

## THE TECHNIC OF THE LABYRINTH OPERATION.\*

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The various methods of opening the labyrinth are so well known, that it is hardly necessary for me to make very extensive remarks on this subject. It has occurred to me, however, that certain methods may be applicable to certain forms of labyrinthine disease, and for this reason I wish to call your attention for a few moments to the various methods which may be employed for opening the labyrinth for the relief of various labyrinthine conditions.

We have to deal with: (1) limited suppuration of the labyrinth; (2) diffuse suppuration of the labyrinth, with extension to the meninges, producing a meningitis; and (3) with certain non-suppurative conditions which may demand labyrinthine operation. I refer to those labyrinthine lesions, the prominent symptom of which is vertigo. Manifestly, the technic which might be required for the relief of a labyrinthine suppuration, the extension of which would terminate in meningitis, would be quite different from that required either in a case of circumscribed labyrinthitis or in a case where the labyrinthine lesion had never been suppurative, but had been a non-suppurative condition from the onset.

I shall describe, therefore, various methods of entering the labyrinth for the relief of certain pathological conditions: 1. A method for entering the labyrinth in cases of suppurative labyrinthitis, with probable extension to the meninges. 2. Methods of dealing with circumscribed areas of labyrinthine caries in which no general symptoms have been present. 3. A method of dealing with diffuse labyrinthitis with no symptoms of extension to the meninges. 4. Methods of opening the labyrinth in cases of chronic non-suppurative inflammation of the labyrinth, where the operation is performed simply for the relief of vertigo or, possibly, for the combined symptoms of vertigo and tinnitus.

For the first condition, that is suppurative labyrinthitis with symptoms of beginning meningitis, the best operation available at the present time is the one devised by Neumann. In this procedure the complete radical operation is first performed and the facial ridge lowered to its extreme limit. The dura in the middle cranial fossa is then exposed over the tympanic and tympano-antral roof, and the

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lateral sinus is exposed from a point just above the knee to as near the jugular bulb as possible. This leaves us a triangle, commonly known as Trautmann's triangle, bounded behind by the lateral sinus, above by the dura of the middle cranial fossa, and anteriorly by the ridge of the facial nerve. The dura is next carefully separated from the overlying bone in front of the sinus by means of a director and a protector, preferably the blade of a medium-sized curette, inserted between the dura and the bone. The bone overlying the curette is next carefully removed by means of the gouge and mallet, the strokes of the mallet being directed downward against the protector so as to prevent injury of the underlying dura. This procedure is carried regularly forward toward the facial ridge until the two limbs of the posterior semi-circular canal are opened. Next, three openings appear representing the two limbs of the posterior semi-circular and a transverse section of the horizontal semi-circular canal. The removal of bone is gradually continued forward towards the facial ridge until one of the openings of the posterior semi-circular canal becomes an elongated slit. This shows the section of the *ductus communis* between the superior crus of the posterior semi-circular and the corresponding crus of the superior semi-circular canal. A fine probe is then inserted into the cross-section of the canal and carried into the vestibule. The openings of the cross-section of the canal are then enlarged in the direction of the vestibule until free vestibular drainage is obtained,—that is, until the ordinary probe will enter the vestibule. This drains the static portion of the labyrinth. The auditory portion of the labyrinth is easily drained by removing the thin layer of bone between the oval and round windows by means of a small gouge. This operation is of use when a suppurative meningitis, resulting from a suppurative labyrinthitis, seems imminent. The removal of bone should be continued below the facial ridge until the auditory nerve at the internal auditory meatus, is reached. The incision of the dura in the immediate neighborhood of the internal auditory meatus will drain the primary focus of infection and, if the operation be performed early enough, may avert a fatal meningitis.

Unfortunately, while theoretically correct, the number of cures reported as the result of this operation are very few. In my own experience the operation has been devoid of value, as far as averting meningitis is concerned. As a method of draining a rapidly advancing purulent labyrinthitis the method is of great value.

In cases of circumscribed labyrinthitis, which are occasionally found at the time of the radical operation,—where a small, carious

area has been found in one of the semi-circular canals, usually the horizontal, and in which no labyrinthine symptoms have been present, or in which the only symptom has been the fistula symptom,—it has been my practice simply to curette the diseased area in the horizontal semi-circular canal, so as to remove all diseased bone, but not to open the canal so widely that the barrier which nature has erected for the preservation of the life of the patient is destroyed. Such a localized curettement of a semi-circular canal has been followed, in my experience, by absolutely no symptoms, and these cases have invariably terminated favorably. It has been my practice to carry a separate strip of iodoform gauze down upon the curetted area, in order to block this off as much as possible from the general radical cavity, so as to prevent subsequent infection of the labyrinth from the radical cavity. In one case of this character the curettement was extended so that the probe entered the vestibule through the external semi-circular canal. In this instance, the entire tympanic cavity was covered by an epithelial graft as well as the posterior mastoid cavity, and the gauze packing was brought out between these two grafts. This case made a perfect recovery, with no labyrinthine symptoms.

The method which I have practiced in draining cases of diffuse labyrinthitis, with no symptoms of extension to the meninges, is perhaps the simplest procedure. This consists in: (1) the performance of the ordinary radical operation, with lowering of the facial ridge to its extreme limit; (2) the horizontal semi-circular canal is opened at its most prominent portion, and a probe inserted into its lumen. By chiseling downward and slightly backward, so as to avoid the facial nerve, the vestibule may be entered. Drainage of the cochlea is performed in exactly the same manner as described in the previous operation, namely, by the removal of the thin lip of bone separating the oval and round windows. This, of course, opens the first and second turns of the cochlea.

Two other methods of entering the labyrinth have been attempted in work upon the cadaver, for the purpose of finding out whether, in cases where the static labyrinth might require operation for the relief of vertigo in non-suppurative cases, a simpler operation is not available. In these cases we are operating in a practically sterile field, and unless the case is infected at the time of operation, or unless, as might happen, the area of operation is infected through the Eustachian tube, the conduct of the procedure should be possible as a thoroughly aseptic operation. It is perfectly possible to open the vestibule thoroughly below and behind the prominence of the

horizontal semi-circular canal, without performing the radical operation. The procedure is rather difficult, and the field of operation contracted. I have never performed the operation upon the living subject, but from work done upon the cadaver I believe that the vestibule can be opened and thoroughly curetted in this way. This procedure should be of value in cases of aural vertigo which resist all other methods of treatment.

Another means of entering the labyrinth which has appealed to me in experimental work is that of entering the vestibule through its superior surface. In this operation, the horizontal semi-circular canal is exposed as the result of a complete mastoid operation. The mastoid operation should be continued so as to thoroughly expose the zygomatic cells, in this way giving a broad exposure of the tympano-antral roof. Such an exposure is necessary for the perfect conduct of the operation. The dura is next exposed in the middle cranial fossa by the removal of the tympano-antral roof. The bone covering the dura is next removed directly inward until the prominence of the superior semi-circular canal appears. This eminence is easily demonstrable if the dura is carefully raised from the surface of the petrous pyramid by means of a thin retractor. If, now, the gouge is applied over the prominence of the horizontal semi-circular canal and the superior surface of the petrous pyramid removed,—that is, if the superior wall of the horizontal semi-circular canal be removed and this removal is continued along the superior surface of the petrous pyramid,—the superior semi-circular canal will be opened. Removal of the fragment of bone which comprises the roof of the superior semi-circular canal will open the roof of the vestibule. The use of the curette in this region will then enable the operator to thoroughly destroy the canals and the terminal filaments of the auditory nerve lying in the superior and horizontal canals as well as in the vestibule. Similarly, the posterior canal may be thoroughly extirpated along the lines already laid down in the Neumann operation, that is, leaving the tympanic contents intact.

This operation appeals to me as possibly the ideal one in dealing with cases of aural vertigo due to a non-suppurative labyrinthine lesion. I have not performed the operation upon the living subject but its performance upon the cadaver is so simple as to recommend it in cases where we are operating in an aseptic field. Such an operation thoroughly destroys the contents of the horizontal canal, the superior canal, and the vestibule, and should be the ideal operation in cases of this character. Moreover, this operation can be performed without a preliminary radical operation. In other words,

it can be accomplished through the ordinary mastoid operative field if the operation is made to include the zygomatic cells, without taking down the posterior wall of the external auditory canal, that is, without the performance of the ordinary radical operation.

These last two procedures, naturally, do not permit of any interference with the auditory portion of the labyrinth.

If the cochlea is to be opened, it is imperative, in most cases, that the complete radical operation be done in order that the operator may obtain a perfect view of the promontory and to enable him to remove the bony wall of the first and a portion of the second turns of the cochlea, by taking down the bridge of bone which separates the oval and round windows. Such an interference with the cochlea would not be necessary in cases suffering simply from vertiginous symptoms.

I believe we are about to arrive at a point where labyrinthine exploration will be a procedure of election in certain cases of impairment of hearing, progressive in type and involving the labyrinth. This remark is more in the nature of prophecy than along the lines of clinical experience, but I sincerely hope that at some future meeting I may have something to say regarding procedures of this character, having for their object improvement of impaired hearing in cases which have otherwise resisted all efforts on the part of the surgeon.

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**Foreign Body Tolerated in the Esophagus for Twenty-seven Days Without Marked Reaction.** G. LIEBAULT, *Revue hebdomadaire de Laryngol.*, April 5, 1913.

The foreign body was a plate, holding artificial teeth, which was located in the esophagus by means of the esophagoscope. Efforts of removal by the buccal route proved so difficult that a retro-thyroidean laryngotomy was planned, when the foreign body was finally removed by the esophageal forceps. In spite of the prolonged pressure of the foreign body there was very little sign of irritation and no abscess or suppuration. SCHEPPÉGRELL.