

# COVID-19 Clinical Mouthwash Protocol Effects on the Oral Pathogen *Scardovia wiggisiae*

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## BACKGROUND

A 60 second oral rinse with 0.12% Chlorhexidine Gluconate has become a common protocol in healthcare facilities and dental offices to reduce the oral viral load of SARS-CoV-2. Though initiated as a result of the Covid-19 pandemic, this protocol lasts longer than the daily routine for most patients and may have unexpected benefits in reducing concentrations of other oral pathogens as a result.

CHX is effective against *S. mutans*, but its effect on *S. wiggisiae* are not well known. *S. wiggisiae* is one of the primary pathogens in early childhood caries. This study aims to find whether CHX can be used as a competent agent to reduce the oral concentration of *S. wiggisiae* and help decrease caries prevalence in the pediatric dental patient.

*S. wiggisiae* is a strict anaerobe compared to *S. mutans* which is a facultative anaerobe. This suggests that *S. wiggisiae* can survive and continue to produce acid under a more oxygen-deprived biofilm. *S. wiggisiae* has shown a high tolerance to fluoride.



## RESEARCH QUESTION

The objective of this project is to evaluate the prevalence of the newly identified oral pathogen *Scardovia wiggisiae* (SW) before and after this procedure to determine any effects. Mouthwash protocols were used in both the undergraduate and graduate pediatric clinics.

Null hypothesis:  
COVID-19 mouth washing protocol has no effect on SW

Alternative hypothesis  
COVID-19 mouth washing protocol has an effect on SW

## MATERIALS AND METHODS

Samples were collected using the Institutional Review Board (IRB) approved protocol "The Prevalence of Oral Microbes in Saliva from the UNLV School of Dental Medicine Pediatric Department.

Samples were collected at three time points T1 (A), T2 (B) (pre- and post-mouth wash, and follow up appointment), T3 (C)



### DNA isolation

Trizol (phenol:chloroform) was used to isolate (extract) DNA. A260:A280 absorbance readings were used to calculate DNA quality and quantity with the NanoDrop 2000 spectrophotometer.

### qPCR screening

Previously validated primers for 16S (positive control), *S. wiggisiae*. PowerTrack SYBR green assays were performed using the QuantStudio qPCR system.

## RESULTS

n=99 Samples A, B  
n=48 Samples A, B, C

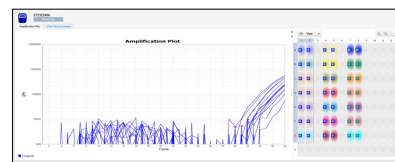
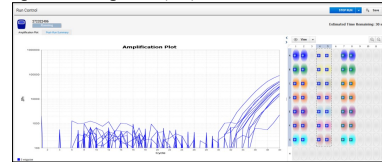
	Sample A (T1)	Sample B (T2)	Sample C (T3)
Average	1141.74 ng/uL	883.94 ng/uL	1350.85 ng/uL
Range	629-1847 ng/uL	663-2110 ng/uL	737-2207 ng/uL
Two-tailed t-test		T1:T2, p=0.0042	T1:T3, p=0.0361
A260:A280	1.61	1.65	1.66
Range	1.45 - 1.84	1.42 - 1.89	1.51 - 1.85

Sample A (T1)	Sample B (T2)	Sample C (T3)
pre-MW n=10/36 (27.8%) SW	post-MW n=3/36 (8.3%)	Recall n=10/36 (27.8%) all original A positive

$\chi^2=17.818$ , d.f.=1, p=0.0001  
(significant decrease)

$\chi^2=0.000$ , d.f.=1, p=0.999  
(same as pre-MW)

qPCR Sample A (T1)



qPCR Sample C (T3)

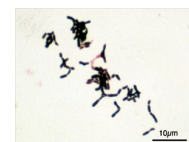
- Gram-positive SW appears to be temporarily reduced in detectable numbers following COVID-19 MW
- SW appears to come back in patients previously SW-positive (all ten of returning patients, Sample C)
- SW does not appear in new patients that were previously SW-negative (Sample A, Sample B negative)

## CONCLUSIONS

- COVID-19 mouth washing protocol can temporarily eliminate detectable COVID-19.
- COVID-19 mouth washing protocol can also reduce gram-positive *S. wiggisiae* temporarily.
- No long-term effects were observed with *S. wiggisiae* (e.g. Sample A positive, Sample C positive)
- Opposite effect has been seen with other pathogens, such as *Selenomonas noxia* (SN)
- Sample A negative, Sample C positive for SN (n=2)
- More research needed to determine (confounding variables).

## REFERENCE

- Costa, D. D., Brites, C., Vaz, S. N., de Santana, D. S., Dos Santos, J. N., & Cury, P. R. (2022). Chlorhexidine mouthwash reduces the salivary viral load of SARS-CoV-2: A randomized clinical trial. *Oral diseases*, 28 Suppl 2, 2500-2508. <https://doi.org/10.1111/odi.14086>
- McDaniel, J., McDaniel, S., Samiano, B. J., Marrujo, M., Kingsley, K., & Howard, K. M. (2021). Microbial Screening Reveals Oral Site-Specific Locations of the Periodontal Pathogen *Scardovia wiggisiae*.



*Scardovia wiggisiae*

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