

Clinical Importance of the Smear layer

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A number of investigations have shown that the presence of bacteria is prerequisite for developing pulpal and/or periradicular pathosis. Depending on the stage of pulpal pathosis, various species of bacteria can be cultured from infected root canals. Kakehashi et al. showed that exposure of pulpal tissue in germ-free rats was characterized by minimal inflammation and dentinal bridging while exposure of pulpal tissue in conventional rats with normal oral flora was characterized by pulpal necrosis, chronic inflammation, and periapical lesions.

Currently used methods of cleaning and shaping, especially rotary instrumentation techniques, produce a smear layer that covers root canal walls and the openings to the dentinal tubules. The smear layer contains inorganic and organic substances that include fragments of odontoblastic processes, microorganisms, their by products and necrotic materials. Because of its potential contamination and adverse effect on the outcome of root canal therapy, it seems reasonable to suggest removal of the smear layer for disinfection of the entire root canal system.

Presence of this smear layer prevents penetration of intracanal medications into the irregularities of the root canal system and the dentinal tubules and also prevents complete adaptation of obturation materials to the prepared root canal surfaces.

Removal of the smear layer by an intracanal irrigant and placement of an antibacterial agent in direct contact with the content of dentinal tubules should allow disinfection of this complex system and better outcome for the root canal therapy.

A new solution, which was a mixture of a tetracycline, an acid, and a detergent(MTAD), was developed in the Department of Endodontics, Dental School, Loma Linda University, USA.

It has been demonstrated that MTAD was an effective solution for the removal of the smear layer and does not significantly change the structure of the dentinal tubules when used as a final irrigant in conjunction with 1% NaOCl as a root canal irrigant. Studies are in progress to compare the anti- microbial properties of this newly developed solution with those of sodium hypochlorite and EDTA that are currently used to irrigate the root canals and remove the smear layer from the surfaces of instrumented root canals.