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Is there an association between the disinfection of exercise benches using proper technique and the total Aerobic Colony

Background

As an infection control practice, surface disinfection is crucial in all public settings such as inside athletic centers. A point prevalence survey was conducted inside a multipurpose fitness center at Virginia Commonwealth University. Sterile culture swabs were used to obtain samples from various gym equipment such as workout benches, hand grips and treadmills (fomites). A significant number of samples were positive for methicillin-resistant *Staphylococcus aureus* (MRSA).⁴ There have been similar findings in other parts of the literature that concludes significantly high total microbial count on the equipment within athletic centers. In general, fitness centers are highly populous and have relatively high humidity which creates an environment ideal for microorganism growth.^(3,4)

A high total microbial load, especially, of MRSA is causative to skin and soft-tissue infections.² It is reported that contaminated gym equipment is a fomite for transmission of various microorganisms. *S. aureus* can survive on inanimate objects for a prolonged period if given ideal growing conditions.² Therefore, it is essential that gym equipment such as workout benches must be disinfected frequently with an antibacterial solution.

The objective of this study was to determine the microbial count found on the top surface of the flat workout benches at Ryerson University's Recreation and Athletics Centre (RAC) after different disinfection techniques were applied by the attendees. The numeric difference in total Aerobic Colony Count (ACC) is measured when a bench at RAC is properly disinfected with an antibacterial solution and paper towels versus when it is sanitized improperly or not disinfected at all.

Methodology

I) Research Design

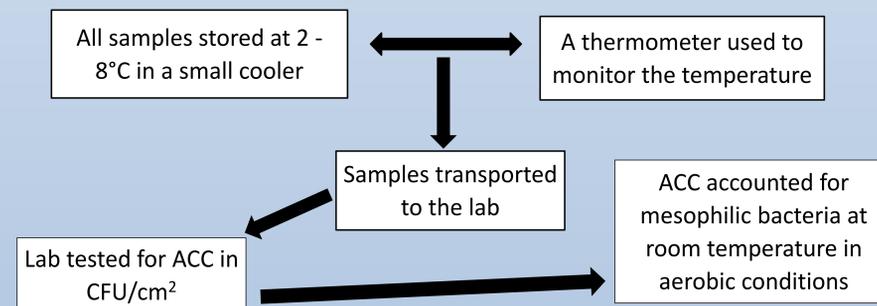
The research was observational and lab-based as it required the collection of field swabs to determine the total Aerobic Colony Count (ACC). It was prospectively observational in a way as attendees who used the bench were observed to see how each person disinfected that bench after its use. The users of these benches within the weight room of RAC did not know about the fact that they were being watched. The disinfecting method applied by each user on the bench was noted into three different categories. The three groups were composed of individuals who applied a proper disinfecting technique, improper disinfection technique and those who did not disinfect the top surface of the bench at all.

Count found on its surface?

II) Data from Swab Collection

- After noting each disinfection technique applied by the users or not doing any disinfection at all, environmental swabs were rubbed on the top surface of each bench.
- Nineteen samples were collected in total, six swabs accounted for each category with an addition of one control sample.
- Control was when the researcher himself, adequately disinfected a flat bench and then took a swab sample.
- For swabbing, the method described in the fifth edition of PHO's Public Health Inspector's Guide to Environmental Microbiology Laboratory Testing was followed.¹

III) Storage and Submission to the Laboratory



Results

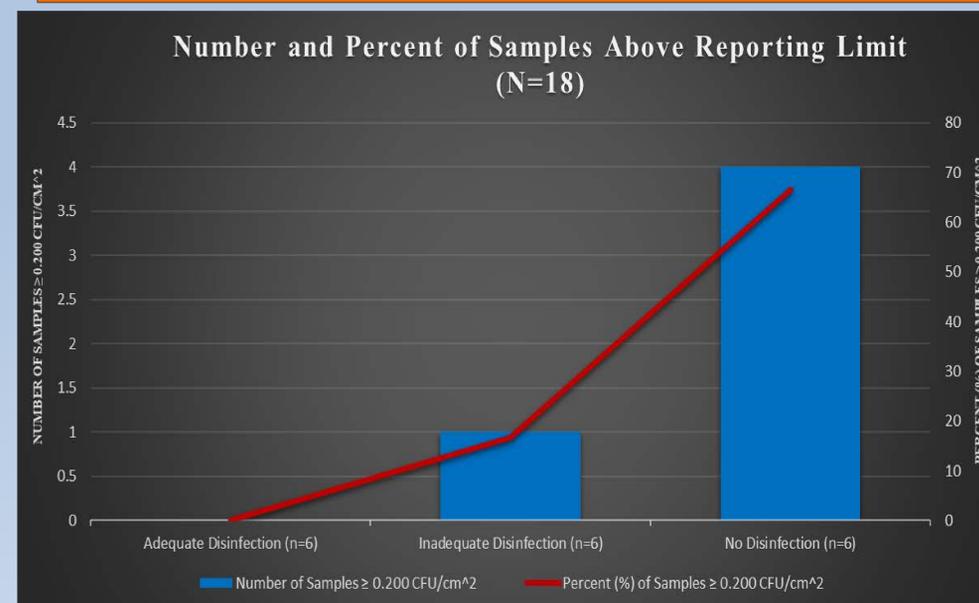


Figure 1: Samples ≥ 0.200 CFU/cm² within all categories

Discussion

As displayed on figure 1, when a flat bench within the weight room of RAC is not disinfected, then four out of six samples' (66.667%) ACC was greater than or equal to 2.00E-01 CFU/cm². However, the ACC was much lower for the group of six samples taken when improper sanitizing was done by the users. Only one (16.667%) sample's ACC was 2.00E-01 CFU/cm². All the six swabs (100%) had ACC less than 2.00E-01 CFU/cm² when the benches were adequately sanitized.

As per Recreation Manager's request, the researcher recommends that RAC's staff may want to place a sign(s) with visuals and key phrases to point out the significance and prompt surface disinfection among all the attendees.

Possible Limitations

- 1) Small sample size due to a limited budget
- 2) Non-exact value of ACC of samples resulting less than 2.00E-01 CFU/cm²
- 3) No Public Health specific guideline or standard that defines "adequate disinfection" of gym equipment (mitigated with a control sample)

Conclusion

These findings link back to the hypothesis based upon the literature that the total microbial count is high whenever exercise equipment is not disinfected. This is because athletic centers such as the RAC are crowded, humid, and the nature of the activities carried out in this type of facility increases the growth of microorganisms. Therefore, the practice of disinfecting contaminated gym equipment must be followed proactively by everyone.

Acknowledgments

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References

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