



# The Role of Magnification in Micro Endodontics - A Review



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Submission: October 30, 2017; Published: December 08, 2017

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## Abstract

Better visualization provides better treatment. Traditional endodontics has been based on tactile sensation not on vision. In the last few decades dentistry has witnessed explosion of new instruments, materials and techniques. Most important revolution has been the widespread adoption of microscope, which enables clinician to complete the procedure with more precision. High level of magnification increase the amount of visual information and increases the chances of more accurate diagnosis and treatment planning.

**Keywords:** Dental operating microscope; Magnification; Endodontics

## Introduction

Endodontic therapy is frequently referred to as “working blind” or “difficult to see” and treatment is usually based on the tactile sensation. The only possible way to “see” inside the root canal system is with the help of radiograph. Before advent of operating microscopes, one could “feel” the presence of problems like a ledge, a perforation, a blockage, a broken instrument, but the clinical management of that problem was never as predictable as it is now a day's [1].

Magnification increases ability of operator to visualise the fine and smallest details and aid in proper diagnosis and treatment planning. Despite their high cost, integration of Dental operating microscope into an endodontic practice as it improves the quality of treatment and prognosis. The surgical precision can be even achieved manually provided with visual acuteness, but this can be enhanced many times by use of magnifying devices and operating microscope are high end magnifying device now days revolutionizing dental practice.

## History of microscopes in endodontics

The first commercially available Dental Operating Microscope (DOM) was Dentiscope and was introduced in 1981 by Chayes Virginia. It was poorly configured as it can be magnified up to 8X and ergonomically difficult to use. In the late 1980s Dr. Gary Carr promoted the use of the DOM for improving outcomes of micro endodontics [2]. Howard S Selden [1986] was the first endodontist to publish an article on the use of the DOM in endodontics. In 1995, the American Association of Endodontists (AAE) formally recommended to the Commission on Dental Accreditation (CODA)

of the American Dental Association (ADA) for microscopy training in Endodontics. In 1999, Gary Carr, introduced a DOM that had Galilean optics with several advantages that allowed for easy use of the scope for nearly all endodontic and restorative procedures. It gained rapid acceptance within the endodontic community, and is now the instrument of choice not only for endodontics but for periodontics and prosthodontics.

## Use of magnification in endodontics

1. Examination, diagnosis, and treatment planning.
2. Enhanced visualization enables the clinician to diagnose the problem in very early stage. High powered magnification allows the clinician to identify colour alteration, tiny amount of pulp, demineralization around the groove. Precision can be enhanced during treatment and retreatment can be avoided [3].

## Diagnosis of cracked teeth

Longitudinal fractures and micro fractures are often difficult to diagnose with unaided eyes. Cracks at elevated enamel margin, craze lines and wear facets exposing dentin can be viewed more precisely with operating microscope [4].

## Access cavity preparation

Traditional access preparation of access cavities depends on type of tooth, however with modern endodontic techniques, a dental operating microscope providing magnification and better illumination helps in conservative preparation.

### Broken instrument removal

Use of operating microscope and a specially designed ultrasonic unit and tips makes instrument removal much easy than earlier. The instrument is visualized using high magnification, so more amount of dentin is conserved and subsequent complications can be avoided.

### Hidden canals

Earlier described by Walter Hess in 1917 that anatomical variations are not as rare as it is assumed, many of the structures cannot be readily detected with traditional endodontic treatment. Complex structures like middle mesial canal in mandibular first molar and c shaped canal in mandibular second molar can be more readily identified with the aid operating microscope.

### Removal of calcifications

Calcification in pulp chamber and canals often complicate endodontic treatment. Negotiation of canal in such cases and removal of calcification can be done without sacrificing important tooth structure [5].

### Perforation repair

Visualization plays important role in treatment of iatrogenic problem such as pulpal floor perforation and lateral root perforation.

### Microsurgical apicoectomy

Incorporation of microscope in surgical endodontics by Prof. Kim in the 1990s along with use minute retro mirrors made it possible to carefully examine the apical segment of the root end and better management of tooth and bone. Microsurgical flap design and soft tissue management is also greatly enhanced by aid of microscope in surgical endodontics [6,7].

### Conclusion

If you can see it better you can treat it better. High quality endodontic therapy is the basis for long term function and biologic success, ensuring that patients remain free of pain. The shift in clinical accuracy from low magnification-tactile based endodontics to vision based endodontics has brought new era in the field of endodontics. Microscope reduces distance and improves the overall treatment quality and encourages endodontists to review and perfect their own treatment concepts resulting not only a positive impact on the entire practice structure but also increases the enjoyment of providing better treatment.

### References

1. Apotheker H, Jako GJ 9(1981) A microscope for use in dentistry. J Microsurg 3(1): 7-10.
2. Carr GB, Murgel CA (2010) The Use of the Operating Microscope in Endodontics. Dent Clin North Am 54(2): 191-214.
3. Mora AF (1998) Restorative Microdentistry: A New Standard for the 21<sup>st</sup> Century. Prosthet Dent Rev 1(3).
4. Glenn A, Van As (2007) Evaluation of Enamel and Dentinal Cracks Using Methylene Blue Dye and the Operating Microscope. Inside Dentistry 3(7).
5. Thomas Clauder (1991) The Dental Microscope: An Indispensable Tool in Endodontic Practice, Reprint from - The Microscope in Dentistry: An Editorial Forum for Dental Professionals, published by Carl Zeiss Meditec AG, Jena, Germany, USA.
6. Rubinstein RA, Kim S (2002) Long-term follow up of cases considered healed one year after apical microsurgery. J Endod 28(5): 378-383.
7. Tibbetts LS, Shanelec D (1998) Periodontal microsurgery. Dent Clin N Am 42: 339-359.



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DOI: [10.19080/ADOH.2017.06.555699](https://doi.org/10.19080/ADOH.2017.06.555699)

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