

The Permeability of the Open Drop Mask

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The open drop method for administering ether is a frequent choice in pediatric anesthesia. The major advantages of this technique are the simplicity, the absence of re-breathing and the minimal resistance. The latter depends on the thickness of the gauze layer covering the wire mask. Thick layers hinder the perhalation and require greater respiratory work on the part of the patient. To minimize this it is generally agreed that the mask should be covered by not more than 4-8 layers of gauze for infants and small children.

We have noticed that drops of diethyl ether, divinyl ether, halothane or methoxyflurane may penetrate the mask. The velocity of the drop is directly proportional to the dropping height (a falling body accelerates 980 cm./sec.²). When the moving child's small head is "splinted" between the administrator's elbow and the other hand, the volatile agent may be unwittingly dropped from a considerable height. The velocity gained from this height will allow ether in a liquid state to fall on the patient's face; the 4 to 8 layers of gauze serve only to break up the drops into smaller ones.

The higher the velocity the more liquid will penetrate through the mask. To demonstrate

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this diethyl ether colored with Lugol's solution was dropped on a pediatric size wire mask covered with 4 layers (240 mesh) surgical gauze from different heights at 80-100 drops per minute for 2 minutes. Increasing the height resulted in an increasing staining of the white filter papers placed below the mask.

A relation exists between the number of the layers of gauze and the distance for this "breaking through" effect. Using increasing number of layers on the mask, we measured the distance from ether can to mask at which the ether droplets became visible below the mask. Table 1 was obtained at room temperature (20° C.).

It is worthwhile to remember that, when administering volatile liquid anesthetic agents by the open drop method for infants and children, the dropper of the container should be not more than an inch or two above the mask.

TABLE 1

Layers (240 Mesh Gauze)	"Breaking-Through" Point (cm.)
2	3
4	5
6	7
8	14
10	25
12	35
14	100

The names and addresses of some of the equipment described in the gadget section may be obtained from the Journal office: ANESTHESIOLOGY, J. B. Lippincott Company, East Washington Square, Philadelphia, Pennsylvania 19105.