accomplished with difficulty. The return flow from this patient was free, and resembled the return which is experienced when a spinal anesthetic is given.

Conclusion: In a series of 405 caudal anesthesias one patient was found to have a dura that terminated below the level of the second sacral foramen. Aspiration in several planes is absolutely essential to determine whether the point of the needle has perforated the dura.

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A DIRECTIONAL SPINAL ANESTHESIA NEEDLE

Kirschner in 1931 described a needle for spinal anesthesia with an opening in the shaft just proximal to the beveled closed end. Such a needle was recommended to aid in the more accurate control of the duration and extent of anesthesia since it could be manipulated to permit the injection of solution in a stream flowing parallel to the long axis of the spinal fluid column rather than against the side of the canal opposite puncture. Others have utilized such a needle (W. W. Dill, W. T. Lemmon), but it has not gained widespread popularity. A similar needle * (fig. 1) has been evaluated critically in the laboratory and clinic.

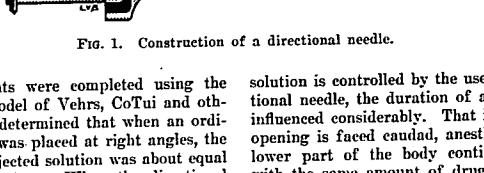

FIG. 1. Construction of a directional needle.

Experiments were completed using the glass tube model of Vehrs, CoTui and others. It was determined that when an ordinary needle was placed at right angles, the spread of injected solution was about equal in both directions. When the directional needle was inserted so that the opening faced caudad, the spread was predominantly in that direction; if cephalad, it was toward the head. It was determined also that the angle at which the directional needle was placed with respect to the long axis of the column of spinal fluid was of slight consequence in influencing the direction of greatest spread of solution. With the standard needle this factor extensively altered the spread.

The directional needle was used in clinical anesthesia with a technic that varied only in the direction in which the opening faced. An average in extent of anesthesia of seven dermatomes' difference was recorded when the injection was placed caudad or cephalad. In patients receiving spinal anesthesia on two occasions with the opening in opposite directions the difference averaged eight dermatomes.

It was determined also that when the predominant spread of the injected anesthetic solution is controlled by the use of a directional needle, the duration of anesthesia is influenced considerably. That is, when the opening is faced caudad, anesthesia of the lower part of the body continues longer with the same amount of drug than when the opening is faced cephalad or a standard needle is used. If the opening is toward the head, the duration of anesthesia will be greater in that direction. A complete report of these studies is in press (*New York State Journal of Medicine*).

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* Needle was supplied by Becton, Dickinson and Company.