Case Report

Enigma of Mandibular Anterior Teeth – Case Report Of Type II Canal Configuration

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ABSTRACT

It is well known fact that pulp canal system is complex and canals may branch, divide and rejoin. A canal is often left untreated as the clinician fails to recognize its presence due to lack of knowledge of root canal morphology or due to lack of experience and skills to negotiate that canal. For the prevention or healing of periapical pathology the clinician should be familiar with the various canal configurations. Mandibular anterior teeth are almost always associated with vertucci's type II canal configurations. In spite of this the second canal in these teeth are mostly missed by the dentist. This paper reports two such cases of mandibular anterior teeth with vertucci's type II canal configurations.

Key words: mandibular anterior teeth, type II canal

INTRODUCTION

Successful endodontic therapy depends on thorough cleaning and shaping followed by adequate three dimensional filling of the canals. One of the main reasons for failure of root canal treatment is because the clinician has not removed all the pulp tissue and microorganisms from the root canal system(1). Therefore it is of utmost importance that the clinician be familiar with root and root canal anatomy. Mandibular anterior teeth are usually found to have variable canal configuration. The endodontic implications of the mandibular incisor roots and canals were extensively studied and reported by Rankine-Wilson and Henry. The canal configuration may be of Type I, II, or III, in that order of frequency. Of the 111 teeth examined by Rankine-Wilson and Henry, 60% had Type 1, 35% showed Type II, and 5% were classified as Type III(2). Benjamin and Dawson report that the lower central incisor has two canals in 41.4% of cases, with independent formina in 1.3% of cases(3). Lower incisors should always be considered to have two canals. But due to the smaller size of mandibular anterior teeth and inadequate access preparation usually these extra canals will be missed by clinicians. If present, these canals will be located labially and lingually. Labial canal will be the straighter(2). For the successful endodontic therapy it is important to adequately debride & fill entire root canal space. This article aims to report two such cases of Vertucci's type II canal configuration in lower anterior teeth.

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CASE REPORT

Case: 1

A female patient of age 52 year reported to the department of conservative dentistry & endodontics on referral from periodontist. Chief complaint was moderate pain with lower anterior. Clinical examination showed severe gingival recession, Pain on percussion, grade II mobility with 31, 41. On vitality test both 31, 41 showed negative response to electric pulp tester (Gentle –Pulse Pulp vitality tester, Parkell Electronics,Farmingdale, NY, USA) and endofrost(roeko endofrost, coltene whaledent, Germany). Radiographic examination revealed bone loss extending to middle third of root of both the teeth and widening of periodontal ligament space in the apical region. The condition was diagnosed as primary perio and secondary endo lesion (classification of Simon JH, Glick DH, Frank JL). After informed consent and prophylactic scaling semirigid splinting was done from tooth 32- 42 to stabilize mobile 31, 41. Access cavity preparation was done and extended adequately to get straight line access to both the canals. Vertucci's Type II canal configuration was confirmed on working length IOPA. Thorough cleaning and shaping was carried out for both the canals using rotary protaper files (Dentsply Maillefer, Ballaigues, Switzerland) with intermittent irrigation using 5.25% sodium hypochlorite (Novo dental product, pvt, Ltd, Mumbai,India). Ca(OH)2 intracanal medicament(RC-Cal, India), was placed for two weeks. On following appointment obturation of root canal space was completed.

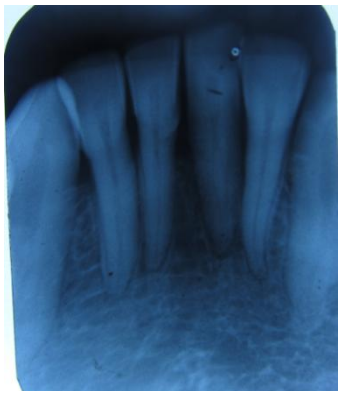
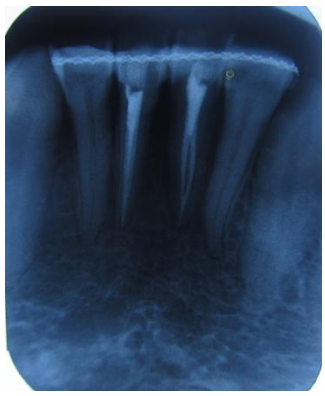


Fig 1-a: preoperative radiograph



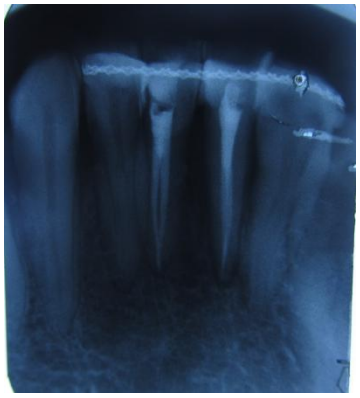


Fig 1-b: postoperative radiographs showing type II canal configuration in both 31 & 41.

Case: 2

A 32 year male patient reported to department of conservative dentistry with chief complaint of sensitive teeth in lower front teeth region. Clinical examination showed that lower anterior teeth 33 - 43 were attrited and pulp exposure was obvious. Teeth 32- 42 were responsive vitality test, where as 33 and 43 showed negative response. Radiograph showed apparently normal periapical area. Condition was diagnosed as symptomatic irreversible pulpitis. Endodontic treatment of teeth 33 – 43 followed by prosthetic rehabilitation was planned. In the following appointment access cavity preparation was done for all the teeth from lower right canine to lower left canine. Single canal was negotiated in each tooth. After thorough cleaning and shaping $ca(OH)_2$ (RC-Cal, India), dressing was given. After 3-4 days patient returned with moderate pain. Under dental operating microscope (seiler precision microscope) search was made for the presence of second canal. Vertucci's Type II canal configuration was observed in both lower canine and lateral incisor bilaterally. Both the canals are thoroughly cleaned and shaped with rotary protaper files (Dentsply Maillefer, Ballaigues, Switzerland) using sodium hypochlorite (Novo dental product, Pvt, Ltd, Mumbai ,India) as an intermittent irrigant. After the intracanal medication of $ca(OH)_2$ for two weeks, canals are obturated to the working length.

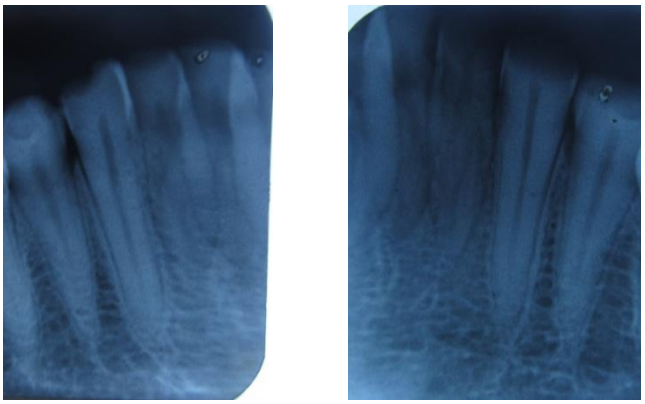


Fig 2-a: Preoperative radiographs of right & left side with changed horizontal angulations

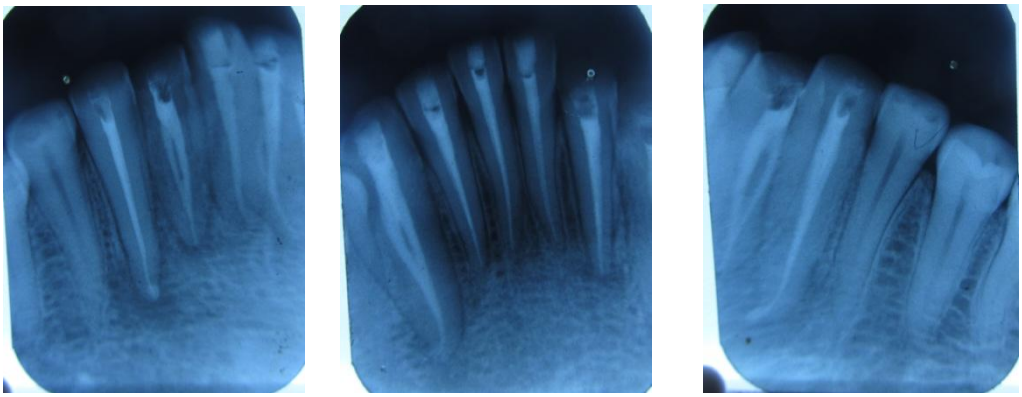


Fig 2-b: Postoperative radiographs showing type II canal configuration in lateral incisor & canine

DISCUSSION

Mandibular anteriors are found to have type II canal configuration commonly but unfortunately in general practice only one canal will be instrumented. Weine stated that the uninformed dentist may believe that mandibular incisors are relatively simple teeth on which to perform endodontic therapy and ranked these teeth next to the molars and the multicanaled mandibular bicuspids in degree of difficulty(2). To add to the problems, because of their proximity, it is virtually impossible to radiograph these teeth from a sufficient angle to know in advance that two canals are present. Understanding the anatomy of these teeth is necessary for identification of these configurations.

Noting a correlation between crown shape and canal configuration, it is found that those with short, squatty crowns had blunted roots, usually with a divided or split canal. When two canals were present, the labial canal was the straighter. The point of division for divided canals usually was in the cervical third of the root. A labiolingual section reveals the great width of the pulp canal, never visualized by the routine intraoral radiograph, which allows room for two separate canals or one wide canal with an island of dentin in the middle. Because of this narrow mesiodistal dimension, the access preparation must be extremely precise to avoid root perforation. Because of the implications of canal configuration, the access preparation suggested is oval but is wide labiolingually to allow for proper instrumentation. Rankine-Wilson and Henry demonstrated that the routine entry ordinarily used allows for the instrumentation of the labial canal only in teeth with two canals or the labial wall of a single-canaled tooth(4). The 40% of teeth with two canals

reported by Rankine-Wilson and Henry is almost never reached by practitioners during clinical situations(2).

In our first case radiograph was suggesting the presence of two canals based on fast break guideline and extended access preparation made both the canals negotiable where as in the second case no such indication was present in radiograph. IOPAs were taken by changing the angulation from normal to aid in identifying anatomy. Even upon careful exploration of internal anatomy we were unable to find out the second canals in case 2. Observation under dental operating microscope finally revealed the anatomy and presence of second canal in both lower lateral incisor and canine bilaterally in case 2.

It is easier to recognize an anatomic feature if one is already prepared to see it. But the use of dental operating microscope increases the chances of identification, negotiation and thorough cleaning of these types of canal variations due to its increased magnification and illumination. Numerous antimicrobial agents have been recommended as inter appointment dressings.(5) Calcium hydroxide paste is a simple and remarkably effective antimicrobial medicament. It has been shown to dissolve necrotic tissue and enhance the tissue dissolving effect of sodium hypochlorite solution(6). In the present case, calcium hydroxide was used as the intracanal medicament.

CONCLUSION

Knowledge of the internal anatomy of the teeth, clinician's skill, and availability of advanced equipments like microscope definitely add to the success of endodontic treatment. Mandibular anterior teeth should not be considered simple teeth from endodontic perspective. As Casteluccci has suggested lower anterior should always considered to have two canals.

REFERENCES

1. Cohen AS BD. Orofacial dental pain emergencies: endodontic diagnoses and management. In: Cohen S, Burns RC, eds. Pathways of the Pulp,. 8th edn. ed. Boston, MA, USA, : Mosby; (2002).
2. Weine FS. , . Endodontic Therapy. 5th Edition ed. St. Louis:: Mosby; 1996.
3. Benjamin KA, Dowson J. Incidence of two root canals in human mandibular incisor teeth. Oral Surg Oral Med Oral Pathol. 1974 Jul;38(1):122-6.
4. Rankine-Wilson RW, Henry P. The Bifurcated Root Canal in Lower Anterior Teeth. J Am Dent Assoc. 1965 May;70:1162-5.
5. Bystrom A, Claesson R, Sundqvist G. The antibacterial effect of camphorated paramonochlorophenol, camphorated phenol and calcium hydroxide in the treatment of infected root canals. Endod Dent Traumatol. 1985 Oct;1(5):170-5.
6. Hasselgren G, Olsson B, Cvek M. Effects of calcium hydroxide and sodium hypochlorite on the dissolution of necrotic porcine muscle tissue. J Endod. 1988 Mar;14(3):125-7.