

## Root Canal Irrigants **Suhrab Singh**

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Department of Endodontics, Santosh Dental College and Hospital, Ghaziabad, India

The main purpose of root canal therapy is to eliminate microorganisms, their toxins and debris by chemo-mechanical preparation. However, even after efficient cleaning and shaping, total disinfection of the complex root canal system remains unattainable. Studies have shown that the mechanical instrumentation of root canal walls leads to the formation of a thick smear layer which covers the dentinal walls that has both the inorganic and organic content.

**Corresponding author:** Suhrab Singh

✉ suhrab.singh@gmail.com

Department of Endodontics, Santosh Dental College and Hospital, Ghaziabad, India.

**Tel:** +91-9755-712-732

McComb and Smith first identified the smear layer 30 years ago on the walls of instrumented root canals and reported it to be irregular, amorphous, and granular in shape under scanning electron microscope. It is composed of inorganic debris, dentin chips, and organic materials including remains of the pulp tissue, bacteria their by-products, blood cells and the odontoblastic processes all of which has been described in detail by multiple authors [1,2].

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Furthermore, the smear layer is usually 1-2  $\mu\text{m}$  thick, and may be packed into the dentinal tubules as far as 40  $\mu\text{m}$  which are known as smear plugs [3-5]. But there is still no agreement on the question of keeping it or removing it during canal treatment which is still a matter of debate. Some investigators argue that the presence of the smear layer increases the success rate of endodontic treatment by blocking the dentinal tubules and preventing bacterial exchange from the tubules into the canal space or vice versa by reducing dentine permeability [6,7].

In contrast to this, some investigators believe that the smear layer should be completely eliminated from the surface of the root canal walls because it can harbor bacteria. Brännström believes that the smear layer serves as a ground for feeding of micro-organisms and also helps them colonize [8] which can be

detrimental to efficient disinfection and sterilization of dentinal tubules by preventing and blocking sodium hypochlorite, calcium hydroxide, and other intracanal medicaments and irrigants from penetrating and reaching into the dentinal tubules. It also acts as a barrier between the obturating materials and the canal wall and therefore interferes with the formation of an appropriate seal [9-12].

It is a known fact that one of the most important factors which strongly affect the outcome of a root canal treatment is the canal seal gained by appropriate obturation [13]. Investigators showed root canal sealers to have a better adhesion to the root canal walls after the smear layer was removed [12,14,15]. Although a great deal of effort has been made to understand the effect of the smear layer on the apical or coronal seal, the controversy of keeping or removing it still exists.

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