

## **Effect of HOCl Solution on *Streptococcus. Mutans* and *Porphyromonas. gingivalis***

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**Objectives:** The objective of this pilot study was to investigate the bactericidal effect of Hypochlorous Acid (HOCl) against *P.gingivalis* and *S.mutans* that cause periodontal disease and tooth caries, respectively.

**Significance:** *The potential bactericidal effect of the HOCL could have significant benefits for dental patients in reducing the risk of developing dental caries and periodontal diseases.*

**Materials & Methods:** Twenty-eight samples (four groups, seven samples per group) were prepared by culturing *P. gingivalis* in 5ml of brain-heart infused (BHI) broth with 5µg/ml of hemin and incubated in 37 °C anaerobic conditions for 48 hours.

Thirty-two samples (four groups-seven samples per group) were prepared by culturing *S. mutans* in 5 ml of BHI broth supplemented with 1 ml of 5% sucrose and incubated in 37 °C anaerobic conditions for 24 hours.

Optical density was measured using spectrometer for each culture. Challenge tubes were constructed by collecting two 2ml of each culture, centrifuging at 4000 rpm for 15 minutes. The supernatants were discarded and 2ml of deionized water (DI) was added to the pellets. The suspensions were then vortexed vigorously at maximum strength for 1 minute.

Four different condition challenge tubes were created by adding 1ml of vortexed solutions to 9ml of DI water, or 9ml of DI water passed through the Oral Irrigator, or 9ml of HOCl recommended solution (20ml of DI water with 0.25ml of HOCl solution), or 9ml of HOCl recommended solution passed through the Oral Irrigator. Samples were taken from each challenge tube at t=0, 5, or 10 minutes, diluted, and plated on BHI agar plates to determine CFU.

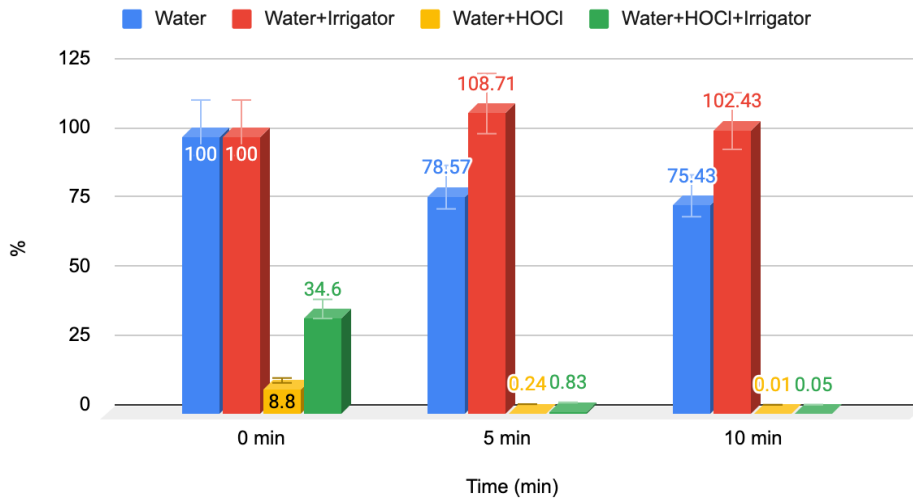
### **Results:**

The two-way ANOVA test showed a statistically significant difference in the percent survival of *P.gingivalis* and *S. mutans* ( $p < 0.0001$ ) at four variable conditions.

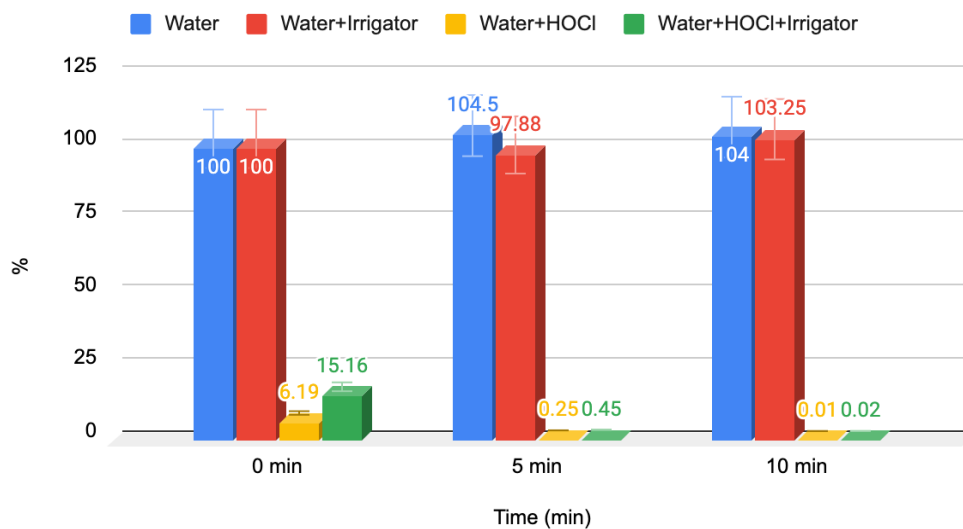
*P.gingivalis*: All post-hoc comparisons between the conditions were significant except Water+HOCl vs. Water+HOCl through Irrigator.

*S. mutans*: All post-hoc comparisons between the conditions were significant except Water+HOCl vs. Water+HOCl through Irrigator and Water vs. Water through Irrigator.

## P. gingivalis Percent Survival



## S. mutans Percent Survival



**Conclusion:** HOCl recommended solution (0.25 ml of HOCl into 20 ml water) has an effective bactericidal effect on *S. mutans* and *P. gingivalis*.

**Summary:** The purpose of this study was to test the bactericidal effect of hypochlorous acid. The results indicated that the diluted solution can be used with a high predictability as a mouth rinse.

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