

THE ADVANTAGES OF THE DENKER OVER OTHER
OPERATIONS ON THE MAXILLARY AN-
TRUM, WITH A REVIEW OF TWENTY-
ONE CASES AFTER THIS METHOD.

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There is, of course, not such a thing as any one operation being perfect for operating on all chronic suppurating antrums, but the Denker operation has, it seems to me, more to recommend it than any other operative procedure which has been suggested up to this time. I shall not compare this operation with those procedures in which a temporary opening is made in the inferior meatus, middle meatus or both for the relief of acute suppuration in antrums without polypi, necrosis of bone, etc.—in other words, in antrums with only a moderate pathologic process. It is the opinion of some that in antrums with only moderate pathologic changes, washing the cavity through the inferior meatus will cure the great majority of these cases without any operation.

If an operation is to be recommended for relief of chronic antrum suppuration, it should be a procedure with the following advantages:

1. It should give as a final result a normal functioning nose without a tendency of antrum suppuration to relapse.
2. It should allow the operator to be thorough in the removal of all polypi, necrotic bone, etc. All parts of the antrum should be opened to direct inspection.
3. It should leave the nasal cavity as near as possible in a normal condition. The turbinates should not be sacrificed, and too large an opening should not be left between the antrum and the nose cavity, so that an atrophic condition would be set up.
4. It should have a healing period reasonably short and without any considerable pain or discomfort.

5. It should have few or no complications, as fistulas into the mouth, lacrimal obstruction, etc.

The advantages of the Denker operation over other procedures recommended for relief of extensive pathologic changes in the antrum can probably be best shown by comparison with each individual operation.

The alveolar or Cowper operation has, it seems to me, nothing to recommend it. If an antrum suppuration is caused by a bad tooth and is acute or subacute, all that is needed is treatment of the tooth by a dentist and washing of the antrum through the inferior meatus by the rhinologist. If the antrum is a chronic one, then the removal or treatment of the offending tooth with a Denker operation on the antrum would be indicated. If a large opening into the antrum is made through the tooth socket, the after-treatment is long, probably a lifetime; the antrum probably becomes infected from the mouth cavity, and often it is necessary to insert a tube from the antrum draining into the mouth. To have a constant drainage of mucopurulent discharge into the mouth is very annoying to the patient, while a Denker operation, after the proper care of teeth, would bring about a cure in a very short time. In the Cowper operation the contents of the antrum cannot be inspected thoroughly, polypi and diseased bone cannot be removed thoroughly, as in the Denker operation.

The Küster operation, which consist in making a large opening into the antrum through the canine fossa, and clearing out granulations, polypi, etc., without making an opening into the nose and carrying out the after-treatments through the opening in the mouth, is not to be recommended. The only thing which the operation has to recommend it is that it allows inspection of the greater part of the antrum cavity. The Denker gives much better inspection, closes the opening into the mouth at once, gives perfect drainage into the nose, and the after-treatment is much shorter.

The points of advantage of the Denker over the Luc-Caldwell are as follows:

1. The opening into the antrum from the nose is farther forward in the Denker, making the after-treatment easier; especially is this so if the patient is to wash the antrum with a tube.

2. The anterior angle can only be reached through an operation which removes the bone from pyriform aperture posteriorly, opening the anterior angle. This is not done in the Luc-Caldwell operation. The inferior turbinate, if normal, is left intact in the Denker, while in the Luc-Caldwell the anterior part is usually removed; therefore, in this respect the Denker would be much preferred. The mucous membrane in the nasoastral wall in the Denker, which is laid on the floor of the antrum, encourages a final good result, and therefore shortens the time of healing very much. This flap also prevents the piling up of granulations at the base of the bony nasoastral wall, which is very liable to occur in the Luc-Caldwell.

The Denker operation has all the advantages of the Luc-Caldwell, with the other advantages first mentioned.

The only disadvantage which I have seen from the Denker operation is that the nerve filaments to the central incisors and canine teeth are cut, causing a numbness in these teeth; but it has been my experience to see these symptoms gradually become less marked and finally not noticed by the patient.

The Canfield or Canfield-Ballenger operation has some of the advantages of the Denker, but certainly an intranasal operation on an antrum filled with polypi, etc., is not as satisfactory as the Denker, where direct inspection through a good-sized opening can be obtained. The Skillern operation is very similar to the Canfield, but is less radical, and really cannot be recommended for chronic suppuration.

The intranasal opening of the antrum as suggested by Myles, the operation of Krause, removal of anterior part of the middle turbinate and making quite a large opening into the antrum, also making a large opening into the antrum with saws after the removal of the anterior part of the inferior turbinate, as suggested by Vail; the opening into the antrum with chisels, as suggested by Stein, Corwin, etc.; trephining of nasoastral wall by Bishop, and rasping of same by Wells, and cutting away of wall with Ostrom's forward cutting forceps, the breaking down of a larger part of nasoastral wall, with retention of inferior turbinate, as suggested by Sluder; the saving of inferior turbinate, as suggested by Hirsch, with a large opening inferior to the turbinate; the operation of Rethi, in which a

large opening into the antrum through both inferior and middle meatus, and Roe's opening of nasointral wall with forceps, and the operation of Freer, etc., are all good for mild cases, but if the antrum is filled with polypi, the bony walls are necrotic, or cysts are contained in the antrum, then only a more radical operation is indicated, and I believe the Denker is to be preferred.

It has been said that there is too much shock to the external operation, and that it is necessary to operate with a general anesthetic, but I do not find that either of the statements hold true. The Denker can be done with very little discomfort with cocaine and novocaine and without shock. As a rule, I do not find it necessary to use a general anesthetic. There is no more necessity for a general anesthetic for the Denker operation than there is in removing a crooked bony septum of the nose.

It seems to me that the advantages of the Denker operation should again be mentioned:

1. It gives a good view of the interior of the antrum—better than can be obtained through an intranasal operation.
2. It gives a large opening at the anterior angle of the antrum, which is not obtained by any other external operation.
3. It gives a large mucous membrane flap, which materially shortens the after-treatment and prevents granulations from closing the opening from below.
4. It leaves a normal functioning turbinate and nasal cavity, usually healing from three to four weeks.

REVIEW OF CASES.

In reviewing the twenty-one operations, I shall discuss them briefly from the following viewpoints:

1. Anesthesia used.
2. Whether the antrum suppuration was complicated by other sinus troubles, diseased teeth, cysts, etc.
3. If other sinus troubles were present, was an operation done on this sinus at the same sitting, or previously, or afterwards?
4. Whether previously an operation had been done on the antrum.
5. Whether the wound in the mouth was entirely closed with sutures at the time of the operation.

6. If complications, what they were.

7. The final result.

1. As to Anesthesia.—In twenty-one operations, cocain and novocain was used in twenty cases, and ether in one. One per cent novocain was injected over the anterior surface of the antrum under the periosteum, after applying a small amount of cocain to the mucous membrane. I usually apply cocain with an applicator to the nasoastral wall and inferior turbinate. A solution of novocain and adrenalin is applied to the antrum cavity during the operation. If one is operating on a child or nervous woman, it would probably be best to use a general anesthetic, ether preferred. I used morphin, one-quarter grain, about one hour previous to the operation in my former cases, but of late have discarded it and do not see any difference in the discomfort.

2. Complications of the Antrum Disease by Suppuration in Other Sinuses, Cysts, etc.—Only two of these cases were complicated by frontal sinus suppuration, and ten of the operations were complicated by ethmoid suppuration. One case had a sphenoid suppuration. None of the cases was complicated by cysts, bad teeth or bony septum in the antrum.

3. If Other Sinuses Were Affected, Was an Operation Done on the Other Sinuses at the Same Sitting as the Denker Operation, or before or after?—In only one case was the middle turbinate removed and ethmoid curetted at the same sitting of the Denker operation. In ten cases the middle turbinate was removed and ethmoids were curetted previously to the Denker, and in one case the sphenoid was opened previously to the Denker. In two cases an intranasal frontal sinus opening was made after the Denker.

4. As to Whether a Previous Operation had been Done on the Antrum.—In no case was an operation done on the antrum previously.

5. As to Closure of Mouth Wound.—In ten cases the antrum was packed rather tightly; also on top of the nasoastral flap, and the end of the packing left hanging into the mouth through the mouth wound, and in two to three days the packing was withdrawn through the mouth and then two or three sutures inserted. This procedure is supposed to disturb the flap of the antrum less than if the packing is removed through the nose.

In the last eleven cases very little packing has been used and the mouth wound has been entirely closed, getting primary union, doing away with any danger of fistula in the mouth. Very little packing is necessary.

6. As to Complications.—In one case in an old gentleman, with a double Denker operation, erysipelas set in on the fourth day. The healing went along nicely, except that the lip was so swollen that sutures could not be placed in the mouth wound after the packing was removed and, therefore, fistulas in the mouth on both sides was the result. These fistulas, after some difficulty, were closed.

In one case a man with very filthy mouth and filthy habits, a small abscess of the soft-part anterior to antrum was the result. After a few days this pus cavity was evacuated and he made a good recovery.

7. The Final Result.—I have followed seventeen of these cases and in each one there has been a good result. There has not been a relapse in one case. In one case, in which part of the inferior turbinate was removed, there is slight crusting, but the patient also has some ethmoid trouble which would account for that. In the cases without other complicating sinuses, the nose is perfectly normal and I feel that I am justified in being enthusiastic about the Denker operation.

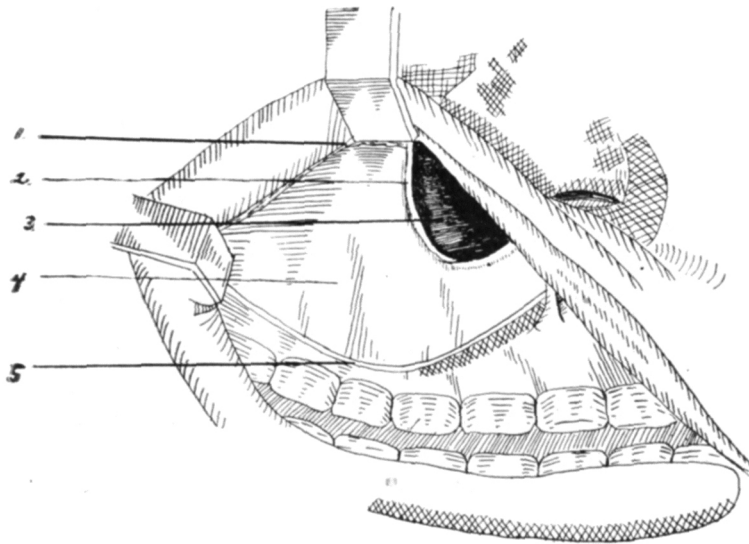


FIGURE 1.

First step in the Denker operation. The soft parts incised and retracted.

- 1—Lip and soft parts from the anterior wall of antrum, etc., retracted upward.**
- 2—Apertura pyramidalis.**
- 3—Nasal mucous membrane.**
- 4—Bony anterior antral wall.**
- 5—The lower border of the incision.**

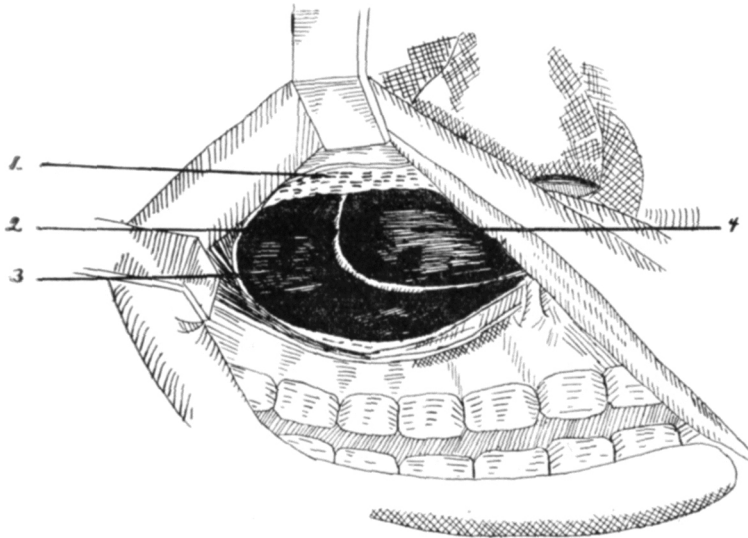


FIGURE 2.

Second step in the Denker operation.

- 1—The superior border of the removed bony anterior wall.**
- 2—The border of the partially removed bony nasointral wall.**
- 3—The maxillary antrum.**
- 4—The mucous membrane of the nasointral wall.**

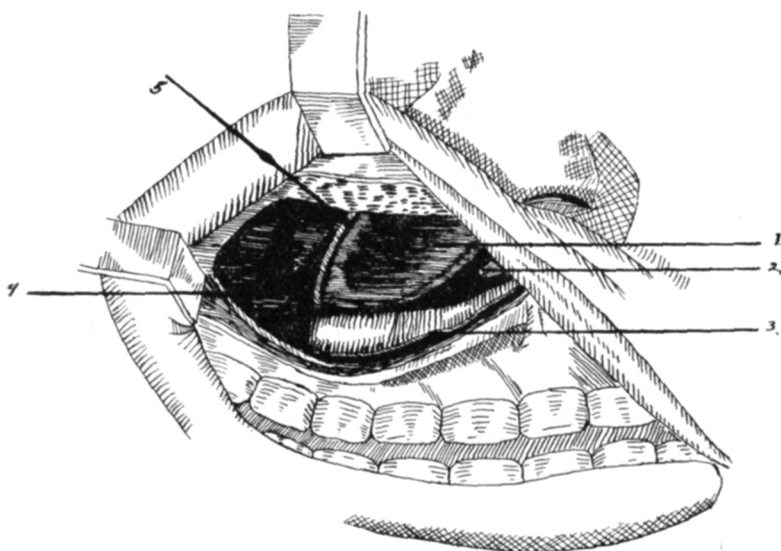


FIGURE 3.

Third step in the Denker operation.

- 1—The inferior turbinate body.**
- 2—Space between the inferior turbinate and the flap opening into the nasal cavity.**
- 3—The flap of mucous membrane from the nasooantral wall lying on the floor of the antrum.**
- 4—The maxillary antrum.**
- 5—The posterior border of the partially removed bony nasooantral wall.**