

NEW OPERATION AND INSTRUMENTS FOR DRAINING THE FRONTAL SINUS.*

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Acute suppurative inflammation of the frontal sinus generally heals without operation on the sinus provided obstructions to the escape of the pus from the lower end of the canalis naso-frontalis are removed and I believe that in the majority of cases chronic supuration of this cavity would soon cease under simple measures if there was free drainage. At all events free drainage is necessary in every case whether or not curetting of the cavity is required, and the more easily this can be secured, the better. In my experience most patients refuse to have an external operation performed, probably on account of their dread of the resulting scar, and they can only be driven to it by intolerable pain or by external deformity due to the disease.

In nearly all cases, a probe may be passed from the naris into the frontal sinus after the anterior portion of the middle turbinated body and any pathological obstructions have been removed. Whatever operation is to be performed, all these obstructing conditions should first be eliminated, therefore, very few cases remain in which a simple and safe intra-nasal operation that will establish free drainage is not eminently desirable.

I desire to present such an operation for your consideration without taking time to refer to any of the other well known operations. In a word my operation consists of passing a steel pilot through the natural canal into the frontal sinus and running in over this a hollow burr by which a canal 6 m.m. in diameter is made, and then inserting into this canal a self retaining gold tube so large that the pus will necessarily drain and that the patient may easily wash out the sinus.

In performing the operation, I first introduce a small silver canula and wash out the frontal sinus with a 50% solution of the commercial solution of peroxide of hydrogen, warm; I immediately follow this with a warm saturated solution of boric acid. I then inject into the sinus slowly, five to ten minims of the following solution which trickles down about the canula and anaesthetizes the field of operation. Atropin gr. 1/10th, Strophanthin gr. 1/5th, Suprarenalin,

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gr. 1/5, Oleum Caryophylli m.iii, Acid Carbollic gr. X, Cocaine Hydrochlorate gr. xcvi, Aqua. Dist. ad. f oz. i. I then introduce the steel pilot Fig. I, A, which is no larger than an ordinary probe, and with the patient in the sitting position, administer chloride of ethyl for a minute or two, which insures complete anæsthesia. The handle is removed from the pilot and the hollow burr Fig. I, B, (which has already had a flexible sheath. Fig. I, C slipped over it and been attached to the chuck of a dental engine) is slipped over this pilot into the naris and up to the lower end of the naso-frontal canal. Gentle continuous pressure is then made, the electric current is turned on and within a few seconds the frontal sinus has been entered. In some operations I have used the chloride of ethyl and in others have relied on local anæsthesia, which appears to be sufficient. Before turning on the power one should note just how much of the proximal end of the burr protrudes from the nostril, otherwise he will not realize when it has passed into the sinus and he may waste a lot of time (as I did in one operation) in the impossible effort to



Fig. I. Ingals' Pilot Burr; two-third size. A, pilot; B, burr; C, shield.

make it go farther. One can not recognize the drilling of the bone by either the sound or the feeling of the instrument. As soon as the sinus has been entered the burr is withdrawn and a packer, (similar to a uterine packer) the end of which has been bent to the same curve as the pilot, is introduced and through it the frontal sinus is packed and dried by a strip of absorbent gauze an inch in width which is left long enough to stop any bleeding. The gauze is then withdrawn and a similar strip saturated with 95% of carbolic acid or with 10-20% solution of chloride of zinc is introduced in the same way and allowed to remain a few minutes. The packer is then withdrawn about an inch to insure thorough cauterization of the whole canal, and the strip is then drawn out, through the packer, so as to avoid cauterizing other parts of the nasal cavity. The gold tube, Fig. II, (the upper end of which has been sprung together and covered with a gelatine capsule) is then slipped on an applicator and passed up the canal until stopped by its lower flaring end. A probe is now pressed up against the end of the tube and the applicator is withdrawn. For recent operations I have used the shield C, Fig. I,

which has been made a spiral tube throughout its whole length, to put over the applicator as a check to prevent the gold tube from slipping too far on it. When the gold tube has been placed in the canal it is crowded off the applicator, as the latter is withdrawn, by pushing the spiral tube upward. Within half a minute the gelatine capsule will dissolve and the end of the tube will have opened out so that it will be retained. The operation is then complete. I give the patient a small syringe with a bent nozzle, Fig. III, by which the frontal sinus can be washed out or medicated. Little or no attention by the surgeon will be needed afterward. The instruments consist of a flexible steel pilot, Fig. I, A, $14\frac{1}{2}$ c.m. long and 1 to $1\frac{1}{2}$ m.m. in diameter which will project 5 to 10 m.m. beyond the hollow burr when the latter has been passed up to the farthest extent. This absolutely prevents perforating the top wall of the sinus.

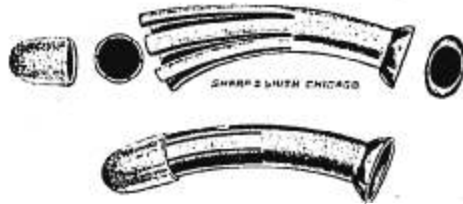


Fig. II. Ingals' Spring-gold frontal sinus drainage tube. The upper tube in the cut shows the upper end opened out. The small cut at the right shows the lower end of the tube. The small cuts at the left show the diameter of the tube and the gelatine capsule. The lower tube shows the tube with the upper end sprung into the capsule.

A removable handle for the pilot to facilitate its introduction. A hollow burr, Fig. I, permanently fixed to the end of a hollow steel wire cable, 6 c.m. in length which is permanently fixed to a steel tube (like a trephine) the other end of which terminates in a shank for attachment to the dental engine chuck. At the proximal end of this tubular portion where it terminates in the shank, is a small opening in its side to facilitate cleaning. The cutting burr is 6 m.m. long and $6\frac{1}{2}$ m.m. in diameter and is so made that it will feed rapidly and cut any bone with which it comes in contact. The burr might be made larger without much danger of doing harm, but I believe its present size is within the limits of perfect safety and in the light of experience, I can see no reason for a larger drainage canal than this affords. The whole instrument, which I have named pilot-burr, is 19 c.m. in length. It will be observed that the distal end of the pilot is necessarily kept in position by the canal into which it is inserted so that the whole apparatus can not revolve when the burr

is turning, and the proximal end is held by the tubular end of the burr so that the operator has the instrument under control. The thin spiral steel sheath for the cable and tubular portion of the burr, Fig. I, C, prevents any injury to the nasal passages due to rapid turning of the instrument. This is flexible so that it may follow any curve that is given to the pilot. A dental engine, rated 1/8th h.p. furnishes the most convenient power though an apparatus to operate the burr by hand might be made. The packer, Fig. IV, is a thin tube the external diameter of which is a trifle less than that of the burr. It is bent to the same curve as the pilot and is very easily introduced through the enlarged canal into the frontal sinus. From the examination of the frontal sinus in cadavers upon which I did the operation, I found that the opening through the mucous membrane lining the frontal sinus was not clear cut, and was apparently much smaller than the burr, therefore I had a ring knife made on a

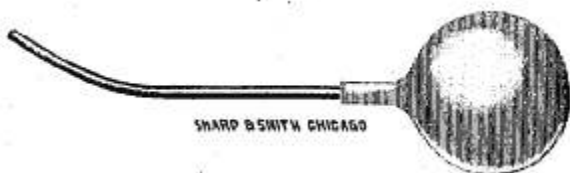


Fig. 111. Syringe for Washing Frontal Sinus; two-third size.

flexible steel stem wherewith to curette the borders of the ostium frontale; this worked satisfactorily, but since perfecting the drainage tube, I find it unnecessary. The self retaining gold tube, Fig. II, is $3\frac{1}{2}$ c.m. long and 6 m.m. in diameter. It is made of spring gold. The lower end has an oval cup-like flange 12 m.m. long by 6 m.m. wide. From the upper end the tube is sawed down 2 c.m. in 6 places making six sections, nearly a m.m. of the end of each of which is bent inward at a right angle so as to make the end blunt. About 12 m.m. below this upper end I bend out each of these sections so as to make the upper end funnel shaped and about 9 m.m. across at the end, which makes the tube self retaining. The slits down the side make each of these sections a nearly flat spring about 2 m.m. wide and 2 c.m. long and renders it easy to withdraw the tube at any time the surgeon may wish. The slits also prevent pocketing of pus about the tube in the lower part of the sinus. The part of a gelatine capsule used to hold these six spring sections together when intro-

ducing the tube is a trifle smaller than the normal size of the drainage tube. The applicator is a bent copper wire over which I pass the spiral shield thus forming a shoulder to prevent it from slipping too far into the gold tube, and providing a means of pushing the latter off of the applicator. The syringe that I furnish the patient, Fig. III, consists of a small rubber bulb holding two to four drachms fitted with a hard rubber tube $3\frac{1}{2}$ m.m. in diameter and 7 to 8 c.m. long. This was made of an antitoxine bulb, the vent of which had been closed and a tube taken from an old atomizer. A Eustachian catheter might be bent for this purpose.

Beaman Douglas in *THE LARYNGOSCOPE* for May, 1904, p. 346, gave five objections to intra-nasal operations for opening the frontal sinus.

1. Absence of the frontal sinus.
2. Thinness of the posterior (or upper) wall of the sinus.
3. Liability of entering an enlarged ethmoid cell instead of the frontal sinus.



Fig. IV. Frontal Sinus Packer; one-third size.

4. Variation in direction of naso-frontal duct.
5. Danger of opening into the olfactory fissure and injuring the nasal artery and nerve, and of opening a direct line of communication with the brain, with the possibility of injuring the brain, or of septic meningitis.

The first and fourth of these objections have no bearing on the operation that I propose.

Regarding the second—because of the protrusion of the end of the pilot, it is impossible to perforate the posterior wall of the sinus in this operation, excepting by a lateral grinding action of the burr in an extremely narrow sinus, where the dural surface of this wall would be less than 3 m.m. distant from the center of the naso-frontal duct—a condition that if ever present, would be extremely rare. If such a condition were met with, I do not think the dura could be cut by the burr.

Regarding the third objection—If an ethmoid cell is suppurating, it should be drained, therefore no harm would be done by this operation.

Fifth, As to the danger from the olfactory fissure—the objection urged applies with even greater force to external operations that establish a drainage canal large enough to be permanent, and injury of either the artery or nerve would be of no serious moment. The danger of infection must be met in any case and should be minimized in every possible way, but this danger is no greater with this than with other operations.

In conclusion, the advantages presented by this operation as they appear to me are:

1. It causes no scar, it affords efficient drainage and it enables the patient himself easily to cleanse the sinus.
2. It is much safer than other intra-nasal methods.
3. It can be done early before permanent pathologic changes have taken place and in such cases it may be expected to effect a cure.
4. The early establishment of free drainage usually prevents serious pathologic changes.
5. It is no bar to a later external operation if that should become necessary; indeed, by taking the place of a part of that operation it renders it much less formidable.

I have done the operation several times with good results and in no case has anything unfavorable occurred; therefore, I can heartily recommend it in practically all cases of suppuration of the frontal sinus in which a probe can be passed from the naris into this cavity.

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Some New Instruments—URBANTSCHITSCH—*Monatschr. f. Ohrenh.*,
Berlin, Jan., 1905.

The author describes an attic irrigator which is not new, an instrument for intra-nasal measurements called a "Distanzometer," and an end-piece for the vibrator, which is saddle-shaped, to fit over the bridge of the nose. He uses the latter in cases of coryza, and claims that its use gives the patients considerable relief.

YANKAUER.