



SPECIAL EDITION

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FORMALDEHYDE EXPOSURE IN EMBALMING ROOMS: METHODS OF CONTROL

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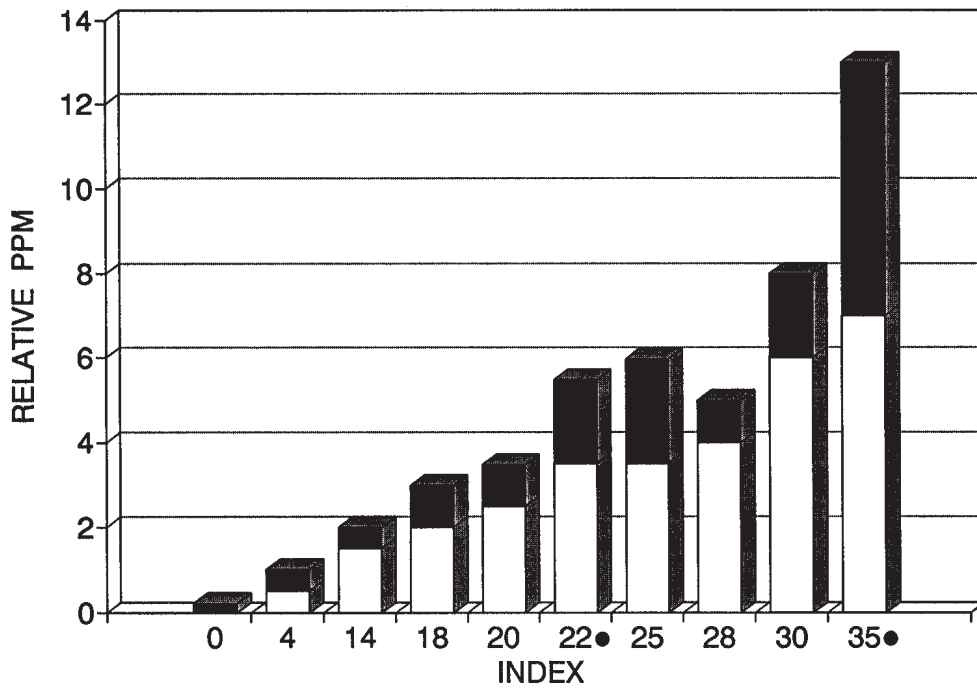
Part 2

DISCUSSION: From an analysis of the findings we conclude that the most important effect in controlling and minimizing formaldehyde concentrations during embalming is good ventilation and the use of proper technique. An adequate ventilation system, combined with techniques of embalming that reduce overall exposure to the concentrated chemical, can reduce the formaldehyde concentrations in air by as much as 85%. Ventilation in most average embalming rooms is probably barely adequate due to the age of the ventilation system and the physical layout of the room. This study indicates that TWA's for well ventilated embalming rooms are well within OSHA standards and the STEL's are more than acceptable. This might not be the case in an embalming room with subpar ventilation coupled with the embalmer not utilizing all techniques available to him to reduce his exposure to the concentrated chemical.

In addition, it is apparent that the total formaldehyde concentration used during embalming is an important factor. Using a fluid with a lower index of formaldehyde results in reduced exposure in excess of 40% when the index is reduced roughly the same amount.

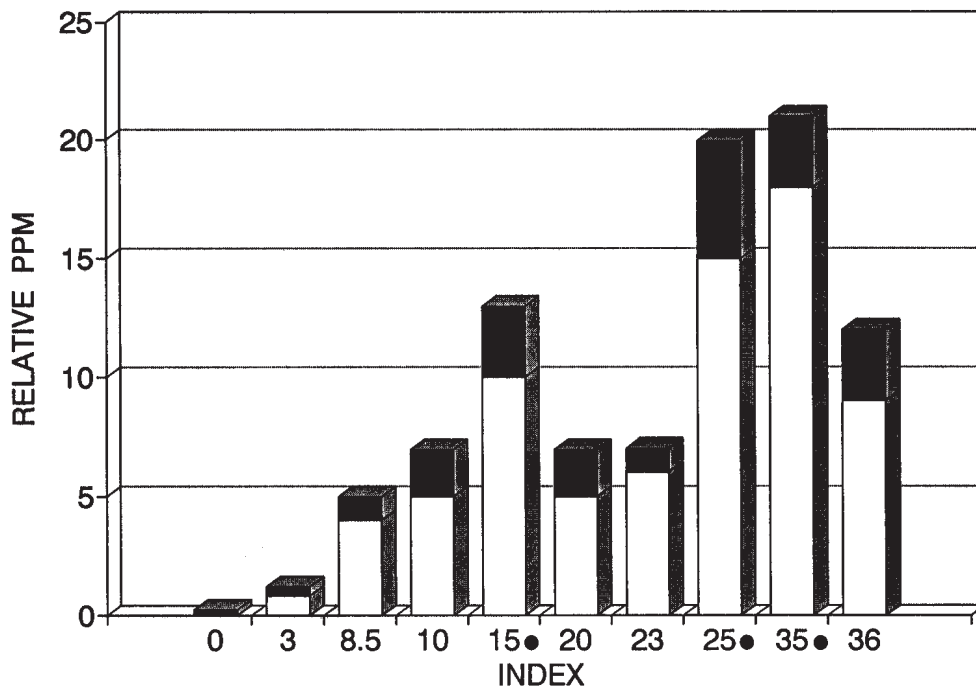
The glutaraldehyde based fluids used in the embalmings generated much less exposure to formaldehyde due to their reduced formaldehyde index. This effect was achieved without compromising sanitation or preservative value. Reduction could be achieved by just lowering the amount of formaldehyde based fluid used but in most cases preservation or sanitation would be compromised. The TWA's and STEL's are very low and would probably not be a critical factor even in embalming rooms with poor ventilation and the use of poor vapor control techniques. From reexamination of Graph 3, it is obvious that embalming under a worst case situation of no ventilation and no techniques of vapor control can still result in exposures that are so low as to be on the edge of detectability (0 - <.2ppm). This was accomplished by the use of a glutaraldehyde based arterial fluid that was very low in formaldehyde combined with a glutaraldehyde based cavity fluid that was extremely low in formaldehyde (0-3%).

GRAPH 4



● denotes high methanol

GRAPH 5



By comparison of the arterial fluids readily available to embalmers, it is obvious that the total concentrations of formaldehyde measured in the air are directly related to the index and quantity of the concentrated fluid used. The ppm values in Graphs 4 and 5 are arbitrary and are not the values that would be obtained if the fluids were to be used in an actual embalming. The values do, however, establish a relative scale for comparison. The cavity fluids tested show basically the same relationship to index as does the arterial fluids tested. The range of readings (again arbitrary) was much greater because of the tendency to be higher in formaldehyde content and their being typically used full strength without any dilution. Some arterial fluids and more cavity fluids showed higher readings than expected on the basis of formaldehyde percent. This effect, we believe, is due to increased volatility resulting from a higher than average methanol or other volatile chemical content in these fluids. The higher readings result from more rapid dispersal of formaldehyde into the atmosphere.

IN SUMMARY: Institute adequate ventilation in your embalming room. Attempt to maximize air flow and total hourly air exchanges. Make sure that you have a source of return air for your ventilation system to achieve maximum efficiency. An exhaust fan pulling against a tightly sealed room or a negative pressure is very inefficient. Sometimes a return air source is no more difficult to install than an additional vent. Attempt to place the exhaust fan, if possible, low to the floor and close to the source of most fumes and in a position where no contaminated air is forced past the embalmer. Use good vapor control technique during all embalmings. Always irrigate the table, keep all lids on fluid bottles and the embalming machine, rinse all spills immediately to the drain and try to reduce spills during cavity treatment.

Attempt to reduce your total concentration of formaldehyde used during embalming by the use of glutaraldehyde based fluids that are low in formaldehyde. Consider fumeless, low index formaldehyde fluid or lesser quantities of higher formaldehyde index fluids but be certain that you do not compromise sanitation or preservation if you substitute fluids that lower formaldehyde but do not replace it with glutaraldehyde or other preservatives. All embalmers should strive to reduce their exposure to formaldehyde in the embalming room. The atmosphere you create in the embalming room will affect you the rest of your life.

This study naturally leads to another very important question. What are the effects of glutaraldehyde exposure in embalming rooms? That is a whole other story and the results are most surprising.

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