Endodontic success is predicated on the ability to debride and clean the canal system. That canal system is a complex array of accessory and lateral canals and complex arrays of accessory and lateral canals inaccessible to endodontic files. (Figure 1) As practitioners, we are able to clean the main canals with files, either hand or rotary. But can not mechanically remove pulp tissue and debris out of the canal anatomy present adjacent to the main canals. Treatment success requires elimination of the pulp tissue and associated bacteria from this anatomy, so that it can be sealed during obturation. Irrigation has long been accepted as a key factor of treatment to achieve those goals.

Yet, complete clearing of residual bacteria especially in the apical portion of the canal system has been difficult to achieve with traditional methods using even sodium hypochlorite (NaOCl) and EDTA. But also improves disinfection of the canal system, clean the canal walls and it may be sealed during obturation. (Figure 3, 4)

Irrigation the key to Endodontic success

Although, instrumentation with files is important to enlarge the canals and ready them to be obturated. Debris consisting of pulp tissue and associated bacteria is not effectively removed by files. Irrigation with an appropriate irrigant can be used to remove that debris from the canal walls. NaOCl is still the accepted irrigant due to its tissue dissolving ability and antibacterial nature. Yet, it can not effectively reach far beyond the main canals to remove the residual tissue. Tissue dissolution can be enhanced to more effectively remove postoperative debris and further into the accessory anatomy to allow better sealing of the canal system improving treatment success.

Smear layer within the canal system plays a factor in success in endodontic treatment. The smear layer contains bacteria which when left within the canal system may enhance the occurrence of infection endodontically. When compared to traditional irrigation methods, laser enhanced irrigation has demonstrated better intercanal smear layer removal. As

Laser Enhanced Endodontic Treatment

By Dr Gregori M. Kurtzman, USA

Figure 2: SEM showing bacteria and pulpal debris in the apical 2/3 that was not removed fully using standard irrigation protocol. (Courtesy Prof. Georgi Tomov, Plodiv, Bulgaria)

Figure 3: SEM showing complete removal of bacteria and pulpal debris in the apical 2/3 after irrigation using the LT-IPI™ protocol. (Courtesy Prof. Georgi Tomov, Plodiv, Bulgaria)

Figure 4: SEM cross-section showing complete removal of bacteria and pulpal debris in the apical 2/3 after irrigation using the LT-IPI™ protocol leaving the tip of the LT-IPI™ tip in the chamber. (Courtesy Prof. Georgi Tomov, Plodiv, Bulgaria)

Figure 5: LiteTouch™ Induced Photomechanical Irrigation protocol. (Courtesy Prof. Georgi Tomov, Plodiv, Bulgaria)

Figure 6: Accessory canal existing in the apical 1/3 of the canal that was filled with a smear layer and debris that is not visible to the naked eye.

Figure 7: Accessory aperture filled with a smaller debris consisting of pulpal debris that is not visible to the naked eye.

Figure 8: Placement of the LiteTouch™ tip into the irrigant in the chamber and activation of the Er:YAG laser (Photo courtesy of Prof. Georgi Tomov, Plodiv, Bulgaria)

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