

Antibacterial effect of chlorine dioxide and hyaluronate on dental biofilm

Type: Article

Abstract:

The objective of this study is to investigate antimicrobial action of chlorine dioxide (ClO₂) gel and hyaluronate gel (Gengigel (R)) on dental biofilm. Pooled supra and subgingival dental biofilm were obtained from healthy individuals and incubated aerobically and anaerobically. Plaque bacteria investigated including *Streptococcus constellatus*, *Streptococcus mitis*, *Eikenella corrodens*, *Fusobacterium nucleatum*, dental plaque pool samples (aerobic and anaerobic) and *Staphylococcus aureus* and *Escherichia coli* as internal control microorganisms. All bacteria were grown in Brain Heart Infusion (BHI) broth and the clinical isolate strains were sub-cultured on BHI agar. Single pure colonies of bacteria were transferred into fresh BHI broth and incubated overnight. Bacterial counting was done using hemocytometer. Antibacterial activities were determined using bacteria grown on Mueller Hinton II agar and antimicrobial disc diffusion susceptibility testing with paper discs impregnated with ClO₂ and Hyaluronate gels as well as by minimum inhibition concentration (MIC) test. Bacterial morphological alterations following treatment with ClO₂ and Hyaluronate gels were viewed under Scanning Electron Microscope (SEM) at 3500x, 10000 x and 20000x magnification. Positive results were obtained with disc diffusion technique whereby both agents exhibited antibacterial action against the microorganisms tested. ClO₂ gel produced large diameter inhibition zones while Hyaluronate gel resulted in smaller diameter inhibition zones. In MIC test the lowest MIC value of ClO₂ gel (0.02% w/v) was obtained for *S. aureus*, *S. mitis* and *S. constellatus*. The other bacteria and pool samples of dental biofilm indicated slightly higher MIC values (0.2% w/v) for ClO₂ gel. However, MIC values for Hyaluronate gel could not be determined. Under SEM, ClO₂ gel produced obvious alterations to the bacterial morphology while no changes were observed after treatment with hyaluronate gel. Chlorine dioxide gel demonstrated stronger and obvious antibacterial activity.

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