

By contrast, the tri-phenol reagent failed to disinfect 37 of the 60 sites using the one-minute procedure. Even following the product's recommended ten-minute protocol, the tri-phenol failed to properly disinfect 29 of the 60 sites. In fact, using the manufacturer's instructions, the tri-phenol showed no significant difference from the saline control when tested against one of the three bacteria.

Conclusion

In relation to the number of patients seen daily in a dental practice, the tri-phenol reagent requires an extensive, ten-minute procedure that cannot be replicated in most dental offices. Furthermore, the product has clearly demonstrated to be an ineffective surface disinfectant. By comparison, the alcohol chlorhexidine reagent has not only proven to be a very effective surface disinfectant, but also requires a more realistic, one-minute protocol in relation to the time allotted between each patient.

References

1. Stephens J, Kiger R, Kettering J, In vitro comparison of the effectiveness of three surface disinfectants. *CDA Journal*, 22:40-46, 1994.
2. Mechant, VA, Glisson, MJ and Molinari, JA, Infection control practice in Michigan dental offices: Report of a survey. *J Mich Dent Assoc*, 71(1):14, 1989.
3. Environmental Surface Disinfectants, Alcohol. *Clinical Research Associates Newsletter*. Nov. 1996; Vol. 20:11.
4. EPA Re-testing of Sterilants Causes Compliance Confusion. *Dentistry Today*, March 1994, p.88.
5. www.micrylium.com

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A Newer, Effective, and More Efficient Disinfectant

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Purpose

The purpose of this study is to compare the antimicrobial effectiveness of two commercial surface disinfectants in relation to time.

Literature Review

As dental health care providers, there is a great concern for various bacteria and viruses to which professionals, as well as patients are exposed on a daily basis. The use of surface disinfectants is essential to reduce bacterial and viral counts to levels that contribute to the safety of each patient and dental worker. There are over 70 disinfectants currently being used in various dental offices, however, they are not equally effective and vary in efficiency.^{1,2} In 1995, a study conducted by the Clinical Research Associates tested ten phenolic-based products against tuberculosis bacteria and polio virus. None of these products reduced organism counts to the acceptable level. In 1996, the same test was performed with 25 alcohol-based products and only four passed all requirements.³ "OSHA field offices have reported that, if an antimicrobial of choice has been found ineffective, an individual is not in compliance with the standard even if the product is still registered."^{1,4} With the number of patients seen by the dentist and the hygienist in a day, the necessary time to disinfect just isn't available with a commonly required ten-minute procedure, therefore, the importance of proper disinfection is often overlooked in order to treat a specified number of patients in a timely manner. By testing a commonly used disinfectant requiring a ten-minute protocol against a newer product with a more time efficient protocol of one minute, the relative efficacy of the two disinfectants was determined in relation to a more realistic time allotted between each patient.

Methods and Materials

The disinfectants that were tested include an alcohol chlorhexidine product and a tri-phenol product. The standard procedure for disinfecting using the tri-phenol is "spray-wipe-spray-and wait ten minutes". The newer product, alcohol chlorhexidine, claims to require less time with a recommended procedure of "spray-wait one minute-and wipe".⁵

These products were tested against bacteria from three general categories: *Escherichia coli* was chosen as a gram negative bacteria; *Staphylococcus aureus* was selected to represent gram positive bacteria, and *Mycobacterium chelonae* as an acid-fast bacteria. Ten specified areas were designated for each bacterium and a negative control of saline on a formica surface. Prior to testing, this surface was cleaned with a bleach solution and rinsed with sterilized water. Each designated area was then inoculated with 100 micro liters of the cultured bacteria. A sterilized toothpick was used to spread the bacteria completely over each site. After the bacteria had thoroughly dried, both disinfectants were first tested using the "spray-wait one minute-wipe" procedure. Five of the ten areas for each bacteria were sprayed with the alcohol chlorhexidine reagent and the remaining five areas were sprayed with the tri-phenol reagent. After one minute, gauze was used to wipe the inoculated surface. Then a sterilized swab moistened with saline was rolled over each test site and placed in a broth culture tube. This procedure was repeated four times to give a total of 20 sites for each bacteria. The ten-minute protocol was then tested using the same procedures. Our results were observed at five days on the basis of growth verses no growth.

Results

	GROWTH / NUMBER OF SITES	
	1 Min. Procedure	10 Min. Procedure
ALCOHOL CHLORHEXIDINE		
<i>S. aureus</i>	3/20	1/20
<i>E. coli</i>	0/20	0/20
<i>M. chelonae</i>	0/20	0/20
TOTAL	3/60	1/60
TRI-PHENOL		
<i>S. aureus</i>	18/20	8/20
<i>E. coli</i>	5/20	4/20
<i>M. chelonae</i>	14/20	17/20
TOTAL	37/60	29/60
SALINE		
<i>S. aureus</i>	10/10	10/10
<i>E. coli</i>	9/10	8/10
<i>M. chelonae</i>	10/10	10/10
TOTAL	29/30	28/30

The results show that the alcohol chlorhexidine reagent demonstrated the greatest amount of antimicrobial activity against the microorganisms when tested with both the one-minute and the ten-minute protocols. The level of activity demonstrated a high statistically significant difference from that of the tri-phenol disinfectant ($p < 0.0001$) ($p < 0.001$) respectively. From the 60 sites tested for the three bacteria, the alcohol chlorhexidine reagent showed growth in only three of these sites, using the recommended one-minute protocol. Using the ten-minute protocol, there was only one site out of 60 that showed growth.