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Antimicrobial Effectiveness of Chlorine Dioxide and Sodium Hypochlorite in Retreatment

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Objectives Our aim was to compare the antimicrobial efficacy of hyper-pure chlorine dioxide (hClO_2) in endodontic retreatment cases compared to gold-standard sodium hypochlorite (NaOCl).

Methods Forty patients aged 18-60 having root canal treated teeth presenting chronic apical periodontitis were chosen. A two-stage disinfection involving the tooth surface was followed by disinfection of the pulp chamber above the covered gutta-percha. Root canal obturation was then removed mechanically and intracanal sample (R1) was taken by paper point method. Patients were randomly divided into two groups. During retreatment the test group was disinfected with hClO_2 and the control group with NaOCl . After disinfection of the root canal and one-week temporary closure, a second intracanal sample (R2) was obtained. The samples were cultured and analyzed by PCR strip test.

Results The most common genus found in infected root canals were Streptococcus, Staphylococcus, Fusobacterium, Tannerella and Enterococcus with prevalence of 39%, 31,7%, 41,5%, 25,9% and 19,5%, respectively. After irrigation with NaOCl Streptococcus (52,4%), Fusobacterium (21,7%), Klebsiella (19%) and Enterococcus (19%) were detected and with hClO_2 Streptococcus (47,1%), Enterococcus (35,3%), Tannerella (33,3%) and Prevotella (17,6%) were found. Candida albicans was found after irrigation in both groups with prevalence of 9,5% (NaOCl) and 5,9% (hClO_2).

Conclusions Neither disinfectants were completely effective. In both cases several genera persisted in the root canals. After irrigation with hClO_2 a more diverse flora was found, then with NaOCl . For a more effective disinfection a combination of the two is suggested. Incomplete disinfection by both irrigants suggests the need for a new disinfection solution or a more effective method.