A MODIFIED TECHNIQUE FOR THE PHYSIOLOGIC RHINOTOMY

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The physiologic (trap-door) antrotomy has been advocated by Cottle (1966) and well-described by Horowitz (1967). In this surgery the object is to leave a normal functioning maxillary sinus with intact bony walls and a patent osteum into the middle meatus of the nose. It is quite difficult at first to realize that the nose and sinuses function best when they are returned to their normal anatomic status.

In re-appraising my results with this technique, I have found three problems which in my hands at first were difficult to control:

1. Residual numbness of the membranes and teeth below the incision over the canine fossa.
2. Fragmenting of the bony osteoplastic flap (trap-door).
3. A sudden disappearance of the drainage tube or tubes left in the natural osteum or inferior meatus following surgery.

Despite statements to the contrary, whenever an incision is made through the mucous membrane over the canine fossa some of the infra-orbital nerves are severed and the membranes beneath the line of incision will be numb for many months, and possibly permanently. To prevent this, Shiffman (1970) has advised making the incision along the gum line and elevating the periosteum upward from this point until the opening is made through the canine fossa. The gum line is the area that becomes pigmented when heavy metals such as lead or mercury are ingested. Since following this technique, I have found the loss of sensation in the mucous membranes almost imperceptible in my patients.

The secret of maintaining intact the osteoplastic flap is to preserve the periosteum on the exterior and mucous membrane on the interior surface of the bone. When making the incision at the gum line and elevating the tissues it becomes more difficult to preserve the periosteum over the outside of the bony flap. The technique which I have found to overcome this problem best is to use the dental drill.

After evaluating the sinus x-rays so the upper limit of the roots of the teeth can be approximated, a groove is made with the 2 millimeter bone drill immediately above this area. Starting approximately 3 to 4 millimeters lateral to the region of the canine tooth the groove is extended horizontally approximately 1 centimeter and 1 to 2 millimeters below the elevated periosteum. When this groove has been deepened sufficiently, which is usually 2 to 3 millimeters, then a vertical groove is made approximately 3 millimeters upward from each end of the horizontal groove. These are carried deep until

entrance is made into the maxillary sinus. The horizontal groove is then deepened until the mucous membrane is reached. Using a 3 or 4 millimeter osteotome on the vertical grooves, they can be extended to 5 or 8 millimeters. The horizontal groove penetration can be completed with the osteotome into the sinus if necessary. The scalpel may be needed to cut through especially thick mucous membrane. Then using the osteotome as a lifting wedge, the osteoplastic flap is brought anteriorly and superiorly revealing the contents of the antrum.

The trap-door is held open with a United States Army-Navy retractor held by an assistant, who must be careful not to damage the mucous membrane of the inner surface of the bony flap. Mucoceles, polyps, and cysts can usually be removed easily through this approach. If the natural osteum is found to be adequate, the sinus can be closed by replacing the osteoplastic flap into its original position with thumb pressure over the skin of the cheek. After bringing the soft tissues into their original position the incision is sutured along the gum line.

If extensive infection and/or polyposis are found in the sinus, then further work must be done within the sinus itself. The polypoid degeneration of the mucous membrane can be painted with 10% silver nitrate or it can be very carefully removed with the preservation of the periosteum. In cases where there is extensive long-lasting infection in persons who have general systemic diseases such as diabetes, chronic glomerulonephritis, or cardiac decompensation, then the entire contents of the sinus may need to be removed, including the periosteum.

The natural osteum, if inadequate, should be enlarged by removing the polypoid membrane and at times a portion of the bony margins in the middle meatus to provide a more adequate opening into the nose. In these cases I have been inserting a 20 to 24 French chest tube with a radiopaque strip. The tube is tailored by cutting away part of the tube on its proximal and distal ends, leaving a tail approximately 4 millimeters wide, which includes the radiopaque strip. Approximately 2 centimeters in the middle of the tube is left intact. This is the portion that will maintain the opening in the region of the natural osteum. This tube is then sutured at its proximal end high onto the nasal septum. The ventilation tube is left in position for approximately six months and then removed. During this period scar tissues should become stationary and an adequate osteum should persist. A small polyethylene tube may be placed through the middle meatus for irrigation purposes if it seems to be indicated.

If the drainage tube placed through the natural osteum breaks loose from the septum it will slip slightly backwards, but because of the long tail which extends into the sinus, will not disappear. An x-ray would immediately reveal if it were in the sinus or not. It is comforting when taking repeat sinus x-rays before the tubes have been removed to see the radiopaque line extending from the septum into the sinus.

In one case the pressure from the extension of the tube within the sinus caused a constant headache and for this reason the tube was prematurely removed. The headache disappeared; however, a small polyp developed in the natural osteum and the headache returned. An inferior meatus window was produced and the patient has had no further headache.

One other patient on whom bilateral physiologic antrotomies were performed developed a severe infection with a complete recurrence of the problem. He had extensive chronic glomerulonephritis and diabetes. He refused further surgery and for this reason I now leave an inferior meatus window in approximately 10% of my cases. In addition to those with severe co-existing systemic diseases, I provide an inferior meatus antrotomy when there is uncontrolled vasomotor rhinitis for any cause or when the patient is difficult to handle or may not co-operate with me and my methods of treatment.

SUMMARY

A modification of the physiologic antrotomy is presented. The technique described helps prevent numbness of the teeth and gum on the side of the surgery, fragmenting of the osteoplastic flap, and adequate control of the drainage tube through the natural osteum.

In this technique the incision is made at the gum line. The periosteum is elevated up to the canine fossa and entrance is made into the antrum by producing the osteoplastic flap with the dental drill, osteotome, and scapel, leaving periosteum on the anterior surface and mucous membrane on the posterior surface of the flap. A ventilating tube, when used, is a plastic chest tube in which a radiopaque strip is present. A tailoring of the tube is done to reduce the amount of tube extending into the sinus and in the nose, and still maintaining an adequate opening at the natural osteum.

RÉSUMÉ

L'auteur présente une modification à la technique d'antrostomie physiologique.

Le procédé décrit aide à prévenir l'engourdissement des dents et des gencives du côté de l'opération, la fragmentation du lambeau ostéoplastique et enfin le contrôle convenable du tube de drainage à travers l'ostéotome naturel. Dans ces conditions l'incision est faite à la limite de la gencive, le périoste est ruginé, jusqu'à la fosse canine et l'accès est réalisé dans l'antre en dessinant un lambeau ostéoplastique avec une fraise dentaire, un ostéotome et un bistouri. On laisse ainsi le périoste sur la surface externe et la muqueuse sur la surface postérieure du lambeau.

Un tube d'aération, le cas échéant, et un tube plastique avec repère radiopac, ce tube est destiné à maintenir l'ouverture adéquate de l'ostium. Il est taillé pour réduire sa longueur dans le sinus et dans le nez.

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