ISSN: 2581-5989
PubMed - National Library of Medicine - ID: 101738774

International Journal of Dental Science and Innovative Research (IJDSIR)

IJDSIR : Dental Publication Service

Available Online at: www.ijdsir.com

Volume – 3, Issue – 1, January - 2020, Page No. : 313 - 317

Surgical Management of Mandibular Anterior Teeth with unusual Root Canal Configuration: A Rare Case Report

[1]Dr. Arya A S, MDS, Department of Conservative Dentistry and Endodontics. DAPM R.V Dental College, Bangalore.

[2]Dr. Shashikala K, MDS, Department of Conservative Dentistry and Endodontics. DAPM R.V Dental College, Bangalore.

[3]Dr. Aganashini Sucheta, MDS, Department of Periodontics. DAPM R.V Dental College, Bangalore.

[4]Dr. Prasad Keshava B.S, MDS, Department of Conservative Dentistry and Endodontics. DAPM R.V Dental College, Bangalore.

Corresponding Author: Dr. Arya A S, MDS, Department of Conservative Dentistry and Endodontics. DAPM R.V Dental College, Bangalore

Citation of this Article: Dr. Arya A S, Dr. Shashikala K, Dr. Aganashini Sucheta, Dr. Prasad Keshava B.S, "Surgical Management of Mandibular Anterior Teeth with unusual Root Canal Configuration: A Rare Case Report ", IJDSIR- January - 2020, Vol. – 3, Issue -1, P. No. 313- 317.

Type of Publication: Case Report

Conflicts of Interest: Nil

Abstract

Root canal morphology plays an important role in management of root canal treatment and its prognosis. Teeth with aberrant root canal configuration associated with endo perio lesions make the cases more challenging to manage. Due to the complexity of these infections, an interdisciplinary approach along with advanced diagnostic methods and magnification helps the clinician to do the case successfully. This article presents a case report of meticulous management of mandibular anteriors with two canals associated with a periapical cyst and severe bone loss.

Keywords: Multiple canals, Lower anteriors, Surgical, Peri apical cyst, RCT

Keymessages : This case report highlights the importance of root canal morphology and their variations associated with periapical lesion. Thorough subject knowledge, skill, accurate diagnosis using recent diagnostic aids for proper treatment plan and prognosis of the case are all essential for a clinician.

Introduction

Endodontic-Periodontal lesions are complex in nature and have varied pathogenesis. For successful endodontic treatment, thorough knowledge of root canal morphology along with its variation is very essential. Anterior teeth may have aberrant anatomical variations in the number of roots and root canals.[1]

The root canal morphological variations always poses a challenge to the operator during endodontic treatment sometimes resulting in a missed canal or an unfilled canal. These dead spaces harbour the microorganisms, which proliferate and spread causing an infection, resulting in a periapical infection[2]

Various invitro studies of the root canal morphology of extracted mandibular incisors and have reported the prevalence of 12–35% of two canals in lower anterior teeth. However, the prevalence of multiple canals in all mandibular incisors of the same patients has not been reported.[3]

The case report has a striking feature of presence of extra canals in all the mandibular incisors in the same patient with a chronic endoperio lesion and peri apical cyst which has made the case more challenging and complicated.

Case Report

A 35-year-old male patient reported to the Department of Conservative Dentistry and Endodontics of R V Dental College, Bangalore, from Karnataka state in India with the chief complaint of pain and pus discharge in the lower anterior region. History revealed that the patient had a dull aching, intermittent pain mainly at night hours since 1 year.

On clinical examination gingival recession and mobility was seen associated with mandibular anteriors. On probing deep pockets with pus discharge was seen [Figure. 1]. All the mandibular anteriors were positive to percussion. These clinical findings were confirmed with a negative response to electric pulp tester except right mandibular canine.

Figure 1: Pre-operative clinical photograph

The intraoral periapical (IOPA) radiograph showed severe vertical bone loss #31,32, 41,42,43 up to apical one third level and #31 showed complete bone loss. There was well defined round radiolucency measuring 8x6mm in the periapical aspect of #42,43 with break in lamina dura suggestive of periapical cyst. Also, two canals were appreciated in #32,42 - Vertuccis type II canal configuration[Figure 2]a.

On hard tissue examination generalized periodontal Pocket depth of 8-12 mm was noted with lower anterior teeth. #31 revealed severe bone loss with pocket depth of 14 mm and #31 also showed grade III mobility whereas other teeth i.e #32,41,42,43 showed grade II mobility

Soft tissue examination revealed generalized recession with erythematous gingiva which was soft in consistency with purulent discharge in digital pressure. Final diagnosis of Primary periodontal lesion secondary endodontic involvement with respect to (w.r.t) #31,32,41,42,43 was made. Sequential treatment plan was carried out.

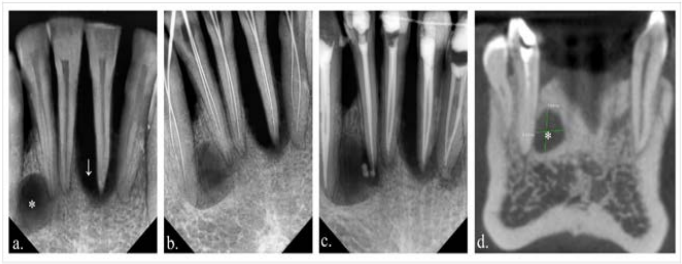

Figure 2: a. preoperative radiograph (*showing periapical cyst w.r.t #42,43 and down arrow showing severe vertical bone loss w.r.t #31), b. teeth showing multiple canals and working length determination, c. Obturation, d. CBCT image showing Periapical cyst in #42,43 measuring 7.9 x 5.9mm

Patient had undergone phase I periodontal therapy which included scaling and root planning. Composite splinting was done in the labial aspect prior to access opening from #33 to #43. An emergency access opening was performed w.r.t 31.32.41.42.43. As persistent pus discharge was seen hence CaOH Intracanal medicament was placed in all the affected teeth. Patient was recalled after 1 week.

Endodontic treatment from #43 to #32 were continued for the next appointment. All the incisors were endodontically explored under magnification with Loupes and found to have two separate canal orifices extending into two canals and joining short of the apex to continue as one (Vertucci's Type II canal morphology), thus showing one apical opening.

Working length was radiographically determined in different angulation to evaluate the extra canals [Figure 2]b. Complete chemo-mechanical preparation of all the teeth were done by hand instrumentation and 2.5% sodium hypochlorite, 15 % EDTA and saline irrigation was done as per standard protocol. Cleaning and shaping were done till 25.04% Heroshaper hand files. Obturation was done with gutta-percha by lateral condensation technique. Access opening were restored with ZnOE [Figure 2]c.

Before surgical intervention and immediately post obturation, a CBCT scan was done. CBCT confirmed a Periapical cyst in #42,43 measuring 7.9 x 5.9mm. Severe vertical bone loss (one wall defect) was found w.r.t #31. Multiple canals and canal configuration in all anterior teeth were also detected in the scan [Figure 2].

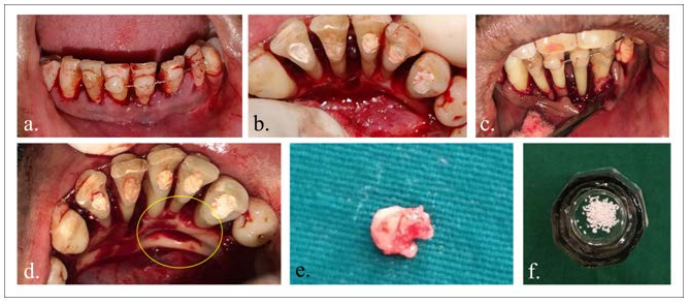

Figure 3: a. Kirkland Incision and the flap was raised from #33 to #43, b,c. Open flap debridement,

d,e. Cyst enucleation w.r.t #42,43 (yellow circle denoting cystic cavity), f. G- bone graft

Adequate anaesthesia was given. Kirkland Incision was made from #33 to #43 and the flap was raised [Figure 3]a. Open flap debridement w.r.t #32 to 43 was carried out [Figure 3]b,c. Cyst Enucleation w.r.t 42,43 was done[Figure 3]d,e. G- bone graft (Hydroxyapatite with collagen granules) were placed in the defect [Figure 3]f. Post endodontic restoration was done with composite resin. Regular Interval Follow-up was done at three months six months and one year which showed good healing in the periapical aspect and with significant reduction in mobility of teeth clinically [Figure 4]a,b,c,d.

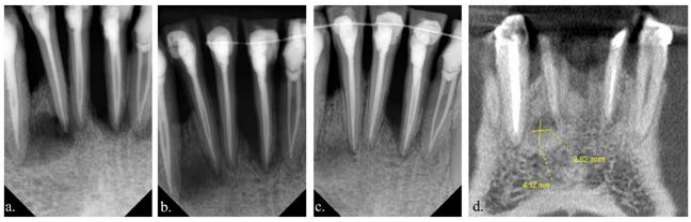

Figure 4: a. 3 month follow up, b. 6 months follow up, c.1-year follow up, d. CBCT one year follow up.

Discussion

Primary periodontal disease with secondary endodontic diseases require both endodontic and periodontal treatment procedures. The most commonly used classification was given by Simon, Glick and Frank in 1972, which includes[4]

- Primary endodontic lesion
- Primary periodontal lesion
- Primary endodontic lesion with secondary periodontal involvement
- Primary periodontal lesion with secondary endodontic involvement
- True combined lesion

The apical foramen is the main access route between the pulp and the periodontium, with the participation of all root canal system: accessory, lateral, and secondary canals, as well as the dentinal tubules through which the bacteria and its products contaminate the medium. Although some of the morphological variations may depend on different ethnic backgrounds, two canals could be expected in about one-quarter for mandibular incisors. This proportion is not found clinically by practitioners

during root canal treatment due to the failure of the dentist to recognize the presence of the second canal. [5,6]

The pulp-periodontal interrelationship is a unique one and can consider them as a single continuous system or as one biologic unit in which there are many pathways of communication.[7] This makes it difficult to diagnose because a single lesion may present signs of both endodontic and periodontal involvement, can coexist in the same tooth, termed combined lesions, where the treatment depends on the degree of involvement of the tissues.[8]

A complete endodontic and periodontal examination should be carried out to confirm diagnosis and to identify or rule out any other systemic disorders. Conventional intraoral radiography provides an accessible, cost effective, high-resolution imaging modality that continues to be of value in endodontic therapy.[9] In specific situations, where the understanding of spatial relationships is required, CBCT facilitates diagnosis and treatment plan. The apical foramen is the main access route between the pulp and the periodontium, with the participation of all root canal system, through which the bacteria contaminate the medium.[10]

Root canal therapy eliminates the infection and inflammation which helps in reducing the mobility of the teeth. Further, modifying the access with proper illumination and magnification helped in identifying accessory canals which resulted in a successful endodontic therapy. Root canal therapy helps to reduce the mobility of the involved tooth therefore, after a successful root canal therapy, tooth mobility can be further assessed to determine the necessity for splinting.[11]

Vertucci in 1974 classified the canal configuration of mandibular incisors into four types:[12]

- Type I: Single canal is present from the pulp chamber to the apex.
- Type II: Two separate canal leaves the pulp chamber but join short of the apex to form one canal.
- Type III: One canal leaves the pulp chamber, but divides into two within the body of the root, the canals merge again to exist as one canal.
- Type IV: Two separate and distinct canals are present from the pulp chamber to apex

In the present case Vertuccis type II canal configuration was seen in all the affected teeth.

The success rate of the endodontic-periodontal combined lesion without a concomitant regenerative procedure has been reported to be in the range of 27% to 37%. The prognosis can also be improved by increasing bony support, which can be achieved by Bone grafting. Alloplastic bone graft (G- Bone) is the standard material composed of natural form of Hydroxyapatite in its ceramic, crystalline form, derived from bovine bone available as blocks. It provides immunocompatible bone cells, essential for osteogenesis, accounting for the proliferation of bone cells, especially from the osteoid. The rationale behind the filling of the surgical cavity with an alloplastic bone graft is biocompatible, osteoconductive and stimulate bone neoformation.[11] Long term follow up is mandatory for these complex lesions and post-operative one year follow up of this case showed resolution of the lesion radiographically and significantly reduced mobility of the teeth clinically.

Conclusion

Endo-perio lesions are very complex in nature and can have varied pathogenesis. Use of advanced diagnostic aids like CBCT helps in accurate diagnosis and treatment planning for complex cases. Magnification along with proper illumination enhances the prognosis of endodontic treatment of teeth with aberrant anatomy. Due to the complexity of these infections, an interdisciplinary approach with a good collaboration between endodontist,

Oral Surgeon and Periodontist is recommended to achieve the best outcome.

Acknowledgement: Special Thanks to Dr. Arun A, Reader in the Department of Endodontics, DAPM R V Dental college, Bangalore.I would like to exprese my sincery gradittude to the Department of periodontics (Dr. Suchetha Aghanashini, HOD & Prof. and Dr. Spandana, Post. Graduate Student) and the Department of Surgery, DAPM R V Dental College, Bangalore for their extended help.

References

1. Ahmed, Hashem Accessory roots and root canals in anterior teeth. International Endodontic Journal, 2016, 49, 724–736.
2. Vertucci FJ. Root canal morphology and its relationship to endodontic procedures. Endodontic Topics 2005;10:3-29.
3. K.S.AlFouzan, A. Almanee, J. Jan, andM.Al-Rejaje, “Incidence of two canals in extracted mandibular incisor teeth of Saudi Arabian samples,” Saudi-Endodontic Journal, vol. 2, no. 2,, 2012.
4. Simon JH, Glick DH, Frank AL. The relationship of endodontic-periodontic lesions.;J Periodontal 1972; 43: 202-8.
5. Miyashita M, Kasahara E, Yasuda E, Yamamoto A, Sekizawa T. Root canal system of the mandibular incisor. J Endod 1997;23(8):479-84.
6. Slowey RR. Root canal anatomy. Road map to successful endodontics. Dent Clin North Am 1979;23(4):555-73.
7. Shenoy N, Shenoy A. Endo-perio lesions: Diagnosis and clinical considerations. Indian J Dent Res 2010 21:579-85
8. Al-Fouzan KS. A new classification of endodontic-periodontal lesions. *Int J Dent*. 2014;2014:919173.
9. *Adriaens PA, De Boever JA, Loesche WJ* Bacterial invasion in root cementum and radicular dentin of periodontally diseased teeth in humans. A reservoir of periodontopathic bacteria. *J Periodontol. 1988 Apr; 59(4):222-30.*
10. Carranza's Clinical Periodontology 12th Edition Michael Newman, Henry Takei,Perry Klokkevold, Fermin Carranza
11. Sunitha V R,Emmadi P, Namasivayam A,Thyegarajan R , Rajaraman V The periodontal - endodontic continuum: A review. Journal of Conservative Dentistry jul 2016; 91:329-54.
12. Vertucci FJ. Root canal anatomy of the mandibular anterior teeth. J Am Dent Assoc 1974;89:369-71.