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Effect of 980 nm diode laser and Q-mix solution on smear layer removal from root canal surface; a scanning electron microscope study

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Smear layer is an amorphous layer spread on root canal walls following instrumentation. This smear layer consists of two confluent components. A thin superficial layer 1-2 μm thick, overlying a densely packed layer that penetrates the dentinal tubules for distances of up to 40 μm . Because it can harm bacteria and bacterial products and can prevent the penetration of intracanal medicaments into the dentinal tubules and interferes with the close adaptation of obturation materials to root canal walls, the smear layer should be removed. Irrigation agitation techniques have been proposed recently to remove smear layer from root canals. Diode laser irradiation produces agitation of irrigants and can improve their smear layer removal ability especially from the apical third of root canals.

Objective: The aim of this study was to compare the efficacy of 980 nm diode laser and QMix 2in1 solution in smear layer removal from the root canals.

Materials and Methods: Forty extracted single rooted permanent teeth were used. Root canals were prepared to full working length using rotary instruments till F3. Prepared teeth were divided into four groups (n=10): Group 1, no irrigation; Group 2, QMix 2in1 solution; Group 3, diode laser and; Group 4, QMix 2in1 in combination with diode laser. The roots were split longitudinally and prepared for scanning electron microscopic (SEM) investigation. The presence or absence of smear layer on the surface of the root canal walls at the coronal, middle, and apical portion of each canal were examined under a scanning electron microscope at x500 and x1000 magnifications.

Results: Smear layer removal was scored according to Guttman rating system for remaining smear layer scores. Diode laser in combination with QMix solution had the least smear layer scores.

Conclusions: Diode laser irradiation in combination with QMix 2in1 effectively removes smear layer from apical thirds of root canals.

Biography

Dr. Waqas Javied Malik has been a keen student during his college life. He completed his college education from Islamabad. He achieved SAARC scholarship and graduated from University of Dhaka, Bangladesh in 2011. He joined the American Board of Laser Surgery and achieved the Diplomat American Board in Laser Dentistry. He also cleared his NBDE exams USA. He has attended many national and international conferences and seminars. Currently he is pursuing his Masters in Oral and Maxillofacial Surgery (MDS OMFS) at Pakistan Institute of Medical Sciences, Islamabad. He is working as Dental Laser specialist at Signature Smiles Dental Clinic. He is working on numerous research projects focusing on application of Lasers in various aspects of Dentistry.

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