

Dr. Andrew Thamboo, MD, MHSc., FRCSC, ENT Surgeon, Ethmoidectomy - Surgical Teaching Video

I believe the ethmoidectomy is one of the hardest procedures to complete properly, and the most important. An open middle meatus provides drainage and optimal treatment of the ethmoid frontal and sphenoid sinuses. Performing a complete ethmoidectomy can be argued as the most essential step preventing failures. Studies actually show that complete ethmoidectomy can resolve chronic rhinosinusitis and other sinuses that are not operated on. So we're going to go through five key steps. First step, you want to identify the lamina. The way we do that is by removing the bulla. I start by finding the hiatus semilunaris superioris and move laterally.

Here I'm using a seeker just to pull the bulla forward. In my personal practice, I send this tissue to the pathologist to analyze the tissue.

I then use a microdebrider to clean out the tissue. Here, I'm using a zero degree microdebrider straight. One of the key things is that I need to be careful about the lamina. You can appreciate a lamina just posterior to that lamella. And if I'm concerned, I can use a cold cutting instrument to get flush against the lamina by removing the face of that bulla.

The next thing is to traverse the basal lamella. So we're going from the anterior ethmoids to the posterior ethmoids. And one of my key things is I actually go through my releasing incision, and the goal is to find the superior turbinate. And the way I find that superior turbinate is by appreciating that if I go through the basal lamella, I go from mucosa, bone, mucosa, and then space, and that space is a superior meatus, and that superior meatus drives me to the superior turbinate. Once that's identified, I then can remove all the septations between the superior turbinate and the lamina. This is why it's so key to find the lamina in the antihethmoidectomy, you have found one of your key landmarks in defining one of your outer boundaries, laterally and medially, you know where the middle turbinate is and the superior turbinate, so therefore you feel quite safe between those two structures.

So, one of the concerns when I go through the basal lamella is that I may destabilize the middle turbinate given how low I go. But one of the key things that I do is that I bolt and suture the middle turbinate. There is evidence to show that this has very little to no impact on smell loss when doing this procedure.

So, one of the key things when it comes to ethmoidectomy is mucosal preservation. Most important requirement for successful surgery is achievement of early regeneration of normal mucosa composed of many ciliated cells. Mucosal preservation is a key factor in determining recovery rate after endoscopic sinus surgery. It is essential not to expose the bone of the outer walls, which includes the skull base, the lamina, nasal beak and posterior table.

Here are examples of ethmoid stripping and how the ethmoid cavity heals thereafter. You can appreciate the osteitis in the CT scans of that thick bone where the crosshairs are. Here's an example of mucosal stripping of the frontal sinus.

So how do we do mucosal preservation? This can actually be quite tough in sinus surgery. There are some key moves for mucosal preservation. In scenarios where it's not really easily strippable of the mucosa, we cut the mucosa at the tension lines. We can use the microdebrider at 5000 RPMs, and the bony edges, we can use high speed oscillating mode, fill mode, to really carve out the sinus cavities without stripping.

Now, when it's easily strippable, we can denude the mucosa over the bone, remove the bone with some cutting instruments and minimize the extent of surgery as well. Now, what are the areas for incompleteness when it comes to ethmoid sinus surgery? The three areas that will help improve outcomes are the retromaxillary cell, the middle turbinate flare and the inferior ethmoid cells. Retromaxillary cell has been studied and has shown that if left behind, it can result in recurrence of sinus disease.

I'm going to show you how you find and identify the retromaxillary cell. So, maxillary sinus has been done, a partial ethmoidectomy has been done, and what you can appreciate here with the ball probe the cell that is actually behind the maxillary sinus. One of the key things here is to marsupialize and open that cell. We like to make it confluent with the other sinus cavities. So you can see and appreciate here we are making that retromaxillary cell in confluency with the maxillary sinus and the ethmoid cavity as well.

Now we'll talk about the middle terminal flare. The middle terminal flare is a component over the vertical aspect of the middle turbinate that goes and attaches to the skull base.

With the ball probe, here I am highlighting where that middle turbinate flare is. I am in the space between the middle turbinate and the superior turbinate. This is a space that is always there as the middle turbinate has to attach to the skull base. I can then use the microprobe to clean up that septation, because I'm now confident that there's a space and how deep and how far I am from the skull base.

Here are examples of failure of ethmoid sinus surgery, primarily because the middle turbinate flare has been left behind.

The next step in completing your ethmoidectomy is finding this middle turbinate flare. As you can appreciate here with the seeker, I am finding that space that separates the middle turbinate and the superior turbinate. And once I do so, and by opening this, I do not tunnel myself into the posterior ethmoid cavity.

The last aspect is the inferior ethmoid cells. Some may say these are cells are left behind because they're looking over the basal lamella and they may be ignored. Previous teachings indicated that sometimes you should switch to a 30 degree scope to look over the basal lamella and ensure that you took these inferior point cells.

Personally, I just use a zero degree scope and given how low I go on the basal lamella and the middle turbinate, we can easily resect and remove all those inferior ethmoid cells.

I hope you appreciate those surgical pearls for looking for more opportunities to learn to improve your surgical outcomes for your patients, definitely look for courses across Canada.