket of the premolar has been curetted with dental bone curette to remove the granulomatous tissue. Kratchman [18] in 1997, and Cho., *et al*. [17] in 2016 didn't recommend socket curettage routinely, but it can be performed gently when a periapical granuloma and/or extruded filling materials need to be removed. Andreasen in 1981 [27], reported that a significant increase in replacement resorption (ankylosis) was found in maxillary central incisors, that were replanted after removal of periodontal ligament on the root surface. He concluded that the presence of an intact and viable periodontal ligament on the root surface is the most important factor in assuring healing without root resorption. For Tsukiboshi 2002 [28], Grossman 1966 [8] and Raghoebar., *et al*. [29] in 1999, care should be taken after extraction to avoid any contact with the socket wall so as to prevent damage to the remaining periodontal ligament which is considered the key in promoting reattachment. The dry extra-alveolar time and the quality of storage are responsible for the condition of the PDL at the time of reimplantation and decisive for the favorable prognosis [26].

The apical resection of the premolar was done with an endo surgical burr. In 1968, Sherman recommended not removing apices because it might have initiated additional and more progressive root resorption [30]. Emmertsen and Andreasen [10] reported that 49% of the replanted teeth showed periapical inflammation and a high rate of insufficient periapical healing. They explained that the reason is an opening of infected dentinal tubules after resection of the apices. In contrast, Raghoebar and Vissink [11], in 1999, demonstrated that resection of the roots also provides an apical space for pooling of fluids, thus minimizing any buildup of hydrostic pressure during and after reinsertion of the teeth. It also facilitated reinsertion, particularly when the roots were curved. Concerning the procedure of apical resection, Bender and Rossman [6], in 1993, reported that the apical root end was resected with a diamond stone or disk with the use of sufficient coolant to prevent overheating of the cementum and dentin. Bernardes., *et al*. [31], in 2009, compared ultrasonic chemical vapor deposition versus high-speed and low-speed carbide burs for apicoectomy and found that ultrasonic root end resection took a, longer time and resulted in rougher surfaces. Abid [12], in 2010, explained that 2-3mm of the apex was resected using a small head round diamond bur mounted on a high-speed turbine under copious distal water irrigation. Jang., *et al*. [5], in 2016, explained that the tooth underwent a 2- to 3-mm resection of the apical root with a #170 tapered fissure bur.

After apical resection, the obturation was performed using the monocone technique with a bioceramic sealer BioRoot ™ RCS from SEPTODONT, followed by a retrograde cavity that has been prepared using ultrasonic instrumentation with a depth of 3mm. Jang., *et al*. [5] reported that a retro cavity preparation of 3 mm depth was performed along the long axis of the root by using a #330 car-

bide bur driven by a high-speed handpiece. Raghoebar., *et al*. in [11] prepared a cavity of 3 to 5 mm depth in the tip of the root using a small round bur. Wuchenich., *et al*. [32], in 1994, compared ultrasonic versus bur root end cavity preparations, the ultrasonic cavities produced more parallel walls and deeper depths for retention, followed the direction of the canals more closely, and gave cleaner surfaces of root end cavities than those prepared by burs. Cho., *et al*. [16] in 2016 prepared a 3-mm-deep root-end cavity along the long axis of the root. In thick roots, cavities were drilled with high-speed diamond burs or slow-speed 1/2 round burs in thin roots, isthmi, fins, and cavities were prepared with ultrasonic tips.

After root end cavity preparation, the cavity was air-dried and filled with MTA. Maeda., *et al*. in 1999, [33] histologically examined the effects on the periapical tissue of various dental filling materials (4-META-TBB Resin, Eugenol Cement, Light-Cured Composite Resin, Light-Cured Glassionomer) applied as retro fillings in rats and compared them with those of amalgam. The 4-META-TBB resin Superbond and the light-cured composite resin produced the least severe inflammatory reaction, with the greatest amount of new bone. It has been reported by Inoue., *et al*. in 2002 [34] that 4-META/TBBMMA resin component combined with bone morphogenetic protein may accelerate wound healing of damaged pulp tissue. A Meta-analysis done by Tseis., *et al*. [35] in 2013, to evaluate the outcomes of surgical endodontic treatment performed in a modern technique has shown that MTA was significantly associated with better treatment outcomes than other retro filling materials (EBA, IRM and Gutta percha). The use of IRM provided significantly worse outcomes compared with MTA. Von Arx., *et al*. in 2010 [36], reported that the best documented treatment-related factor in prognosis of apical surgery is the retro filling material. MTA was found to have the highest and glass ionomer cement the lowest estimated healed rate. Chong., *et al*. (2003) [37], Lindeboom., *et al*. (2005) [38], Tang., *et al*. (2010) [39] and Eren., *et al*. (2019) [40] stated that MTA presented the best marginal adaptation to dentine walls, but no significant differences were found between MTA and IRM as they presented the same clinical effectiveness.

Recently, many researchers from several dental disciplines have been increasingly interested in IR with (bio)materials, including root-end biomaterials and periodontal regenerators. Enamel matrix derivative (EMD) is a protein extract used for the treatment of periodontal defects and soft tissue recession. EMD induces mainly the formation of a cementum like tissue at the apical region of the root's external surface [41]. Al-Hezaimi., *et al*. [42] in 2009, reported the successful treatment of a radicular groove by IR and Emdogain therapy. The radicular groove was removed with a diamond bur and Emdogain was applied to the root surface to reduce the possibility of root resorption. It facilitates migration and differentiation of progenitor cells on the root surface. Filippi., *et al*. [43], in 2006, indicated that treatment of replacement resorption by intentional replantation using resection of the ankylosed sites of the root, extraoral endodontic treatment, and Emdogain for periodontal healing following trauma-related ankylosis, appeared to prevent or delay the recurrence of ankylosis. Platelet-rich plasma (PRP) is a biological product that is defined as the portion of plasma fraction of autologous blood with a platelet concentration above that of the original whole blood. In surgery, PRP reduces bleeding while enhancing soft tissue healing and bone regeneration [44]. Yang. [45] in 2018 evaluated the effects of platelet-rich plasma (PRP) on periodontal healing of replanted root surfaces., *et al.* in dogs. The roots were soaked in PRP and then replanted into the extraction sockets. It reduced tooth ankylosis and increase PDL-like and cementum-like tissue formation. Another platelet aggregate is platelet rich fibrin (PRF) which presents advantages over others such as the preparation in a single step with the production of natural blood products due to the absence of anticoagulants, in addition to resulting in a three-dimensional structure that favors the delivery and support of cell sheets in an area of the tissue, which has been destroyed. The use of platelet rich fibrin (PRF) has been tested as a matrix in the process of regeneration of the periodontist of réimplanter teeth, and describes the PRF as a biocompatible and specific matrix for the delivery of therapeutic sheets that would improve clinical efficacy and would sustain cells in the space between the alveolar bone and cementum. Properties of the growth factors signal the possibility of cell recovery necessary to enable PDL cell proliferation by repopulating the naked surface of the dental root and inhibiting the action of osteoclasts. The physical and chemical properties of fibrin and the local action of growth factors instigate the possibility of using autologous PRF to maintain the viability of the PDL of teeth exposed to dry extra-alveolar time [26]. In this context, the immersion of the extracted tooth in PRF before replacing it in its primary socket increases the number of live cells, and benefits the PDL cells within this period of greater release of growth factors.

Regarding the type of tooth, Andreasen and HjBrting-Hansen [46] found no resorption in 72% of the replanted anterior teeth, when the extraoral period varied from 0-60 min. Based upon these findings no difference seems to exist between the prognosis for replanted anterior teeth and molars, when the extraoral period is identical [10]. IR is contraindicated for tooth with Extremely divergent or curved root(s), or if fracture of the root(s) is predictable during the replantation procedure [47]. Second maxillary and mandibular molars are more common candidates for intentional replantation because access is limited by their position and by thick bone. Their apices may lie near the maxillary sinuses or the inferior alveolar canal [13].

The concerned tooth showed no periodontal pocket. In the study of Choi., *et al*, [13], the inclusion criteria also required normal physiologic mobility and moderate periodontal pocket depths (<5 mm) that were confirmed with radiographs and periodontal probing. Renvert and Persson performed a systematic review suggesting that the presence of residual probing depths >6 mm was associated with tooth disease progression [48]. Bender [6], reported that if a patient presented deep periodontal pocket, the case of intentional replantation was reported as a failure. However, Baykara and Eratalay [49], in 1995, carried out intentional replantation of teeth with periodontal involvement and reported successful outcomes for a period of 8 years. Teeth survived with healthy gingiva, significant decrease in pocket depth and new bone formation. Cho., *et al*. [20], in 2017, demonstrated that periodontal involvement is not an absolute contraindication to intentional replantation; the teeth with 1 preoperative periodontal pocket of 6 depth showed an outcome of 84% cumulative improved rates at 4 years, and the teeth with 2 preoperative periodontal pockets had 44% cumulative improved rates at 4 years. Demiralp., *et al.* [50], in 2003, evaluated the clinical and radiographic results of intentional replantation of periodontally involved teeth after conditioning of root surfaces with tetracycline-Hcl. Results indicated a reduction in probing depth and in the amount of bone loss and healthy gingiva.

Although primary stability after replantation in the socket was achieved, an arch wire semi-rigid buccal splint was used to secure the tooth for 3 weeks. Splinting effect on periodontal healing has been widely studied on replanted teeth. In 1983, Kristerson [51] in his study, extracted vital incisors in monkeys and compared the effect of splinting upon periodontal and plural healing after autotransplantation, using an acrylic splint. His analysis demonstrated that splinting increased the extent of pulp necrosis and inflammatory root resorption compared to non-splinting. However, suture splinting has been used for splinting of auto transplants in humans without complication. Only in cases due to loosening from lack of supporting bone was it necessary to supplement fixation with a composite resin splint. In contrast, Demiralp [50], stated that immobility due to splinting gave teeth a chance to heal and reattach to the soft tissue and bone. He added that extreme mobility can interfere with speaking and eating, and that splinting the excessively mobile teeth may restore occlusion, improving function, comfort, and esthetics. Andreasen., *et al*, [52] in 1992, reported that early restoration of the vertical movement of the luxated teeth promotes healing and may remove small ankylotic areas on the root surface. And that all luxated teeth splinted for a long period should be fixed by vertically flexible splints. Kingsbury [2], in 1971, stated that splinting was usually necessary in multiple replants and in instances in which no adjacent teeth were present to add support and occlusal protection. Cho [20] reported that when the tooth seemed stable, splint was not applied, unstable teeth were splinted semi-rigidly with 1-mm-thick fishing line bonded to the 1 or 2 adjacent teeth with flowable resin, in order to allow physiologic mobility of the tooth and so can result in functional arrangement of the PDL fibers.

An antibiotic prescription for 6 days was given to the patient, with penicillin + clavulanic acid, 1 gr twice a day. In the study of Hammarstrom., *et al*, [53], lateral incisors of monkeys were extracted, then replanted. They were treated with 2ml Streptocillin + benzylpenicillin 200 000 IE/ml, on the day of replantation and on the following 6 days. It was found that after systemic antibiotic treatment, there was no inflammatory root resorption. Sae-lim., *et al.* [54], in 1998, compared the effectiveness of tetracycline and amoxicillin in limiting inflammatory root resorption secondary to pulpal infection, in replanted dogs' teeth. Healing averaged 67.22% for tetracycline group and 56,88% for amoxicillin group. Tetracycline could be considered as an alternative to amoxicillin after avulsion injuries. Kim and Kratchman [55], in 2006, reported that the postoperative preparations should include a prescription of an antibiotic, such as ciprofloxacin or amoxycillin for 1 week. Kingsbury [2] stated that if the patient has not received antibiotics preoperatively (started two to four hours preoperatively), antibiotics are ordered at this time, and the patient is seen the next day for a postoperative checkup and radiograph. In the study of Jang., *et al*. [5], patients were prescribed antibiotics (oral

amoxicillin, 500 mg) and an anti-inflammatory drug (ibuprofen, 400 mg) 1 hour preoperatively. After rinsing their mouths with 0.1% chlorhexidine gluconate solution, (oral amoxicillin, 250 mg) and an anti-inflammatory drug (ibuprofen, 400 mg) were prescribed for 3 days (3 times per day) postoperatively. Messkoub [4] also stated that an oral antibiotic is prescribed for 5 to 7 day and if pain and swelling occur, a pain medication is prescribed. Bender., *et al*. [6], in 1993, reported that an intentional replantation case, without preoperative antibiotics failed after 3 weeks when no antibiotics were used preoperatively. However, when the same tooth was replanted using preoperative systemic ampicillin, the tooth shows radiographic healing after 46 months with little mobility and no periodontal pocket formation.

The follow-up 2 years after replantation revealed uneventful healing. Tooth mobility was normal, with no sigh of ankylosis (percussion sound was normal). The patient was asymptomatic, with normal periodontal probing. The radiographic examination revealed a satisfying bone regeneration and an absence of periodical radiolucency or evidence of inflammatory or replacement resorption.

The present case indicated that tooth replantation is definitely a valid approach along with endodontic surgery, for the treatment of periodical lesions.

Conclusion

Although the survival rate of implants is higher [19], intentional replantation is more cost-effective than any implant options [33,34]. Intentional replantation should be a treatment option discussed with patients, especially because an implant can still be placed if intentional replantation is unsuccessful [33]. In this case, short term successful management of Lower premolar with periradicular lesions with intentional replantation is presented. Patient is satisfied both esthetically and functionally after intentional replantation procedure. The patient is kept under long-term follow-up. The clinical and radiographic results in the current trial were satisfactory. Further study on a much more post-operative period (more than two years) and the use of materials to improve the success of intentional replantation is encouraged.

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