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Moxibustion and Indoor Air Quality

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In April 2009, the Tri-State College of Acupuncture (TSCA), hired a private contractor who specializes in environmental air-quality testing, to perform an assessment in the TSCA clinic training room to determine the environmental effects of burning moxa. The college was concerned about possible health hazards from exposure to the smoke or by-products of moxa combustion. This has ramifications for both practitioners and patients alike.

The site of the air-quality assessment is a large open space of 1,032 square feet (24 x 43) with nine treatment tables in curtained booths for use during student clinical training. This room is also used as the community clinic where student interns work treating patients during the internship phase of their training under supervision of licensed acupuncturists. The curtains provide privacy yet have a space of about 12 inches from the floor and about 24 inches from the 11-foot ceiling, which permits some air circulation. This room has a ceiling-mounted active ventilation system, composed of a continuous rectangular metal duct with a large electric-powered fan inside that exhausts the air to the outside. There are intakes in the duct system over each of the treatment tables where moxa may be burned.

For air-testing purposes, the clinic room was set up as it would be for clinic patient treatments, with the curtains drawn, isolating each treatment booth. Four treatment booth locations were chosen to simulate the actual use of burning moxa during clinic training and patient treatments. The active ventilation system was on, as it would be during normal moxa use in the room. The technician sampled the air quality in each booth with the burning moxa, in the hallway between the treatment booths and in the waiting room. The following potential problems were assessed: carbon dioxide (CO2); carbon monoxide (CO); ozone (O3); volatile organic compounds; and particulate matter.

The analytical results indicated indoor concentrations/levels in the acceptable range for all samplings except for particulate matter. The two measured categories of particulate matter were total suspended particles (TSPs) and respiratory suspended particles (RSPs). The indoor measurements of both were higher than outdoors (in New York City) and significantly higher than the recommended indoor/outdoor ratio of 1:3. While the quantity of suspended particles in the clinic room where moxa was burning was high, the air quality in the waiting room was significantly lower. It was also significantly lower than the value for suspended particles in the outdoor air.

The most important finding in the air-quality assessment was the presence of RSPs, which dominated the TSP reading. The presence of this particulate matter is of significant concern and may pose adverse health effects for those individuals who have consistent exposure.

Particulate matter/airborne particles as TSP concentrations represent the largest range of particles. The TSP include: respirable particles (3 microns or less), which can reach the alveolar area of the lungs; thoracic particles (less than 5 microns), which can reach the trachea and all the airways; inhalable particles (5-10 microns), which can reach only the inside of the nose, mouth, trachea and upper airways.

How long particles remain airborne before their sedimentation on interior surfaces, depends on size and weight. Larger particles take only 3 minutes, while other particles may take 4 hours, and extremely small particles may take 5 to 6 days. Heavier particles are deposited on interior surfaces and released into the air when disturbed by human activity. They are removed by cleaning, as smaller suspended particles may be primarily eliminated by means of ventilation and filtration.

It is an indisputable fact that elevated particle content in air increases the load on the airways, and that these particles may be carriers of specific irritating and allergenic agents. The particle content of the air in treatment areas should therefore be kept low, i.e. elimination measures such as good cleaning and good ventilation, including good filtration.

The U.S. EPA and the World Health Organization have both issued statements of concern regarding exposure to air-borne particulate matter. The following is from the EPA Office of Air and Radiation (OAR), Indoor Environments Division (IED):

"Of primary concern from a health standpoint are: 1) small, invisible respirable-size particles, with a higher probability of penetrating deep into the lungs, where they may stay a long time and may cause acute or chronic effects, and 2) larger particles, such as some molds, pollen, animal dander, and house dust allergens, which do not penetrate as deeply, but may cause an allergic response.

Health effects from exposure to respirable-size particles in the air depend on the types and concentrations of particles present, the frequency and duration of exposure, and individual sensitivity. Health effects can range from irritation of the eyes and/or respiratory tissues to more serious effects, such as cancer and decreased lung function."

The EPA statement on exposure to particulate matter and the results of the air-quality assessment of moxa burning in the TSCA community clinic clearly demonstrates the need to monitor the air quality where moxa is used. Colleges and individual practitioners must consider the adverse effects of moxa smoke and develop a plan to advise employees, students and patients in the clinic environment, that exposure to moxa smoke may pose respiratory health risks, and to consider any and all methods to reduce the risks of exposure.

APRIL 2010