
SURGICAL TECHNIQUE

An original aspirator-spoon for accessing maxillary sinus recesses

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ABSTRACT

Our aspirator-spoon and forceps were specifically designed for controlling and cleansing hard-to-access regions of the right or left maxillary sinus via middle meatotomy only. These instruments are useful in everyday practice for removing aspergillomas, polyps, or foreign bodies from the alveolar and zygomatic recesses of the maxillary sinuses via the endonasal endoscopic approach. In addition, they facilitate the collection of biopsy specimens from these regions.

We designed and produced our aspirator-spoon with MicroFrance Laboratories in 1989. During the next 15 years, we have used this instrument for our cases of maxillary sinus aspergilloma; of the more than 80 patients. None of the patients required a Caldwell-Luc procedure or inferior meatotomy, and none experienced recurrences. Thus, these instruments obviate the need for trephination of the canine fossa or inferior meatus and allow effective treatment via middle meatotomy only. (*Fr ORL - 2005 ; 86 : 29-33*)

Keywords: Aspergilloma, Maxillary sinus, Endonasal, Instruments.

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Figure 1: Study conducted in 1989 to determine the optimal size, diameter, and shape of an instrument for accessing the alveolar recess via a middle meotomy.

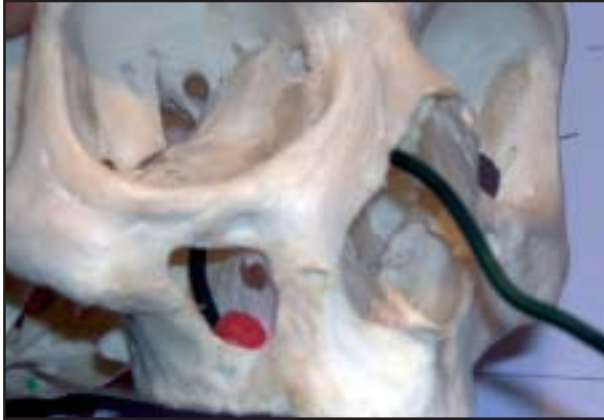


Figure 2: The aspirator-spoon and forceps. Note their distinctive and closely matching shapes.



Figure 3: Spatulate tip of the aspirator-spoon.



INTRODUCTION

When attempting to extract a large aspergilloma or foreign body located deep in the maxillary sinus by the endoscopic endonasal middle-meatotomy approach, the size and shape of currently available microsurgery instruments may limit the likelihood of success. Indeed, these instruments fail to provide adequate access to the zygomatic recess and, even more so, the alveolar recess via a middle meotomy. Therefore, in difficult or doubtful cases, a preference has emerged for a concomitant inferior meotomy or mini-Caldwell-Luc procedure in order to gain adequate access to the zygomatic and alveolar recesses. Although these additional procedures may seem minor, they increase the operating time, the need for operative resources (retractor and operating assistant, motor, irrigation, suture...), and possibly the risk of postoperative morbidity.

DESCRIPTION OF THE INSTRUMENTS

The aspirator-spoon

In 1989, we conducted an anatomic study of dry skulls to determine the ideal shape and size of an aspirator-spoon designed to access the alveolar and zygomatic recesses of the right or left maxillary sinus via the middle meatus (Figure 1). Then, MicroFrance Laboratories produced a prototype of the aspirator-spoon (Figures 2-5). The instrument is shaped as a fairly slender hook equipped with an olive-shaped nozzle for connection of a flexible aspiration hose. The spatulate tip can be used to scoop out the body to be removed. The rigidity of the instrument is intentional, and no attempt should be made to change the shape of the hook.

The forceps

We designed forceps whose size and shape match those of the aspirator-spoon. This facilitates the removal of cysts, polyps, biopsy specimens, and foreign bodies located in hard-to-access parts of the maxillary sinus. The forceps was produced by Xomed Laboratories in 2001 (Figures 2 and 6). Its range is 2 mm less than that of the aspirator-spoon, because of the rectilinear mechanism of the jaw.

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Figure 4 et 5: Dry skull whose maxillary sinus has been opened widely through the canine fossa. *Note*



how the shape of the aspirator-spoon easily provides access to the alveolar and zygomatic recesses via the middle meatus.



Figure 6: *The forceps for the maxillary recesses, held in the right hand.*

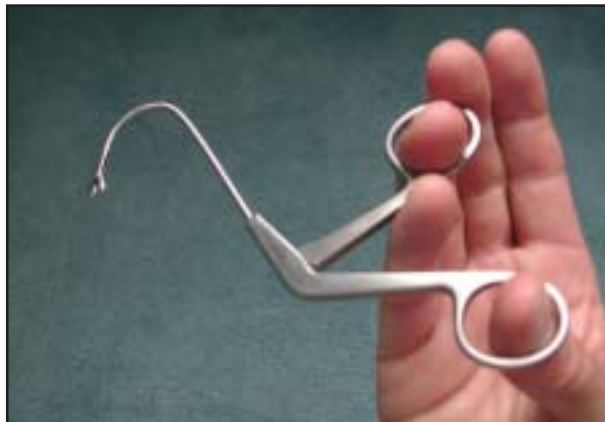


Figure 7: *Intraoperative use of the aspirator-spoon into the left nasal cavity.*



TECHNIQUE

Technique for using the aspirator-spoon

We use this instrument primarily for extracting aspergillomas from the maxillary sinus through a middle meatotomy as the only surgical approach. The surgical procedure is outlined below.

- Adequate exposure and decompression of the middle meatus; in two thirds of cases, this requires endoscopic septoplasty as a preliminary step.
- Middle turbinectomy is performed in the overwhelming majority of cases. The turbinate is trimmed from the basal lamella, of which about 1 cm is left in place under the top of the olfactory cleft. Bipolar coagulation of the middle turbinate branches of the sphenopalatine artery to prevent bleeding.
- Middle meatotomy by opening of the fontanella to create an aperture about 15 mm in diameter, without disturbing the inferior turbinate.
- Conventional aspiration and forceps are used to remove numerous fungal fragments under visual guidance through a 0° endoscope. Samples are collected routinely for bacteriological, mycological, and histological studies.
- We often irrigate the sinus with saline under pressure, using a 60-ml syringe equipped with a large-bore irrigation cannula bent at 90°. Irrigation is done manually, many times, using massive amounts of saline. After each injection, the fluid is aspirated using a large-bore cannula of the Yankauer R type, which is not easily obstructed and facilitates removal of fragments from the nasal cavity. The fragments can be scooped out using a blunt spatula with a 90° bend 1 cm from its tip.
- When the irrigation-aspiration cycles no longer recover fungal fragments, we insert our aspirator-spoon into the nasal cavity and through the middle meatotomy. When the nozzle is raised vertically, the spatulate tip moves downward and easily swivels anteriorly into the alveolar recess. Small movements are then used to detach and scoop up the residual fungal fragments, which are often both numerous and large (Figure 7).
- At this point, to save time and to avoid obstruction of the instrument, we recommend that the instrument be disconnected from the aspiration hose. The large fragments that are repeatedly scooped up to the meatotomy are easily recovered by Yankauer R suction.

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- When the cycles of working the spatula, irrigating, and aspirating no longer retrieve fungal fragments, a 45° endoscope inserted into the meatotomy aperture provides a good view of the sinus recesses. The aspirator-spoon is then connected to the suction hose and maneuvered under visual guidance toward any residual fragments, which are painstakingly detached and washed out, until the sinus cavity is completely clear. Several additional irrigation-aspiration cycles are then performed to eliminate any invisible particles.
- Control of the zygomatic recess is easier to achieve. Swiveling the nozzle horizontally and medially turns the spatulate tip laterally into the zygomatic recess.
- We have been using this instrument regularly for 13 years. All our patients with maxillary sinus aspergillomas were successfully treated via a middle meatotomy only, except one patient with a small aspergilloma. To the best of our knowledge, none of our patients required repeat surgery or experienced recurrent fungal disease of the maxillary sinus.

Technique for using the forceps

The size and shape of the forceps match those of the aspirator-spoon. This ensures easy insertion of the forceps through the middle meatotomy into the maxillary sinus recesses. Using a lateral vision endoscope, the jaws of the forceps can work in hard-to-access regions of the maxillary sinus.

DISCUSSION

The aspirator-spoon and forceps described here are surgical aids produced in 1989 and 2000, respectively, to overcome difficulties encountered with controlling maxillary sinus alveolar and zygomatic recesses, most notably in patients with aspergillomas. Numerous publications and oral communications state that inferior meatotomy or a mini-Caldwell-Luc procedure is needed in addition to middle meatotomy to ensure adequate cleansing of maxillary sinus recesses, as no instrument is satisfactory in this regard [1]. From 1989 on we successfully treated maxillary sinus aspergillomas via middle meatotomy only, using our aspirator-spoon. We then decided to publish our results and to make the

instrument available to everyone. At the same time, we designed the matching forceps to further improve access to maxillary sinus recesses in patients with other conditions (polyps, cysts, or foreign bodies) and in patients requiring biopsy collection.

We have tested the other aspirators available on the market and have found that none is adequately shaped to ensure adequate access to the maxillary sinus recesses. In addition, the flexible aspirators have a number of drawbacks:

- Shaping takes time and produces an irregularly shaped instrument whose ergonomics and length are less likely to ensure a successful procedure;
- Malleability of the material is limited, and sites where excessive torque is applied become flattened, narrowing the channel inside the instrument and therefore reducing the effectiveness of aspiration and precluding adequate cleansing; in addition, efforts to untwist the instrument often cause breakage;
- Malleable material is not sufficiently rigid to ensure effective scraping of the maxillary sinus recesses;
- The absence of a spatulate tip decreases the precision with which material can be detached from the sinus wall.

We believe that two surgical approaches can be used to remove aspergillomas from the maxillary sinus, namely, the endonasal approach with middle meatotomy only and the mini-Caldwell-Luc approach. In our opinion, inferior meatotomy should not be used for this condition, as it requires abrasion of the inferior meatus, creates a nonphysiological and often permanent opening into the maxillary sinus, and does not always provide good vision of the maxillary sinus recesses. We also contend that combining a middle meatotomy and a Caldwell-Luc procedure is inappropriate. However, we believe that a mini-Caldwell-Luc procedure used alone with videoendoscopic visualization of the maxillary sinus is an excellent choice if there is no confinement in the middle meatus.

CONCLUSION

Our aspirator-spoon and forceps provide easier surgical control of the walls and recesses of the right or left maxillary sinus, in men and women, via middle meatotomy only. We have used this instrument for 13 years to treat maxillary aspergillomas, recording a

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single failure and no recurrences. The forceps were designed and used successfully to facilitate the removal of biopsy specimens, cysts, polyps, and foreign bodies from hard-to-access parts of the maxillary sinus.

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