Clinical update

Cloth-covered chiropractic treatment tables as a source of allergens and pathogenic microbes[☆]

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Received 27 August 2007; received in revised form 5 October 2007; accepted 29 October 2007

Key indexing terms:

Infection control;
Primary prevention;
Sanitation;
Chiropractic

Abstract

Objective: Vinyl chiropractic tables have been found to harbor pathogenic bacteria, but wiping with a simple disinfection agent can significantly reduce the risk of bacteria. The aim of this study was to assess the presence of microbes and other allergens or pathogens on cloth chiropractic tables.

Methods: Cloth-covered tables in a chiropractic college teaching clinic were selected. Samples were taken from the facial piece and hand rests with RODAC plates containing nutrient agar, followed by confirmatory testing when indicated.

Results: Numerous microbacteria strains were found, including *Staphylococcus aureus* and *Propionibacterium*. Allergen-producing molds, including *Candida*, were also found.

Conclusion: Cloth tables were shown to contain pathogenic microbacteria and allergens. The chiropractic profession should establish an infection control protocol relevant to treatment tables and discard use of cloth-covered treatment tables in this process.

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[☆] Funding for this project was provided by Parker Chiropractic Research Institute, and none of the authors notes a conflict of interest.

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Introduction

Chiropractic care is a common method for treatment of back pain in the United States and among the most popular of complementary and alternative therapies.^{1,2} At some point, about one third of people with low back pain will consult a doctor of chiropractic for their pain.² Although chiropractic care may involve a variety of physical medicine procedures, the typical treatment will use manipulation to the spine with the patient placed prone on a specialized treatment table that has a split facial piece to accommodate the head with the spine in a neutral position. Usually, tables are covered in a vinyl surface; but some tables are covered in cloth fabric. It is also typical to have a paper barrier that covers this facial piece. This paper is either mounted on a roll to the table or placed in squares over the facial slot.

Studies have assessed the presence of microbes on vinyl-covered tables in teaching clinics in the United States, and pathogenic microbes were found in both instances.^{3,4} However, a review of chiropractic literature does not indicate that an assessment has been made of cloth-covered chiropractic tables regarding the presence of allergens or pathogenic microbial organisms. The presence of pathogenic bacteria on treatment table surfaces should be considered significant when attempting infection control in chiropractic offices, and cloth tables represent an additional concern. Therefore, the purpose of this investigation was to assess cloth tables for the presence of any allergens or microbial contamination that may be harmful to patients being treated on these tables and make suggestions based on the analysis. The hypothesis of the investigators was that cloth tables may hold allergens in addition to microbes, as the fabric is so much more porous than a vinyl-covered apparatus and could represent a difficult surface to clean on a routine basis.

Methods

Sampling

A teaching clinic at one chiropractic college was examined for the presence of treatment tables that were covered in cloth. In the case of the clinic examined, there were 9 cloth-covered treatment tables and 5 benches where a patient can be placed on in a kneeling position with the face in a similar slot as the treatment table. All of these apparatus were in a clinic where student interns may treat other students and family members as part of their supervised training in spinal manipulation.

Samples were taken of the facial piece of each of the tables and benches in this facility. Bilateral cultures of the face piece with the paper removed were made using a special RODAC plate (Becton, Dickinson, and Company, Sparks, MD) containing a nutrient agar in which the plate has the agar overfilled such that a meniscus of agar is exposed above the rim of the plate. A recessed cover is then placed over the plate to protect the sample during transport and incubation. Because the goal was to assess for bacteria and nonbacteria alike, this nutrient agar was used. Plates taken of each apparatus facial piece were labeled as to left or right surface and given a number assigned to each table or bench. Cultures were grown at 37°C for 24 hours and examined for any presence of growth.

Isolation and confirmatory testing

Plates were examined by the team's microbiologist and assessed for presences of both allergens and microbacteria. Suspicious cultures were then subcultured when necessary and Gram-stained and/or confirmed with other accepted confirmatory methodologies. These included coagulase testing for suspected *Staphylococcus* strains and CHROMagar MRSA (Becton, Dickinson, and Company) for suspected methicillin-resistant *S aureus* (MRSA).

Results

Several organisms grew on the plates within 24 hours. Fig 1 shows plates with 24 hours of growth. These included common mold spores, probable *Candida* colonies, and gram-positive bacteria such as *Micrococcus luteus*, *Propionibacterium acnes*, *Staphylococcus epidermidis*, *S aureus*, and *Bacillus subtilis*. *Staphylococcus aureus* was perhaps the most concerning of the strains, and this was confirmed with coagulase testing. The result of MRSA testing with CHROMagar specific for MRSA was negative. However, acne-causing bacteria and allergens like mold were disease-causing entities noted on these tables as well. Fig 2 summarizes testing results.

Discussion

Limitations of the study

This study did not quantify bacterial counts. Although this would be helpful in knowing how

Fig 1. Photograph of all culture plates taken 24 hours postincubation at 37°C.

much of an organism was present, it was felt by the investigators that any presence of pathogenic organisms or allergens was of significance. In addition, a teaching clinic with high volumes of patients may not be generalizable to private practice. However, this still indicates a primary problem with cloth-covered tables, primarily how to disinfect them. This is likely a problem that is generally found in teaching clinics and private practice offices as well.

Significance of this study

A study on vinyl tables has indicated that wiping with a simple disinfection agent can significantly reduce the risk of bacteria on the surface of the treatment apparatus.⁴ This process was found to be fast and cost-effective. Cloth tables that were the subject of this study were not routinely cleaned with anything and were very porous. The fabric was thick and could theoretically hold dirt, secretions from the human body, and a host of other substances from dust and mites to the bacteria and mold found in the study. The investigators could see visible stains on surfaces of the face pieces and table surface. It is difficult to estimate how these cloth surfaces can be effectively cleaned. In fact, at least one study of fabric-covered furniture in hospital environments concluded that nonporous surfaces were preferred in such a health care setting because of the ability of resistant bacteria to survive prolonged periods in cloth fabric.⁵

Furthermore, the investigators do not see an advantage during treatment to having a treatment table covered in cloth vs other nonporous materials that could be adequately disinfected.

Considerations for reducing risks of infection in chiropractic facilities

Among the easiest procedures a health care provider can practice is regular hand washing or hand sanitizing.⁶ This should go without saying; but studies on hand sanitizing within medical, hospital, and chiropractic teaching environments will suggest there is more to be desired in this area.⁷⁻⁹ Perhaps, steam-cleaning existing cloth tables or spraying with a surface disinfectant could be of some temporary benefit. With that said, it is the opinion of the investigators that these findings noted in this study could be the transient flora of the day. Tomorrow, an entirely separate congregation of pathogens could be present on these tables, depending on who has been treated on them last and what they carried. For instance, *S aureus* is now suspected to be present in up to 40% of patients' anterior nares; and close to 1% of people may carry MRSA strains.¹⁰ Seasonally, many viral pathogens come to mind, including influenza. Currently, the chiropractic profession in the United States does not have a suggested guideline that it has adopted for disinfecting of treatment tables, although there are available models in the literature.^{4,11} With many people living longer with immune compromise from chronic

Micrococcus luteus -Small, round, yellow colonies, Gram(+) tetrads. Grew on MSA at 37°C with 10% NaCl no fermentation. Catalase and oxidase positive.

Propionibacterium acnes -Cream colored, convex, glistening colonies. Gram(+) Irregular, club shaped rod with "Chinese character" arrangement. No spores with spore stain. Glucosefermentation(+), Beta hemolytic.

Staphylococcus epidermidis -Pinpoint, circular, white colonies. Gram(+) spheres in clusters. Catalase(+), oxidase(-). Grew on MSA with 10% NaCl no mannitol fermentation. Coagulase(-), urease(+).

Staphylococcus aureus -Small, circular, carotenoid colonies. Gram(+) spheres in clusters. Grew on MSA with 10% NaCl mannitol fermentation(+). Coagulase(+), Beta hemolysis(+), MRSA (-).

Bacillus Subtilis -Large cream colored, irregular, undulate, umbonate colonies. Gram(+) straight rods. Spore stain showed large oval spores. Amylase(+), Dnase(+), Catalase(+). Fermentation of glucose and sucrose with no gas.

Candida -Isolated colonies grew on Sabouraud Dextrose agar. Simple stain revealed vegetative cells. It is assumed that these are *Candida* since it is so common. However, a positive germ tube test or CHROMagar test would be needed to confirm *Candida Albicans*.

Fig 2. Results of culture plates isolated from cloth table surfaces.

disease in today's health care environment, this becomes even more important.

Conclusion

Pathogens and allergens are present on cloth chiropractic treatment tables and benches. A model for disinfection of all chiropractic treatment tables is needed in the United States. There are templates for this in the literature, but they do not address cloth treatment tables.^{4,11} Based on this study, the investigators feel it is rational to recommend that the chiropractic profession, and other health care professions for that matter, abandon the manufacturing of treatment tables and apparatus covered in porous materials such as cloth. Furthermore, tables currently covered in porous materials should be recovered as soon as would be possible in a nonporous material that is properly suited for disinfection procedures. Vinyl appears to be the most common and suitable alternative.

In addition, the chiropractic profession should adopt a comprehensive infection control program for its teaching institutions as soon as possible and share this with field practitioners. This should include stressing infection control in the educational environment, in clinical training, and with field practitioners. It should include the need to wash hands or sanitize them between every patient contact, wipe tables with a suitable disinfection agent between every patient, and consider gloved hands anytime these appear clinically indicated. Other protocols such as offering workers mandated sick time when sick and appropriate vaccine options may be needed as well. In the meantime, risk reduction related to the spread of infectious pathogens and even allergens to patients and health care workers in chiropractic offices can only be controlled if this problem is addressed. Additional testing of tables used in private chiropractic offices should be undertaken to better estimate the risk to patients and health care workers in this environment as soon as possible.

Acknowledgment

This project would not have been possible without the full support of the Parker Chiropractic College Departments of Academics, Clinics, and Research. The investigators acknowledge each member of these

departments for their support and funding of the research. The entire work is dedicated to the memory of our team member, Dr Alan Campbell, who died just after the completion of this project. Al was a great person and surface pathogen expert who was thrilled to work on this topic. His concern for what might be present on cloth tables led to this investigation after we published work on vinyl table surfaces, and his enthusiasm for microbiology drove this work. He, and his contributions to microbiology and the chiropractic profession, will be greatly missed.

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