Should Preclinical Typodonts Be Disinfected Prior to Grading?

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Abstract: This is a report of a unique finding in a preclinical laboratory that may be a potential dental school health hazard. Visual inspection (conducted in April 2008 by a preclinical crown and bridge course coordinator) of typodonts used by second-year students at the University of Mississippi School of Dentistry found that fourteen out of thirty-nine had black spots on the undersurface of the cheek shroud and/or plastic gingiva. The spots were cultured by the Medical Center’s Department of Microbiology and described only as being mold/fungus typical of that which frequently grows in warm, moist, southern environments. Although indoor molds are common, about 5 percent of the general population will develop some type of mild allergic airway problem from molds over their lifetime. Mold on typodonts is unsightly, indicates failure of students to recognize the value of cleanliness in the dental environment, and may be a potential health hazard for some individuals. Cleaning and drying procedures for typodonts were implemented. The transfer of items between students and instructors during preclinical courses provides many opportunities for the spread of potentially harmful microorganisms/viruses. As a minimal level of personal protection, it is suggested that instructors wear disposable gloves and face masks and exercise hand washing between handling student instruments and typodonts. This problem has not been previously mentioned in the literature and merits further investigation/discussion.

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Since the introduction of the first manikin for dental teaching by Columbia Dentoform in 1917, all U.S. dental schools have extensively used some type of artificial typodont for preclinical training.1 Traditionally, grinding on plastic teeth was accomplished dry with typodonts nonsecured to the laboratory bench or attached to a mounting pole. Clinical simulators, introduced in the late 1980s, positioned the typodont in an artificial head and provided for the use of water spray and high-volume suction during tooth preparation. The relatively recent addition of soft plastic cheeks to typodonts more closely mimics the mouth but also creates an environment favorable for microorganism growth. This is a report of a unique preclinical laboratory finding that may be a potential dental school health hazard.

Observations/Findings

A visual inspection (without magnification) of student typodonts (Kilgore model D95-200-GUB, Kilgore Int., Coldwater, MI) conducted in April 2008 by the course coordinator for Missing Teeth II (a preclinical crown and bridge course) at the University of Mississippi School of Dentistry found that fourteen out of thirty-nine had black spots varying in size on the undersurface of the cheek shroud and/or soft plastic gingiva (see Figures 1 and 2). The inspection was due to a concern by the course coordinator that typodonts were not being properly cleaned by students (no reports of illness associated with “spot exposure” had occurred). The black spots could not be removed by rubbing with alcohol swabs or vigorous scrubbing with soap and water. The typodonts (which had been purchased new) had been used by the same students for a previous preclinical operative course (three months long) and five sessions (two weeks) into the current course. Water spray was used for all tooth preparations, and both courses ran consecutively. Students had received basic instructions for soap and water cleaning and care of their typodonts but were not monitored for compliance. Typodonts were secured by students in personal lockers between class sessions. The use of clinical simulators at this school is relatively new (less than two years), and no previous observations were reported to suggest that this was a recurring problem.

The spots were cultured by the University of Mississippi Medical Center Department of Microbiology on blood agar and tryptic soy agar and found to be black-brown mold/fungus similar to several
varieties that grow in humid environments common to the South such as bathrooms and unventilated showers (see Figures 3 and 4). The department did not have the capability to further identify or genotype the organism. It was described as being relatively harmless unless individuals in contact had specific allergies to molds or mildews. The microbiologist recommended replacement of plastic cheeks and gingiva on all typodonts with visible spots and that all student typodonts undergo periodic cleaning (scrubbing with an antimicrobial soap) and daily drying to eliminate a moist environment favorable for mold growth.

Figure 1. Mold growth on artificial cheek shroud of typodont

Figure 2. Mold growth under artificial gingiva of typodont

Discussion

Molds are a type of fungi that are simply plants without leaves, stems, or roots and require an external carbon source for growth. Indoor molds are common due to airborne spores and considered less of a potential health problem than outdoor molds. Even so, about 5 percent of the general population will develop some type of mild allergic airway problem (rhinitis or asthma) from molds over their lifetime (approximately 80 percent of asthmatics are allergic to molds). Indoor molds are unsightly and can produce offensive odors. Additionally,
mold spores can cause health problems even if the spores are dead. Prevention by not providing a favorable growth environment is easier and more effective than elimination of mold after it becomes established.

After further consultation with the microbiology department, actions that were implemented by the supervisor of preclinical labs at this school included:
1. Plastic cheeks and gingiva were replaced on typodonts where mold growth could be found with 4x magnification.
2. All student typodonts were scrubbed thoroughly using an antimicrobial soap (Hibiclens) followed by forty-eight hours of drying in a well-ventilated area.
3. At the end of each lab session, typodonts are rinsed to remove debris and dried before storage (cheeks should be turned inside out to allow ventilation).
4. Typodonts are to be cleaned with alcohol wipes before handling by instructors, who should wear gloves and masks.
5. Before grading of projects, typodonts are to be disinfected and dried for twenty-four hours.

This school has established a policy (based on the above actions) for cleaning and drying of student typodonts during preclinical laboratory courses. The

Figure 3. Black material cultured on blood-agar medium

Figure 4. Black material cultured on tryptic soy agar medium
preclinical laboratory supervisor is responsible for compliance. No additional observations of black spots or other signs of mold growth on student typodonts have been made thus far.

Students are required to wear gloves and face masks to simulate clinical conditions while doing preclinical procedures. Even so, in simulator laboratories, like patient clinics, aerosols are created, and the steady transfer of items between students and instructors provides many opportunities for the spread of potentially harmful microorganisms and viruses between individuals. Even with good oversight, students may not clean instruments and typodonts in a timely or appropriate manner. Allowing the presence of persistent debris or mold on typodonts fails to reinforce the value of cleanliness to students. It behooves the faculty and staff to maintain vigilance to ensure adequate cleaning measures are followed.

The findings reported here also open the door to several unanswered questions. How often should typodonts be cleaned? Should disinfection and complete drying of the typodont be accomplished before final submission of a project? Should instructors wear masks/gloves/eye protection during grading? Because of these uncertainties, as a minimal level of personal protection, it is highly suggested that instructors wear disposable gloves and masks plus exercise frequent hand-washing when evaluating student projects.

Conclusion

Black mold growth was identified on 35 percent of typodonts used in a preclinical crown and bridge course taught at the University of Mississippi in April 2008. The presence of mold on typodonts is unsightly, fails to teach students the value of cleanliness in the dental environment, and may be a potential health hazard for some individuals. Periodic cleaning along with disinfection before submission of projects for evolution and grading was recommended. This problem has not previously been reported in the dental educational literature and merits further investigation/comments.

REFERENCES