A Fiber-Optic Illuminated Suction for Use in Neurosurgery

Technical Note

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Deep dissections in neurosurgery are often hampered by inadequate lighting. Although a head lamp, lighted retractor, and strategically placed overhead lights can usually be coordinated to provide the needed illumination, they are often cumbersome, and in situations where the exposure changes or is particularly difficult, good lighting may be nearly impossible. Because the suction device is so frequently used in such wounds to debride, aspirate, and dissect, it was felt that placing an additional light source directly in the hand of the surgeon would be an advantage. This could be done without additional instrumentation by mounting a light on the suction. Important considerations in the design of such an instrument included limitation of bulk and weight of the instrument as well as the need for it to be free of heat and limiting connections.

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The instrument (Fig. 1) is a small standard suction device (No. 7) which has been coated about its circumference with light-conducting glass fibers down to a point 6 mm from the tip, where bare metal is available for electrocoagulation.* This ring of fibers provides a spot of intense, cold, white light that is 60 mm in diameter when the suction is held 1 cm from the surface of the wound. As the suction is brought closer, the circle proportionally decreases until at contact with the surface of the wound the circle illuminated has a diameter of 20 mm. The glass fibers are packed in a compact bundle about the shaft, cemented, and cured by a process that allows the suction to be autoclaved without collecting water between the shaft and fiber bundle. The fibers and remainder of the suction are coated by an in-

* This instrument is not yet commercially manufactured but is available on order from Flexi Optics Laboratories, Somerville, Massachusetts.

Fig. 1. The fiber-optic illuminated suction instrument.
Fiber-Optic Illuminated Suction Device

sulating elastomer. Connecting the fibers to a variable high-intensity light source is a fiber-optic light carrying cord 100 cm long, allowing the source to be well out of the sterile operating field. This cord can be gas autoclaved, and it has been our practice to gas sterilize the entire suction-cord assembly as a unit. The light source is a General Electric 150 W reflecting-type projector bulb mounted in a fan-cooled housing and fitted with standard non-spark operating room connections. When working in a particularly bloody field, the tip of the fibers must be periodically cleaned by rinsing with irrigation or by wiping with moist cottonoid.

This instrument has been used to show the walls of intracerebral hematomas, to identify bleeding points beneath the bone flaps in subdural hematomas, to demonstrate the Gasserian ganglion, to illuminate aneurysms of the anterior communicating artery for clipping, to help locate dural defects in CSF leaks, to illuminate the lateral and third ventricles for removal of a colloid cyst, and in other procedures where external lighting could not be ideally coordinated.

Photocoagulation through a specific portion of this fiber-optic ring would also be possible, and such a system is under study.