ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 8, Issue, 10, pp.39955-39957, October, 2016

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

REVIEW ARTICLE

NEED FOR MAGNIFICATION: ONE STEP AHEAD IN ENDODONTICS

***Dr. Jyotsana, Dr. Jaidev Singh Dhillon, Dr. Harpreet Singh and Dr. Mandeep Kaur**

Gian Sagar Dental College and Hospital, India

ARTICLE INFO

Article History:
Received 17th July, 2016
Received in revised form
08th August, 2016
Accepted 24th September, 2016
Published online 30th October, 2016

Key words:

Dental operating microsope,
Magnification, Root canal system.

ABSTRACT

With the advent of magnification in the field of endodontics increases operator efficiency as well as the success rate. Traditional endodontics was based on feel not sight. Magnification helps the user not only to see more, but to see well. High levels of magnification increase the aggregate amount of visual information available to endodontists for diagnosing and treating dental pathology.

Citation: Dr. Jyotsana, Dr. Jaidev Singh Dhillon, Dr. Harpreet Singh and Dr. Mandeep Kaur, 2016. "Need for magnification: One step ahead in Endodontics", *International Journal of Current Research*, 8, (10), 39955-39957.

INTRODUCTION

Routine endodontic practice confronts the dental practitioner with an enormous number of challenges. For example, anatomical variations are not as rare or exotic as are frequently assumed. Walter Hess described the complex anatomy of root canals in great detail as early as 1917 (Das and Das, 2013; Clauder, 2007). Many of these important structures cannot be readily detected or treated with traditional endodontic treatment methods. Failures in non-surgical and surgical endodontic therapy were frequent and they still are. This is reflected in daily dental practice and cross-sectional epidemiological studies. The introduction of the dental microscope and the associated ability to inspect the root canals, both orthograde and retrograde, have fundamentally changed our understanding of dental morphology and its complexity. Dentists were not aware of the microscopic techniques till early 1990's. Well-known specialists such as Prof. Syngcuk Kim (University of Pennsylvania, Philadelphia, USA) and Dr. Gary Carr facilitated the establishment and widespread use of microscopic techniques. Prof. Kim's motto "You can only treat what you can see!" has made dentists all over the world enthusiastic about treatment procedures using SOM. In 1998, the American Dental Association instituted microscope as obligatory for all endodontic specialist programs in USA. As the use of dental microscopes increased worldwide, new instruments became established; the utilization of which greatly facilitated a considerable amount of work under the microscope. This all has made a rapid transition from conventional macro-dentistry to micro-dentistry (Clauder, 2007). For a restorative dentist as well as endodontist, the dental microscope offers a large number of benefits:

1. Better Visualization: The surgical microscope has been used to enhance visibility during dental procedures (Von Arxand Walker, 2000). Due to the magnification and clear coaxial illumination of the working field; it is possible to address unique or specialized treatment situations more efficiently and with greater precision. The magnification levels range from 2x to 20x (Carr and Murgel, 2010).

2. Diagnosis: Various problems which were left undiagnosed by the naked eye can now be easily seen under magnification using proper illumination. Microfractures and longitudinal fractures are often overlooked clinically which include cracks in the teeth or restorations, craze lines, wear facets, cracks at marginal ridges which usually are a cause of pain and sensitivity. Visualization under the dental microscope is the basis for further treatment planning (Clauder, 2007).

3. Identification of Complicated Root canal Systems: A plethora of variation in morphology of root canal system is being reported worldwide. Anatomical variations include complex systems like C-shaped canals (Clauder, 2007). Seo (2004) found that 31.3% of Asian populations have C-shaped canals. Treatment of this anatomical variation can be highly complex.

****Corresponding author: Dr. Jyotsana,***
GianSagar Dental College and Hospital, India.

Without the use of magnification, the second mesiobuccal canal in maxillary molars is often difficult to localize which causes higher chances of failure rate in these teeth. Depending on the literature source, the frequency of fourth canal is determined to be between 52% and 95.2% in vitro and between 16% and 78% in vivo (Görduysus *et al*., 2001; Paliwal *et al*., 2011). Apparently all studies point emphasize the advantages of Dental Operating Microscope in the localization of second mesiobuccal canals which eventually increases the success rate of endodontic therapy in maxillary molars (Das and Das, 2013; Clauder, 2007). Mandibular incisors seem easy to treat, but due to their complicated root canal morphology causes higher failure rate. The prevalence of two canals in mandibular incisors reported to be 11.5 – 44.1% and they merge into one canal in the apical 1-3 mm of the root (Uma *et al*., 2004). Various variations are seen in cases of mandibular premolars e.g. Cleghorm BM had reported the mandibular first premolar exhibited three distinct, separate roots and the mandibular second premolar exhibited a C-shaped root canal system (Cleghorn *et al*., 2008).

4. Better visualisation of pulp chamber and canal orifice: Magnification allows the clinician to better identify anatomical landmarks, the pulp chamber- including the sides, overhanging remnants of the pulp chamber, dentinal maps, canal orifices and to differentiate between the pulp horns.

5. Internal Resorption: Dental Operating Microscope can facilitate the removal of the filling in the niches of resorption; help in determination of the extend of resorption and sectioning of the apical segment of gutta-percha and can assist in correct insertion of the reparative material (MTA or Biodentine) in the affected area (Nunes *et al*., 2012).

6. Identification and Removing of Obliterations, Calcifications and Denticles: Calcification is encountered very frequently especially in geriatric patients. Obliterations, denticles and calcifications are the specific types of pulp degeneration. They are predominantly found more in chronic cases, because of natural defence mechanism of tooth by formation of secondary and reparative dentin to protect pulp. They can block the canal entrance or even obstruct further instrumentation. Magnification aids in detecting exact location and careful removal of these obliterations to facilitate entry into the root canal system (Das and Das, 2013; Clauder, 2007).

7. Effective Cleaning and Shaping: Through disinfection of root canal system and precise preparation is one of the prime objective of endodontic therapy. During instrumentation, the improved ability to see specific canals leads to greater efficiency and helps to detect any purulent or blood discharge as well (Das and Das, 2013).In retreatment cases, magnification assists the clinician us for proper removal of guttapercha from the canal and then verifying if any remnants are still present sticking to the sides of the root canal.

8. Effective Obturation: Proper illumination and magnification aids to visualize the space in the root canal system. During obturation, this helps us to achieve the ideal apical seal. Root canal sealers can be better placed under magnification, such a uniform coating of root canal walls can be achieved. While performing sectional obturation and using thermoplasticizedguttapercha, use of DOM is a very helpful aid.

9. Better Visualisation of Open Apex Cases and their management: Endodontic management of teeth with open apex requires careful cleaning and filling of the canal with intracanal e.g $CaOH_2$ paste to induce a complete calcific barrier at the apex of the tooth for the root end closure (Beena and Chandrashekar, 2011). The main goal of this procedure is to control the bacterial infection and establish a suitable environment for the induction of calcified tissue into the apical area[12].Manipulation of modern apexification therapies for special treatment techniques and materials has been facilitated significantly under a dental microscope. Dental operating microscope has aided tremendous improvements in visual acuity of open apex and hence has made possible to provide proper sealing using apical barrier. The use of an operating microscope allows better control of the placement of the MTA apical plug. Several case reports have been published such as one by Chaniotis (2010) who successfully retrieved the guttapercha extruded from the open apex and placed MTA apical barrier under the dental operating microscope.

10. Retreatment Cases with Missed Canals, Perforations, Fractured Posts and Instruments:

a) Missed canals: Kazandag *et al.* studied the detection and negotiation of accessory mesial canals in mandibular molars with the aid of magnifying loupes or the operating microscope. With loupes 16% of mesial canals were detected and negotiated in 11%, whereas with the microscope, 20% of the mesials canals were detected and negotiated in 16% cases (Kazandag *et al*., 2010). This data signifies the role of DOM in identification of missed canals.

b) Root Perforations are undesired complications of endodontic treatment. Once a perforation has been diagnosed, treatment must be rendered to seal the perforation site effectively to minimize injury and prevent contamination of the surrounding periodontal attachment apparatus. Although successful treatment and prognosis depend on many factors, the location of the perforation and the time lapse between exposure and repair are the two most important factors, DOM along with powerful ultrasonics has helped in managing such cases better increases without compromising the loss of sound tooth structure (Biswas *et al*., 2011). This is simply because of the fact that better visualization of these iatrogenic problems under DOM helps us to treat them more effectively (Clauder, 2007).

c) Retrieval of Fractured Posts and Instruments: Due to enhanced vision with magnification and illumination, the Dental operating microscope allows to detect the proper location of the fractured post and broken instruments and to remove them minimal loss of healthy tooth structure (Kahler, 2011).

11. Microsurgical Endodontics: In early 90's Prof Kim used microscopic approach in surgical endodontics with the applicability of retromirrors and resected apical root segment atraumatically with more moderate resection angle. He concluded that microsurgical approach leads to less trauma and faster healing (Mines *et al*., 1999; Rubinstein and Kim, 2002).

Conclusion

There is no doubt that the use of magnification along with other modern instruments has not only expanded the horizons

of dentistry but also taken it to another level of sophistication. Albeit, these equiptments cannot replace experience, knowledge and clinical skill. Therefore, we have to strike a balance between technological advancement and clinical skills so as to achieve excellence.

REFERENCES

Beena S, Chandrashekar L. 2011. Traditional method of management of an open apex in maxillary central incisor.*J Dent Sci Res*., 2(2):1-5.

Biswas M, Mazumdar D, Neyogi A. 2011. Non surgical perforation repair by mineral trioxide aggregate under dental operating microscope. *J Conser Dent*, 14(1):83-5.

Carr GB, Murgel CAF. 2010. The use of the operating microscope in endodontics. *Dent Clin North Am*., 54(2):191-214.

Chaniotis A. 2010. Open apex retreatment under the operating microscope. Roots 6-9.

Clauder T. 2007. The Dental Microscope: An Indispensable Tool in Endodontic Practice. The Microscope in Dentistry, USA, Philadephia, published by Carl Zeiss Meditec AG 1-4.

Cleghorn BM, Christie WH, CCS Dong. 2008. Anomalous mandibular premolars: a mandibular first premolar with three roots and a mandibular second premolar with a c-shaped canal system. *Inter Endod J*., 41:1005-41.

Das UK, Das S. 2013. Dental Operating microscope in Endodontics-A review.*J Dent Med Sci*., 5(6):1-8.

Görduysus MÖ, Görduysus M, Friedman S. 2001. Operating microscope improves negotiation of second mesiobuccal canals in maxillary molars. *J Endod*.,27: 683-686.

Kahler B. 2011. Microsurgical endodontic retreatment of a maxillary molar with a separated file; A case report. *Aust Dent J*., 56:76-81.

Kazandag, Basarani, Friedman. 2010. The operating microscope enhances detection and negotiation of accessory mesial canals in mandibular molars. *J Endod*., 36(8):1289-94.

Mines P, Loushine RJ, West LA. Liewehr FR, Zadinsky JR. 1999. Use of the microscope in endodontics: A report based on a questionnaire. *J Endod*.,25(11):755-8.

Nunes E, Silveira FF, Soares JA, Duarte M, Soares S. 2012. Treatment of perforating internal root resorption with MTA: a case report. *J Oral Sci*., 54(1):127-31.Paliwal A, Loomba K, Gaur TK, Jain A, Bains R, Vats A, Singh A, Sharma R, Majumdar DSP. 2011. Dental operating microscope (DOM): An adjunct in locating the mesiolingual (MB2) canal orifice in maxillary first molars. *Asian J Oral Health Allied Sci*., 1(3):174-9.

Rubinstein R. A., Kim S. 2002.Long-term followup of cases considered healed one year after apical microsurgery. *J Endod*.,28: 378-383.

Seo MS, Park DS.2004. C-shaped root canals of mandibular second molars in a Korean population: clinical observation and in vitro analysis. *IntEndod J*., 37:139–44.

Uma CH, Ramachandran S, Indira R, Shankar P. 2004. Canal and isthmus morphology in mandibular incisors- An in vitro study.*Endodontology*, 16:7-11.

Von Arx T, Walker WA.2000. Microsurgical instruments for root-end cavity preparartion following apicoectomy: A literature review. *Endod Dent Traumatol*.,16:47-62.

****