

fronto-nasal duct quite easily, and while doing so was surprised to notice a little stream of muco-pus running along the probe. The patient was immediately much more comfortable, and by using menthol inhalations was rapidly well. The ocular condition rapidly subsided without treatment.

I wish here to mention a device which has served me well in clearing a sinus of its diseased membrane with the least injury to any healthy tissue. I refer to the use of felt or cloth burrs. Mayer and Meltzer have made for me felt burrs of various sizes, which, when attached to a dental engine, will facilitate very greatly the cleaning of the cavity, as well as assist very materially in checking the hæmorrhage. Stout linen wound around a large dental burr does very well indeed, and I have found it of very great service in cleaning the walls of the maxillary sinus and checking what is sometimes a very troublesome oozing.

In conclusion, I feel like apologising to you for taking up your time in presenting these few notes on cases which to me seem difficult and unusual, still to many or most of you may seem simple and commonplace. I cannot help thinking, however, that the status of the surgery of the accessory sinuses of the nose would be on a surer and more rational foundation if each of us would write rather of his failures and difficulties than of his success.

SOME CONSIDERATIONS UPON CERTAIN FACTORS IN THE DIAGNOSIS AND TREATMENT OF SUPPURATIVE LESIONS IN THE NASAL ACCESSORY SINUSES.¹

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IN any meeting of experts it may be assumed that their views upon the broad aspect of any subject to which they have devoted attention will in the main be one of agreement and will differ only upon points of detail. There are many such differences of opinion and practice in connection with the subject of my paper, and some of these would quickly disappear if at such meetings as this we discussed the details of our experiences, and more especially those which include our failures and disappointments.

Assuming, then, that we are all conversant with the main facts

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regarding the etiology, symptoms, diagnosis, and treatment of suppurative lesions of the nasal accessory cavities, I would like to present a few of my own experiences, and only ask you for yours in return. Obviously my communication must be a "thing of shreds and patches," but my object will be attained if I can in any way promote a discussion which will tend to clear up debatable issues and render the practice of our art more certain and successful.

MAXILLARY ANTRUM.

Etiology.

We are all aware that suppuration in this sinus may be caused by intra-nasal or dental infection, but opinions are greatly divided as to which is the more frequent etiological factor. If there be nothing in the history of the case to guide us, it will be difficult to be certain as to the cause of infection, because we are often consulted by the patient when the suppuration has become chronic, and he has forgotten details of initial symptoms. Furthermore, very carious teeth may be present, even though the infection be of intra-nasal origin.

It may be asked, "What difference from the point of view of prognosis and treatment will it make whether the infection be dental or intra-nasal?" From those who have much experience in the matter the reply will be immediately forthcoming that the prognosis and treatment are more satisfactory in cases of dental origin. Many of us must have frequently cured chronic antral suppuration of dental origin by simple alveolar drainage, and as often failed to relieve those of nasal origin by the same means.

From the point of view of diagnosis clinical experience in this matter would suggest that in an empyema of dental origin there is far less likelihood of finding swelling and hypertrophy of the uncinate process, or polypi in the middle meatus, than when the sinus is infected by the intra-nasal route. Again, when a diseased tooth is the cause of trouble, an injection of a warm weak antiseptic into the antrum will often produce aching of the offending tooth. This tooth, however, may not be obviously diseased—for example, the "crown" may appear to be perfectly healthy—but a pyorrhœa may affect one of the roots (specimen shown).

Diagnosis.

Puncture of the antrum is the easiest and only absolutely reliable test of antral suppuration. It can almost always be applied,

but on three occasions I have been unable to obtain any return of the injected fluid; this was found to be due to intra-antral polypi, which, by a valve-like action, blocked the natural ostium.

Pus in the middle meatus is a well-known sign of antral suppuration, and generally it is seen in the lower and hinder region of the meatus, but occasionally it is observed high up and anteriorly, and then suggests the presence of frontal sinus suppuration.

In one of my cases, where the antrum was alone infected, the position of the discharge in the anterior and higher regions of the meatus was due to a deviation of the septum, which forced the posterior half of the middle turbinal against the outer wall of the nose, and thus turned the discharge forwards. A large polypus in the posterior part of the meatus will produce the same result.

In such a case to diagnose the source of the discharge, the antrum, nasal cavity, and especially the middle meatus should be cleansed from all traces of pus. If the secretion be coming from the frontal sinus it would quickly reappear in the meatus, but many hours would have to elapse before it could overflow from the antrum if its origin were in this cavity.

Transillumination is of great aid in diagnosis, but its evidence is only of presumptive value. An antrum which transilluminates well is not in a state of chronic inflammation, but it may contain a cyst or a polypus. If it is opaque it may contain pus, but this can only be rendered certain by exploration. On the strength of opacity patients have been subjected to operative procedures which would have been unnecessary had a "denture" on the suspected side been removed before the lamp was placed within the mouth.

Treatment.

Alveolar drainage will be more likely to prove effectual as a mode of treatment in cases of dental origin if the disease has been present for a period of months rather than years.

I use a narrow, solid vulcanite plug, the milled surface of which prevents the plug from falling into the mouth.

Some form of radical operation will probably be required for the majority of chronic cases, whether of intra-nasal or dental origin, because of the degenerative changes which have taken place in the lining mucosa of the sinus.

When the uncinate process is much hypertrophied or polypi are present in the middle meatus a radical operation is practically always called for, and since such changes are more frequently

present in cases of intra-nasal origin, our dictum is tantamount to saying that the radical procedure is generally required to cure chronic cases where the source of infection has been by way of the nose.

When radical measures are called for I am accustomed to practise the Caldwell-Luc operation with the following modifications:

(1) The whole inner wall is removed, especially the upper membranous portion. The lower limit of the opening should be level with the floor of the nose, so that free drainage may take place. The lower anterior ethmoidal cells should be curetted at the same time because they are frequently infected, and if not dealt with an imperfect result will be attained.

(2) Only such of the mucous membrane as is diseased should be removed. If healthy mucous membrane be removed healing is much longer delayed, and considerable discharge from granulation-tissue will result.

(3) The bucco-antral wound must be sutured at the close of the operation. Omitting to do this in one case led to a bucco-antral fistula, which for months was an annoyance to the patient and a weariness to myself. Such fistulas are often very difficult to cure unless the wound be opened up and the track "freshened."

(4) No packing is introduced into the antrum. It is quite unnecessary, for it serves no useful purpose, and its removal is very painful to the patient. I have never seen œdema of the cheek since I ceased packing.

(5) The after-treatment consists of syringing the nasal cavities with warm antiseptic alkaline lotions for a period of three to five weeks following the operations.

On some six patients I have opened the maxillary sinus by way of the nasal cavity—that is, by removing the anterior half of the inferior turbinal and then making a large opening into the sinus. The method did not give me satisfaction, and seems contrary to general surgical principles; for I take it that when we are dealing with a chronic suppurating cavity it is the best practice to open it, examine the extent and situation of the disease, and then to deal thoroughly with it, taking care to provide, above all things, for free drainage.

ETHMOIDAL CELLS.

In my experience these small cavities are rarely the seat of suppurative inflammation, except in association with a similar con-

dition in the neighbouring sinuses. When they are alone affected the disease is usually limited to the cells contained in the middle turbinal or to the ethmoidal bulla.

FRONTAL SINUS SUPPURATION.

In difficult cases of pan-sinusitis the presence or absence of pus in the frontal sinus can generally be determined by exclusion—that is, by washing the antrum, middle meatus, and nasal cavities free from all pus, and then carefully examining the lower opening of the fronto-nasal canal.

In acute suppuration of the frontal sinus frequent irrigation of the cavity with warm, mild antiseptics is an excellent method of local treatment, and may be expected to hasten resolution and cure, but I have only known it cure one case in which the disease was of long standing. This failure on my part has not been due to want of patience or experience in the matter.

If the contour of the sinus be fairly regular, and the opening into the nose unobstructed, it is quite easy to understand that irrigation may be successful even in chronic cases, but so frequently the sinus extends into narrow bony recesses, that only a free opening of the cavity and thorough obliteration of these sinous tracts can effect a cure.

The location of pain over the situation of the sinus is no proof that disease is located there. The best results which in my hands have followed the opening of the sinus have been secured by a simplification of Killian's operation. The details are the same as his, with the important exception—namely, I do not remove the floor of the sinus. The diseased ethmoidal cells are thoroughly curetted through the opening below the bridge of bone, and the whole external wound sutured at the close of operation.

Only those who have much experience of the old "packing" operation and the weariness of the long weeks of after-treatment can have any idea of the relief it is to both patient and surgeon to be able to do without bandages at the end of a week, and to let the patient out of hospital. The after-treatment consists of daily irrigation of the sinus through the nose by way of the large communication made at the time of operation.

I have been told that the method courts disaster, and that fatal osteomyelitis of the frontal bone—that grim spectre of radical frontal sinus operations—will soon find me out.

With regard to this point, I would like to say that this compli-

cation in my own two cases (under the old method), and I suspect in those occurring in the practice of other surgeons, has been due to the fact that, while the frontal sinus has been efficiently dealt with, yet the fronto-ethmoidal and ethmoidal cells have not been removed at the time of operation, and have reinfected the higher sinus, and pus thus retained under tension has invaded the diploë of the frontal bone.

Since I have given special care to removing the ethmoidal cells I have had no cause to fear osteomyelitis, and I would strongly recommend the simplified Killian operation to your notice.

In other words, osteomyelitis of the frontal bone, following radical operations on the frontal sinus, is due to ethmoidal infection. Remove the diseased ethmoid cells at the time of operation and the bogey need not cause anxiety.

Sphenoidal Sinus.

In three cases deep-seated pain in an ear, otherwise normal, was a very definite symptom. Irrigation of the sinus with a warm lotion, or instillation of a few drops of peroxide of hydrogen solution, will sometimes induce the same symptom.

If the anterior sinus wall be exposed by means of Killian's long-bladed speculum, the pulsation of pus in the neighbourhood of the ostium is pathognomonic of sphenoidal sinus suppuration, and does not mean that the wall of the cavernous sinus is exposed within the sinus. A similar pulsation is often seen in the perforated drum of a chronic otorrhœa.

In operating upon the sinus it is a good maxim always to remove more of the anterior wall than seems necessary at the time of operation, because of the great tendency of the opening to contract.

Free drainage should be our desideratum; curetting the interior of the sinus is not necessary, and it may be very dangerous.

DISCUSSION.

(Dr. Goldsmith's and Dr. Tilley's paper's were discussed together.)

Dr. OTTO FREER (Chicago) wished to speak in defence of the intra-nasal operation of removal of a large portion of the nasal wall of the antrum of Highmore for the relief of its chronic suppuration. He had had six consecutive cases of chronic empyema of the maxillary antrum, with complete recovery in from three to four weeks, simply as a result of free drainage and ventilation of the cavity obtained in this manner, no curetting whatever having been done. The removal of the anterior two thirds of the inferior turbinated body, and the cutting away

with the trephine and burr of the nasal wall to the nasal floor below, into the middle meatus above, and back to near the posterior limits of the cavity made a large window that permitted some palpation with the little finger, and some inspection of the interior of the maxillary antrum. The intra-nasal operation was one that might be done under cocaine anæsthesia, was not painful, and was not nearly as severe a procedure as the Caldwell-Luc operation, which made a wound in the mouth, broke down the massive facial or buccal wall, and required general narcosis. As stated by Claoué and Rethi, and by himself in previous writings, the radical or Caldwell-Luc operation was always possible if the intra-nasal operation failed; the latter really formed its last step placed in advance.

Dr. C. G. COAKLEY (New York) said pain in the teeth was almost always complained of while irrigating an acutely inflamed antrum although the teeth might be unaffected. He urged the intra-nasal operation for chronic suppuration in the antrum before doing any radical operation, and only resorted to the latter in the event of failure of the intra-nasal drainage. Irrigation of the frontal sinuses ought not to be necessary if proper drainage were afforded either before or after a radical operation. He had not removed the floor of the frontal sinus for six months, and found a considerable saving in the time of operation, and, so far, no interference or delay in healing. Pain referred to the ear had been quite common in his cases of acute sphenoiditis.

Dr. HUNTER (Toronto) asked Dr. Goldsmith what he would do in a case of sphenoidal sinus disease when the septum prevented drainage. Would he remove the turbinals or resect the septum?

Dr. E. FLETCHER INGALS (Chicago) said the cases referred to by Dr. Goldsmith illustrated a class some of which would not be relieved by intra-nasal drainage alone. The last remark of Dr. Tilley, that "after all, drainage is what we attempt to secure," suggested the value of efficient intra-nasal drainage. From Dr. Coakley's statement and his own experience he thought that in 90 per cent. of all cases the frontal sinuses could be explored by the probe. In all cases in which this could be done he thought a free drainage canal could be safely established by the pilot burr that he had recommended. He believed that this operation was as safe as any other on the frontal sinus, and that in 90 per cent. of the cases in which it was done it would prove efficient. In the other 10 per cent. the radical operation spoken of by Dr. Tilley, or some similar procedure, would be needed.

Dr. HARRIS P. MOSHER (Boston) pointed out that the two questions they were trying to settle in regard to disease of the frontal sinus were: which operation would cure? and which would leave the least deformity? In his hands the Killian operation had given the more satisfactory results. From the anatomical standpoint it was best fitted to do so. It was capable of dealing with any problem of sinus disease, excluding, of course, the antrum. The chief objection to it was the possible deformity. That the operation was extensive and thorough were points to its credit. When he began to use this operation he expected marked deformity. He soon found, however, that in a sinus of moderate size it left no deformity, and he had been continually surprised to see how large a sinus could be operated upon after this method with no deformity resulting. In the last year he had operated on ten cases by this procedure. The three last were bilateral. He would pass round casts of five of these cases and a cast of a case done by the granulating method. One of the five cases he treated first by the granulating method. It showed very plainly one thing not to

do. The superciliary ridge in the first operation was practically cut through at the root of the nasal bone. One should leave as broad a strip of bone above the rim of the orbit as possible, and the long axis of the opening which is made in the anterior wall of the sinus should be horizontal and parallel with the rim of the orbit, not vertical or obliquely vertical. So far the only case of his done originally by the Killian method which presented deformity was one in which the long axis of the bony opening was obliquely vertical.

Dr. P. WATSON WILLIAMS (Bristol) spoke in reference to sphenoidal sinus disease. He emphasised the desirability of avoiding the removal of normal structures for diagnostic purposes as was often recommended. If the sphenoidal ostium could not be inspected, he punctured the anterior wall of the sinus in its lower portion with his sphenoidal sinus cutting forceps. The procedure was free from risk, unless unjustifiable force was used. The point of the instrument was blunt, so that injury to the small branch of the spheno-palatine artery was hardly possible, which was the only danger of entering the lower third of the sinus. A great advantage of this method was that the forceps were so devised as to avoid the necessity of removing any intra-nasal structures. In antral suppuration the diseased area was nearly always limited to the inner wall, so that the removal of the portion in and around the uncinate process and the lower ethmoidal cell was often sufficient for cure. If it failed, it was then easy to open through the canine fossa, inspect and remove the diseased areas that were discovered. He added that one should avoid removing more of the anterior wall than was necessary for inspection and the use of instruments.

Dr. STCLAIRE THOMSON (London) congratulated Dr. Goldsmith on having placed his finger on two vital points—one the value of publishing their failures, and the other was the difficulty and dissatisfaction they had in complete eradication of ethmoidal suppuration. He was interested in hearing that Drs. Freer and Claoué did fewer Caldwell-Luc operations than they did a few years ago. Last year in Paris he (Dr. Thomson) found that this operation was also in many cases giving place to puncture and repeated irrigation. He had no hesitation in doing a submucous resection of the septum if required, even in the presence of acute or chronic sinusitis. In reference to earache Dr. Thomson would shortly publish a paper showing how misleading this symptom was in sphenoidal disease.

Dr. LOGAN TURNER (Edinburgh) wished to endorse Dr. Tilley's view that when performing a radical operation upon the maxillary sinus the surgeon should open the cavity through the canine fossa. As thorough a visual exploration of the sinus should be made as possible, and Dr. Turner was of the opinion that that could only be obtained by making a large opening through the anterior wall of the sinus. He did not consider that the necessary inspection could be made by any intra-nasal opening.

Dr. GEO. L. RICHARDS (Fall River, Massachusetts) wanted to record his agreement with the position taken by Dr. Freer and Dr. Coakley, namely, that the large majority of cases of antral suppuration could be treated by puncture through the naso-antral wall. If the opening were made large enough the drainage would be good and many patients could be taught to wash out the sinus through a curved cannula or large Eustachian catheter. He found himself doing the radical operation for maxillary sinus disease less often. The question of cure by the intra-

nasal route depended not so much on how long the purulent process had lasted as upon the character of the lining mucosa. If degenerated and filled with polypi intra-nasal treatment would probably fail. In otherwise uncomplicated primary purulent inflammation of the antrum of nasal origin, nasal treatment, provided the opening through the naso-antral wall were large enough, should be successful.

The PRESIDENT considered that the debate showed that the true attitude was one of eclecticism in the selection of pure rhinological or external methods. He was himself in favour of the treatment of rhinological conditions by rhinological methods, but this principle should not be pushed too far. He thought the difficulty expressed by Dr. Logan Turner was met by explaining to the patient that the less radical operation might require to be followed by the more radical one. He (the President) had more than once had occasion to wish he had operated more radically, but he was sure he had in many instances been able by intra-nasal methods to obviate the necessity for external operation. He saw signs of a growing tendency towards the rhinological methods. He reminded the Section of the certain damage to the teeth in children in opening the antrum freely by the canine fossa. He exhibited some curved bougies for the dilatation of the infundibulum which, combined with the use of Sondermann's suction apparatus (also exhibited), he had found of value in the treatment of frontal sinusitis.

REPLY.

Dr. PERRY GOLDSMITH, in reply, said that the method of exclusion referred to by Dr. Tilley might fail in those cases in which the frontal sinus had emptied itself shortly before examination. He thought they should be sure that sinus mischief did not demand immediate attention before they did any major operation on the septum.

TWO CASES OF ABDUCTOR PARALYSIS.¹

By GEORGE L. RICHARDS, M.D.,
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CASES of abductor paralysis are of sufficient rarity to warrant the reporting of each one, so that whatever light the individual case may possibly throw on the general subject may be at the command of laryngologists in general. Like very much of the material reported in medical literature, my cases are more or less incomplete so far as their etiology is concerned, nor can I give their accurate pathology. One of them, at least, is somewhat unusual as regards the age of the patient. I have made no systematic search of the literature, but in a paper by Wilson, published in the *Laryngoscope*

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