Use of Isovac vs High volume suction for aerosol reduction during an operative dental appointment

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BACKGROUND

- Dental procedures produce aerosols and spatter that may contain infectious agents
- With the outbreak of COVID-19, the potential for transmission of the virus to patients and staff by aerosols and splatter became a major concern
- Given that there are no specific guidelines on practicing dentistry during a pandemic, additional infection control protocols, have been recommended and implemented in dental offices across the world
- However, the efficacy of these protocols has not been proven

OBJECTIVE AND HYPOTHESIS

- Our goal is to assess the efficacy of Isovac system as compared to High Volume Evacuation with a standard tip, in reducing aerosol and splatter associated with a restorative procedure in a pediatric dental operatory
- Our hypothesis is that HVE with the Isovac system will significantly reduce surface contamination during operatory procedures. bv at least 30% in comparison to HVE with a standard tip


METHODS

- On obtaining IRB approval, A total of 60 patients (Frankl 3 or 4) were randomly assigned to HVE or Isovac
- 2 operators treated 30 patients each (15 HVE and 15 Isovac)
- Parental consent obtained on the day of the procedure
- Procedures performed: Class II prep on at least 2 primary and/or permanent dentition on one quadrant or two quadrants on the same side using high-speed handpiece
- The device used to measure the contamination: A3 Sanitation System by Kikkomans
- Contamination on patient bib and provider mask was measured in RLU (relative light units)





ANALYTIC PLAN

- Randomized, controlled, unblinded trial
- Assumed that a 30% reduction in surface contamination is clinically important enough to choose one method over the other
- Power analysis suggested that 30 patients per group would provide 90% power to detect a 30% reduction in surface contamination
- All data analyzed for statistical significance using t-test for continuous variables or Chi Square test for categorical data

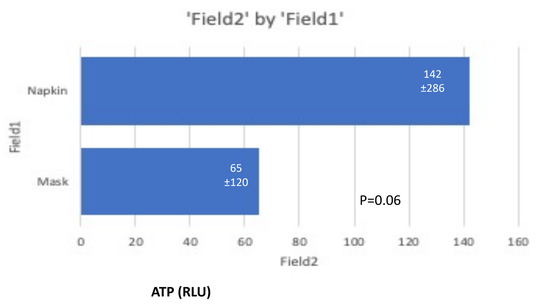
RESULTS

Patient Demographic

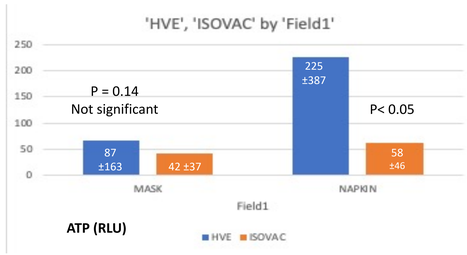
Parameter	HVE with Standard Tip	ISOVAC
Age (yr)*	11.2 ± 3.9	11.7 ± 3.8
Gender	10M:20F	10M:20F
Frankl 3 Frankl 4	13% (4) 87% (26)	30% (9) 70% (21)

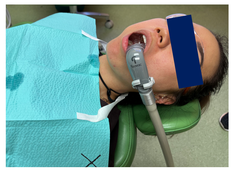
- Statistical analysis was done to see whether surface contamination varied with:
  - Age
  - Gender
  - Frankl Scale
  - Dentist performing the procedure
- We found that there was no effect of the patient's age, gender, Frankl scale, or the dentist on the amount of surface contamination on the napkin or the mask

Surface Contamination: NAPKIN vs MASK




Surface Contamination: HVE vs. ISOVAC






SUMMARY

- ISOVAC device significantly reduced surface contamination on the napkin, close to the patient's mouth
- Although there was a trend for reduced surface contamination with ISOVAC on the dentist's mask, it was not statistically significant
- The amount of contamination on the mask was more than 50% less than on the napkin, a difference that was almost statistically significant

CONCLUSION

- ISOVAC does significantly reduce the amount of surface contamination, but only close to the patient
- There is a higher level of contamination close to the mouth, but contamination decreases rapidly as you move away
- The lower amount of contamination on the mask probably explains why there was no significant difference in contamination of the mask between HVE and ISOVAC. It is harder to show a significant reduction when there was such a low level of contamination
- As there was no significant difference in contamination on the mask, it seems unlikely that ISOVAC would reduce the risk of transmission of an airborne vector from a patient to the dentist, as compared to standard HVE

POTENTIAL SOURCES OF ERROR

- Providers: Working distance between provider and patient differed based on use of magnification (Loupes vs no loupes)
- Variable to dental assisting technique while holding HVE
- Impact of suction power
- Maxillary vs mandibular teeth
- Oral Hygiene of patient
- Extra oral time of the swab before testing
- Possible operator bias in swabbing