

of heavy duck cloth 5 cm. wide has been stitched around the upper inner margin of the canopy, thus reinforcing it as well as keeping the walls of the canopy apart.

The canopy may be quickly dropped by detaching the hangers from the brass eyelets, if necessary for the administration of any nursing care not accomplished through the open top. The canopy may be promptly replaced and an adequate concentration of oxygen re-established.

For use on adults the canopy may be provided in front with a collar and zipper mechanism through which the head may be inserted.

If a cooling effect is necessary, a metal container filled with chipped ice and containing at its lower aspect a drain and

tubing leading to a pail, may be suspended by a short chain from the horizontal bar (A).

This type of oxygen equipment has been found particularly satisfactory in the treatment of infants and small children but may be employed with certain adult individuals. The cellophane canopy makes the patient visible at some distance, which is of particular value in the treatment of children. This device has been found simple and economical to construct, and a remarkably high concentration of oxygen can be maintained with a comparatively low liter flow.

GEORGE A. KNEELAND, A.B., M.T., AND
HUBERTA M. LIVINGSTONE, M.D.,
*The University of Chicago Clinics,
Chicago, Illinois*

MANUFACTURE OF AN ENDOTRACHEAL CATHETER CUFF

The use of an endotracheal catheter in anesthesia is an established practice. The use of an inflatable cuff on the catheter is also an accepted technic. Frequently the cuff leaks at an inopportune moment. A procedure has been developed for the manufacture of an endotracheal catheter cuff which reduces the incidence of leak to a minimum.

I have found two sizes of cuff to be adequate, the 32 and 38 gage French endotracheal catheters. For the smaller catheter, a cuff made from 3/8-inch Penrose drain is satisfactory. The larger catheter requires a cuff made from 1/2-inch Penrose drain.

The materials needed for the manufacture of the cuffs are:

- 1 Ea. Tube of thick rubber cement
- 1 Ea. Length of 3/8-inch Penrose drain, new
- 1 Ea. Length of 1/2-inch Penrose drain, new
- 1 Ea. 32-gage endotracheal catheter
- 1 Ea. 38-gage endotracheal catheter
- Several 8-gage French rubber urethral catheters
- 1 Ea. 22-gage French urethral catheter
- 1 Ea. Pair of scissors
- 1 Ea. Can of ether
- 2 Ea. Mosquito forceps

A number 8 urethral catheter is used rather than rubber tubing because it is more durable, does not collapse and can be used again. The same size layer of Penrose drain is used for both layers of cuff.

The base layer of drain is cut 5 cm. long and the outer layer is cut 4.5 cm. long. The tip of the number 8 catheter is cut off and two holes are cut in the sides near the end. The catheter is then cleansed with ether.

The cut drain is slipped onto the 22-gage catheter and rolled onto the proper size catheter, as shown in figure 1 (a larger catheter than 22 was used for photographic purposes).

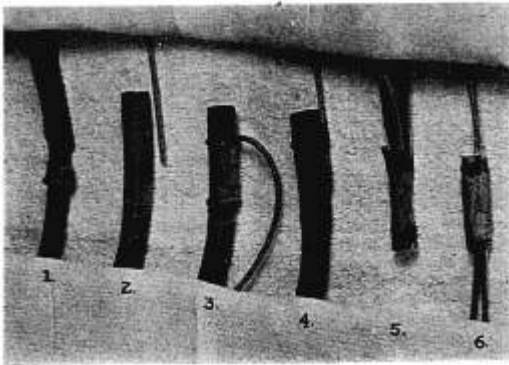
The base layer of Penrose drain is rolled onto the catheter rather close to the edge as shown in figure 2. The outer layer is then rolled on top in the middle of the base layer.

The outer layer of drain is rolled up on the end away from the edge of the catheter and held with the fingers while it is being cleansed with ether. Thick rubber cement is placed on the drains at the junction of the rolled edge and well out on the base layer. It is well to place the cement well up on the rolled edge. The cement is allowed to dry. The outer drain is rolled all

the way back to allow the placing of the number 8 catheter. The outer layer is then unrolled to make a cuff of 2.5 to 3 cm. from cement to cement. The roll is held with the fingers while the drain is again cleansed with ether. The rubber cement is applied first around the number 8 catheter which is then moved back and forth to get cement under it as well as on top. Cement is applied at the junction of the two layers as at the other end. The

dry, a second is put on in the same position. This is repeated as many times as necessary. Usually only two or three applications are needed with thick cement.

Finally, a fresh layer of cement is run around the rolled edge and the outer layer unrolled. The whole cuff is then rolled off the catheter. Care is taken to keep the thumb at the end of the catheter as the cuff is rolled off, lest the cuff unroll inside out.



cement is allowed to dry, with the number 8 catheter in the position shown in figure 3.

A second layer of cement is applied to the rolled drain and base layer away from the catheter end, and the outer layer unrolled immediately. The excess cement is wiped off.

The number 8 catheter is placed in the position shown in figure 4. Pressure is applied to make it adhere to the cement on the base layer. A large glob of cement is placed on either side of the catheter at the junction of the rolled edge and base layer. The purpose of this glob is to build up a layer to fill the space between the base layer and outer layer produced by the catheter. After the first two globs

Mosquito forceps are applied as close to the number 8 catheter as possible, as shown in figure 5. After twelve to twenty-four hours the forceps are removed, the ends of the cuff trimmed and the whole powdered with talc.

If the two layers of the cuff are adherent on the initial inflation, they can be forced apart by pressure. The sticking can be prevented then by the insufflation of a small dip of the talc into a balloon of the cuff.

The cuffs can be slipped on the catheter for use by spreading with a long intestinal forceps.

CHARLES C. WYCOFF, M.D.
San Francisco, Calif.