TECHNIC OF PREFRONTAL LOBOTOMY

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Prefrontal lobotomy was first described by Moniz as a desirable procedure for the relief of suffering in patients with serious mental aberrations. Freeman and Watts were instrumental in popularizing the procedure in this country even though there was considerable skepticism on the part of other neurosurgeons and psychiatrists. The relatively blind technic used by Moniz was definitely improved by Freeman and Watts; even though it remained blind they became extremely accurate in incising the white tissue that they wished to sever. Lyerly adopted a more adequate exposure. If bleeding occurred he was able to expose the region by means of a speculum.

It seems timely to describe a technic for prefrontal lobotomy that I have used since 1943 in 470 patients. An operative mortality of 1 per cent indicates its degree of safety. The technic employed appeals to the neurosurgeon because of its simplicity and the rapidity with which it can be executed. Most important, however, is that the white tissue is visualized as it is divided with the electrocoagulation suction unit.

The following technic has been instituted in all cases. The anterior half of the scalp is shaved and prepared for operation, with the patient usually under light pentothal sodium intravenous anesthesia. This minimizes the apprehension of an already markedly apprehensive or agitated patient. With the patient in a semi-Fowler position, the scalp is infiltrated with 1 per cent procaine in the region in which the incision is to be made. No elaborate measurements are taken since the dimensions of all skulls vary greatly. Visible anatomical landmarks are used, such as the pupil of each eye and the coronal suture line which can readily be seen after the scalp has been shaved. Two parallel incisions, usually 4 cm. in length, in a sagittal plane are made in line with the pupil of each eye, extending just to the anterior border of the coronal suture on each side (Fig. 1 a). The scalp edges are retracted with a self-retaining mastoid retractor and a button of bone, 2.5 cm. in diameter, is removed by means of a specially built trephine which is attached to an ordinary brace such as that used in the Doyen drill. The center of the trephine opening is usually 3 cm. anterior to the coronal suture. The dura is opened with a semicircular incision, with the pedicle toward the midline. The dural edges are kept securely fastened with a suture through the edge of each by crossing a black silk suture over the midline. A wedge of cortex is cleanly excised by means of the electrosurgical unit through each opening, thus exposing the white tissue (Fig. 2 a). A ventricular needle is inserted in the direction of the edge of the lesser sphenoid wing in line with
Fig. 1. (a) The line of incisions and the trephine button of bone, which is removed and replaced at close of operation, are demonstrated. (b) The plane of leukotomy is shown as executed by the electro-surgical suction apparatus under direct vision by means of a lighted brain retractor.
Fig. 2. (A) A wedge of cortex has been removed by means of the electrosurgical suction unit. (B) Ventricular needle has been inserted with its tip in contact with the posterior edge of the lesser wing of the sphenoid process. (C) The needle track is used as a guide for the direction of the plane of white tissue that is to be incised. (D and E) A straight spatula is used to complete the leukotomy after a channel about 3 cm. wide has been made in the white tissue to the inferior portion of the frontal lobe.
Fig. 3. The extent of incision with spatula is shown.

Fig. 4. Since the spatula does not incise all the white tissue in the digitations nor the upper outer quadrant, the latter is divided with a curved suction tip. The white tissue in the digitations is divided under direct vision with the electrosurgical unit. The cortex covering the gyri is incised as noted.
the anterior horn of the lateral ventricle (Fig. 2 b). If the lateral ventricle is normal in size, the needle will just skirt the anterior edge of the anterior horn. As is the case in many of these individuals, however, the ventricular system is enlarged owing to atrophy, and the ventricular needle may enter the ventricle. In such instances it is a simple matter to withdraw the needle and direct it slightly more anteriorly; even though the edge of the sphenoid wing may not be reached in that manner, the point of the needle will then contact the orbital plate. The needle track serves as a guide in the location of the ventricle and also the depth to which one wishes to go (Fig. 2 c). The needle track is then followed with the electrosurgical suction instrument and the white tissue divided in a sweeping motion from side to side. This procedure is performed under direct vision, care being taken that all tiny bleeding points are controlled. In most individuals there are few bleeding points; in others, however, the tiny vessels in the white tissue may be numerous and especially just anterior to the tip of the lateral ventricle. The needle opening is followed down to the cortex on the inferior surface of the frontal lobe (Fig. 1 b). Arterioles that emerge from the anterior horn and fan out into the contiguous white tissue present a valuable guide as the white tissue

![Diagram of brain surgery](https://example.com/diagram.jpg)

*Fig. 5. The method is shown of closing the dural flap with a hammock of two strips of gelfoam to prevent leakage of cerebrospinal fluid and seepage of blood from the incision into the cranial cavity.*
is incised. The ependyma of the ventricle appears as a thin, translucent membrane. It may readily be depressed in a caudad direction so that if the ventricle is dilated, the white tissue immediately beneath the anterior horn of the lateral ventricle can be incised to the edge of the lesser wing of the sphenoid process. Great care is taken to be certain that all the white tissue is divided on the medial inferior quadrant to the lateral ventricle, and this is completed under direct vision with a lighted brain retractor. The white digitations in the gyri can readily be seen and divided.

The leukotomy is completed by means of a blunt speculum (a straight brain spatula is used; Figs. 2d and e and 3). Division in the lateral upper quadrant must be completed with a curved instrument. A small caliber suction tip lends itself well since it has a smooth point and readily can be bent to the desired angle (Fig. 4). The medial half can be completed by means of the electrosurgical coagulation unit. All bleeding points, even though slight, are carefully controlled.

Great care should be exercised at all times to avoid injury to the larger arterial branches. Evaluation of the results obtained by the section of the white tissue in the area described is of very slight value if segments of brain tissue are devascularized in regions distant to the actual leukotomy.

The incisions made through the white tissue are thoroughly irrigated with saline solution to remove any small bits of fragmented brain. The dura is closed with two interrupted black silk sutures, and a hammock of gelfoam is placed immediately beneath the dural flap (Fig. 5). This serves to seal the loosely sewed dura and prevents blood from entering the cranial cavity after operation. The bone buttons are then replaced and the scalp sutured with two layers of interrupted black silk. A light dressing, firmly attached with elastoplast bandage, has been entirely satisfactory in our cases. A thread of silk is placed beneath the interrupted sutures as suggested by Borden.2 This facilitates the removal of the sutures in a patient who may be uncooperative. The extent of the leukotomy may be varied according to the symptoms of the patient. I have found it necessary in patients with intractable pain from malignant disease to incise the white tissue beneath the anterior horn posteriorly to the tip of the caudate nucleus.

Lobotomy is indicated in patients with mental disorders who do not respond to conservative psychiatric measures. The extent of its role can be determined only by thorough investigation of patients before and after operation. Patients with extensive malignant lesions resulting in incapacitating and uncontrollable pain may be dramatically relieved from their suffering by lobotomy. Considerable care must be exercised in selecting patients for the procedure. Perhaps it would be better to state that very slight if any improvement can take place in any patient who is apathetic toward his condition. Since lobotomy relieves tension, self-concern and fear, it is necessary that the patient is actually tortured by his self-concern over his condition. I feel strongly that it is the neurosurgeon's duty to perform the operation as safely and accurately as possible, but that the burden of deciding whether a
mental patient should be subjected to the procedure falls on the shoulders of competent neuropsychiatrists who have had an opportunity to study many patients before and after operation.

No neurosurgeon wishes to be a technician only. In most instances, however, the neurosurgeon has not had the proper training nor has he the time to devote the many weeks and perhaps months of intimate contact with the patient and his relatives to reach a just decision. Therefore, he is not in a position to weigh justly the merits for or against operative interference.

It is not enough to study the patients after operation only from the psychosomatic standpoint; they must also be studied from the neurophysiologic aspect.

The psychiatric training of a patient following lobotomy also is important and many satisfactory results may be obtained by adequate instruction of patients who otherwise might be listed as failures.

The results in 100 patients subjected to prefrontal lobotomy by the above described technic have been published by the Boston Psychopathic Hospital group. The results in 470 patients are being reviewed at the present time.

REFERENCES