

## Microscope in Endodontics - "You Can Treat Better What You See and You Won't What You Don't"

*"Microscopic endodontics is a technology that emphasizes visual information, rather than tactile information"*



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### COLUMN ARTICLE

Endodontic therapy aims at preservation and restoration of natural dentition by treating the teeth which are pulpal and periapical involved. The main objective of successful endodontic therapy is a thorough mechanical and chemical cleaning of the "entire root canal system" and its complete obturation with an inert filling material [1].



Figure 1: Operating Microscope.

Therefore, the ability to locate "all the canals" in this system is an important factor in determining the eventual success of the case. If a canal is not detected, it cannot be

cleansed and filled and is a potential cause of failure of endodontic therapy [2].



Figure 2: Surgical Loupes.

The clinician must have a thorough knowledge of the root canal morphology before he can successfully treat a tooth endodontically. The morphology of the root canal system in the mesiobuccal root of maxillary molars has attracted the attention of researches and the clinicians from the past 75 years. Since then anatomical variations in the maxillary molars have been extensively studied. The most common variation in the maxillary molars is the presence of a second mesiobuccal canal in the mesiobuccal root (also referred to as MB2, minor, secondary, second mesial, mesiolingual).

It has been known that maxillary molars often have two canals in the mesiobuccal root, since Hess and Zurcher described that in 1925. But its significance was not established until Weine, *et al.* [2] in 1969, suggested that the inability to locate, instrument and obturate the second mesiobuccal (MB2) canal could lead to endodontic failure in these teeth. The challenge for the clinician in the successfully treating maxillary molars is locating the MB2 canal.

Many previous studies have focused on the prevalence of a second mesiobuccal (MB2) canal, which has been investigated with a variety of methods, which includes; an in vitro root sections, [1,3,5-8] radiographs, [9] clearing techniques, [9-12] scanning electron microscopy, [11] all have demonstrated the presence of MB2 canals in 52% to 96% of these teeth. The prevalence of MB2 canal has been shown to occur comparatively more in maxillary first molars than second molars [11-13].

*During endodontic access opening, locating an extra canal by conventional method is difficult due to limited access and visibility. In the recent time, various instruments have been introduced to magnify the access cavity during its preparation, these includes: surgical loupes / telescopes with surgical headlamps, endoscopes, oroscopes, Surgical Operating Microscopes (S.O.M) (Figure 1) etc., Surgical loupes (Figure 2) are commonly use to locate any additional canals or any changes/abnormality on the pulp chamber floor, but Operating Microscope is a more advanced magnifying system than any other system.*

In the entire dental health care profession, field of endodontics is the only specialty that exists in which clinician cannot directly see what they are treating. Endodontic treatment was and is regarded as a blind procedure. Traditionally, most endodontic canal detection procedures are relied on the clinician's tactile dexterity and mental image of the canal system, because the ability to visualize the canal orifices is limited. This has changed with the utilization of the enhanced vision systems in endodontics. The use of surgical loupes and headlamps has evolved into the use of the Surgical Operating Microscope (S.O.M).

Endodontic therapy has undergone numerous technological changes and has entered the hi-tech era. The recognition and treatment of extra canals has assumed higher importance to ensure overall endodontic success. In this scenario, the second mesiobuccal (MB2) canal in the mesiobuccal root of maxillary molars has become an endodontic enigma. Thus, the successful detection, negotiation and obturation of this canals are vital to holistic endodontic therapy (Figure 3 and Figure 4).



**Figure 3:** Selective dentin removal (troughing) done to locate and negotiate MB2 canal.



**Figure 4:** Detecting and Negotiating MB2 canal under Operating Microscope at 15X magnification.

*In endodontics, the use of microscope seems to be indispensable. Studies are showing that the clinicians are discovering that every facet of endodontics is better, safer, and easier.*

The learning curve can be fairly steep, but it seems to be worth climbing.

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