

THE PRESENT STATUS OF INTRANASAL OPERATIONS FOR THE RELIEF OF INVOLVEMENT OF THE OPTIC NERVE \*

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Since those remote days—"l'âge de pierre de rhinologie"<sup>1</sup>—when operation on the sphenoid sinus was first considered impossible and later frightfully dangerous, the tide of optimism respecting surgical results has been subjected to many fluctuations, and much wreckage litters these stormy shores. Ethmoid and sphenoid sinuses alike have suffered from the attacks of overenthusiastic and underskilled operators, who have had little experience with cadavers and less radiologic study and who have torn blindly through middle turbinates and scrambled up a suppurating, unrecognizable mass of cellular débris. Too frequently nasal operation has been advised when other sources of toxic irritation to the optic nerve—tobacco, alcohol, multiple sclerosis, syphilis, the teeth, tonsils, gallbladder and the prostate—have passed unconsidered. Certain observers have maintained that from 50 to 80 per cent of patients with acute optic neuritis will get well untreated except by ocular rest and proper diet in the absence of discoverable toxic foci.<sup>2</sup> It is therefore not surprising that so eminent an ophthalmologist as Sir John Herbert Parsons, when the guest of this society a few years ago, expressed decided skepticism regarding the intranasal etiology of optic neuritis,<sup>3</sup> and American ophthalmologists, though early recognizing the probability of this type of infective process, have debated the worth of the results of otolaryngologists for a good many years. How far are the latter to blame for this dissatisfaction?

The recent presidential address of Peter<sup>4</sup> before the American Academy was an agreeable contrast to many discussions of this topic.

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1. Canuyt and Terracol: *Le sinus sphénoïdal*, Paris, Masson et Cie., 1925, p. 278 (bibliography).

2. Lenoir and Beaujeu: *Nevrite optique aiguë*, *Ann. d'ocul.* **161**:502, 1924. Chaillous, J.: *Guérison spontanée des nevrïtes retrobulbaires aiguës*, *Ann. d'ocul.* **161**:106, 1924. Davids, H.: *Der endonasale Eingriff bei Erkrankungen der Sehnerven*, *Arch. f. Augenh.* **115**:66, 1924. Etienne, R.: *Symptômes oculaires et orbitaires dans les sinusites sphénoïdiennes*, Thèse de Paris, 1921.

3. Parsons, John Herbert: *Retrolubar Neuritis*, *Northwest Med.* **24**:4, 1925.

4. Peter, Luther C.: *President's Address*, *Tr. Am. Acad. Ophth. & Otolaryng.*, 1928.

He was frankly convinced of the desirability of radical operation and cited notable instances of visual fields with defects returning to normal after operation, with a minimum of subsequent atrophy when operation was done early. Peter has, of course, enjoyed the collaboration of rhinologists skilful enough to be radical without unnecessary trauma, although he voiced a not uncommon complaint among ophthalmologists, that they hesitate to operate on apparently normal noses.

The pathologic process in this invasion of the optic nerve sheath is familiar, as a result of the basic work of de Lapersonne,<sup>5</sup> van der Hoeve,<sup>6</sup> Loeb<sup>7</sup> and Leon White.<sup>8</sup> Before his untimely death, the last mentioned author departed somewhat from his early views of the influence of a congenitally small or pneumatized optic foramen "strangling" the swollen nerve, and was disposed to consider the adjacent nasal sinuses last among possible causes of neuritis.<sup>9</sup> High resistance of the dural envelop (evidenced familiarly in the course of many mastoid suppurations), while not preventing that edema which is so fatal to the papillomacular bundle, nevertheless must be largely responsible for the infrequency of neuritis from direct extension of suppurative sinusitis. The studies of Onodi<sup>10</sup> and Schaeffer<sup>11</sup> and, more recently, of Canuyt and Terracol<sup>12</sup> exhibit optic nerves in every possible relation to one or both sphenoids, to the posterior ethmoids alone, to the ethmoids and sphenoids in combination or to the sphenoid extension into the lesser wing. Postural suction-filling of the posterior cells with iodized oil 40 per cent, after the methods of Proetz, will show overlapping, imperfect filling and thickened membranes much better than any attempt at direct injection. In the presence of an enlarged blind spot, color scotomas, etc., ocular manifestations varying from day to day, such irregularities in the silhouettes produced by the iodized oil assume diagnostic significance.

5. De Lapersonne, F.: *Névrites optiques et sinusites sphénoïdales*, Ann. d'ocul. **122**:182, 1899.

6. Van der Hoeve, J.: *Enlargement of the Blind Spot; an Early Symptom in the Diagnosis of Optic Nerve Affections Due to Disease of the Posterior Accessory Sinuses*, Arch. Ophth. **40**:30, 1911.

7. Loeb, H. W.: *The Optic Nerve and the Accessory Cavities of the Nose*. Ann. Otol. & Laryng. **18**:243, 1909.

8. White, Leon E.: *The Optic Canal in Optic Atrophy*, Tr. Am. Laryng. Rhin. & Otol. Soc., 1925, p. 211.

9. White, Leon E.: *Location of the Focus in Optic Nerve Disturbance from Infection*, Ann. Otol. Rhin. & Laryng. **37**:129, 1928.

10. Onodi, A.: *Das Verhältniss des Nervus opticus zu der Keilbeinhöhle und den hintersten Siebbeinzellen*, Arch. f. Laryngol. u. Rhinol. **14**:360, 1903.

11. Schaeffer, J. Parsons: *The Nose and Paranasal Sinuses*, Philadelphia. P. Blakiston's Son & Company, 1921.

12. Canuyt and Terracol: *La névrite retrobulbaire d'origine sinusale*, Arch. d'ophth. **41**:120, 1924.

What changes in operative procedure have arisen during the past few years? Have American surgeons become more or less conservative when asked to attack the menace of blindness from sphenothmoidal involvement? Has the ophthalmologist's indecision regarding possible benefit from intranasal operations communicated itself to otolaryngologists?

To the last question, one may safely answer no. The President of this society made statements twenty-three years ago which are entirely valid today: "It is necessary all the more to depend on painstaking and often-repeated nasal examinations, if we wish to clear up a certain percentage of obscure ocular symptoms. Furthermore, now that the ophthalmologists have found it necessary to confine their study more and more to the eye, it is incumbent upon those of us who are doing eye work to keep ourselves and them fully alive to the progress that is being made in this line."<sup>13</sup>

Transantral methods date back to Jansen<sup>14</sup> in 1894 and transfrontal to Killian<sup>15</sup> and others about 1900. Guisez<sup>16</sup> and many others have recently followed the transorbital route. The transseptal method of Hirsch<sup>17</sup> for pituitary tumors was popularized by Segura<sup>18</sup> for sphenoidal work about 1920.

Many German clinicians incline toward Halle's flap method of ethmoid approach, with retention of much of the middle turbinate, and some approve of his idea of covering in the sphenoidal opening by four flaps of mucosa formed by a preliminary cross-shaped incision and packed back into place.<sup>19</sup> Others, and also the Austrians and the French, consider Halle's approach and flaps time-consuming for posterior cases,

13. Hastings, Hill: *Ocular Symptoms of Nasal Origin: Report of Case of Retrobulbar Neuritis*, Tr. Am. Laryng. Rhin. & Otol. Society, 1906, p. 12.

14. Jansen, A.: *Zur Eröffnung der Nebenhöhlen der Nase bei chronischer Eiterung*, Arch. f. Laryngol. u. Rhinol. **1**:135, 1893-1894. Furet, F.: *Trepanation des deux sinus sphénoïdales à travers un sinus maxillaire sain*, Presse méd. **9**:61, 1901. Duverger, A. M. J.: *La voie transmaxillonasale dans les interventions sur l'arrière-cavité des fosses nasales, le corps du sphénoïde, et le nasopharynx*, Thèse de Bordeaux, 1905.

15. Killian, G.: *Die Radikaloperation der Stirnhöhleentzündungen*, Arch. f. Laryngol. u. Rhinol. **13**:59, 1902.

16. Guisez, J.: *Huit cas de trepanation du système sphéno-ethmoïdale par la voie orbitaire*, Tr. Soc. franç. O. R. L., 1906, vol. 22, p. 93; Rev. hebdom. de laryngol. **2**:417, 1906.

17. Hirsch, O.: *Ueber Methoden der operativen Behandlung von Hypophysistumoren auf endonasalem Wege*, Arch. f. Laryngol. u. Rhinol. **24**:129, 1911.

18. Segura, E. V.: *Overture du sinus sphénoïdal et de la selle turcique par voie endoseptale*, Arch. internat. de laryngol. **2**:817, 1923.

19. Passow and Claus: *Operationen am Gehörorgan, in der Nase usw.*, Leipzig, Barth., 1923, pp. 128 and 140.

and prefer the classic method of Hajek,<sup>20</sup> in which hook and forceps are used. Such simplified technic seems to be preferred in Scandinavia, Italy and Holland also, with the addition of the use of forceps, as advocated by Luc and Grünwald. French and other Latin clinics follow Luc's<sup>21</sup> method of crushing and avulsion after removal of the anterior end of the middle turbinate, with the addition of various hooks, divulsors and especially the punch of Faraci. Segura of Buenos Aires has achieved much popularity for the transseptal route,<sup>18</sup> but while this gives an unexcelled clearance to the sphenoids, it leaves the posterior ethmoids untouched.<sup>1</sup> If this operation produces favorable results in retrobulbar neuritis, they must come, therefore, from its destruction of the upper septum and sphenoidal rostrum. Canuyt and Terracol<sup>1</sup> favored the transethmoidal route. Certain English clinicians have recently been employing the Sluder technic, although St. Clair Thomson,<sup>22</sup> Tilley and Watson Williams have long adhered to conservative intranasal methods based on Hajek's early work. Horgan,<sup>23</sup> like Sewall, has recently revived the orbital approach, while in Australia, Verge<sup>24</sup> is again using the frontal-ethmoidal route of Killian.

Mosher<sup>25</sup> clarified the somewhat brutal transantral procedures of Jansen<sup>14</sup> by his careful anatomic studies, and many otolaryngologists have formed their ethmoidal technic on the rules laid down by him and by Skillern.<sup>26</sup> The brilliant work of Sluder created a group of ardent supporters; but, like that of Ballenger, his technic was not uniformly successful in hands less skilful. Many operators now attempt to save the anterior part of the middle turbinate, removing the posterior tip and underlying cells and taking down high bony thickenings of the septum.<sup>27</sup> For this special purpose, the brilliant technic of Sewall's transorbital

20. Hajek, M., in Denker and Kähler: *Handbuch der Hals-, Nasen- Ohrenheilkunde*, Berlin, Julius Springer, 1926, vol. 2, p. 892 (bibliography); *Nebenhöhlen der Nase*, ed. 5, Vienna, Deuticke, 1926, p. 453.

21. Luc, H.: *Les suppurations de l'oreille moyenne et des cavités accessoires des fosses nasales*, ed. 2, Paris, 1910, p. 368.

22. Thomson, St. Clair: *Diseases of the Nose and Throat*, ed. 3, London, Cassell, Appleton, 1927, p. 319.

23. Horgan, J. B.: *Surgical Approach to the Ethmoidal Cell System*, J. Laryngol. & Otol. **41**:510, 1926.

24. Verge, C. A.: *Surgical Approach to the Ethmoid*, J. Laryngol. & Otol. **43**:266, 1928.

25. Mosher, H. P.: *Anatomy of the Sphenoidal Sinus and the Method of Approaching It from the Antrum*, Laryngoscope **13**:177, 1903.

26. Skillern, Ross H.: *The Accessory Sinuses*, ed. 3, Philadelphia, J. B. Lippincott Company, 1925 (bibliography).

27. White, Leon E.: *Sphenoidal Sinus Operations for Optic Nerve Disturbances*, Laryngoscope **34**:135, 1924. Barlow, Roy A.: *Infection of the Sphenoid Sinus*, Ann. Otol. Rhin. & Laryng. **37**:477, 1928.

approach rarely seems necessary.<sup>28</sup> If the antrum is also involved, access to the ethmoid and sphenoid is usually easy, and such drainage is excellent. Kistner recently demonstrated to me a fine example of polypoid swelling in a closed sphenoid reached through the antrum; the only indication for operation had been a rapidly enlarging blind spot. Antrum and sphenoid both presented extensive mucosal thickening, yet in the absence of nasal symptoms it had been difficult to convince this patient of the urgency of an operation to cure the condition of the eye.

For obvious reasons the sphenoidal mucosa is rarely curetted by the intranasal route; nevertheless, eye symptoms may be stirred up repeatedly if the mucosa remains inflamed or thickened. I am reminded of three cases in which the broad, new bony ostium tended to become narrowed by a thin circular collar of scar tissue; these people soon began to complain not only of the classic "posterior" headache, but also photophores, flickering of the letters and tiring after a few minutes at reading or sewing, and they were greatly worried. These patients were all operated on from three to seven years ago. It has been necessary merely to snip away this girdle of diaphragm of scar tissue to secure free circulation of air again and complete freedom from eye symptoms. One syphilitic patient, with a negative Wassermann reaction, has required this relief three times in four years. In two of these cases the sphenoidal mucosa has again become boggy, and I have had to pull out polypoid areas through the enlarged ostium. When severe inflammation is present, the whole membrane can rarely be pulled out like the skin from an eggshell, as Canuyt said.<sup>1</sup> Workers in this field have doubtless all had patients who mentioned seeing showers of "red sparks" when the operator nears the optic canal; and it will generally be found by injection of iodized oil that such people have a considerable degree of encirclement of the nerve by the sphenoid or ethmoid cavities. Occasionally, such a patient will fuss about transitory visual phenomena more than about lacrimation or mastoid-occipital headache, when phenolized oil is injected, according to the method of Sluder, or when iodized oil is used. Indeed, Lynch<sup>29</sup> advises of two cases in which instillation of iodized oil so aggravated the ocular symptoms that immediate operation was necessary; vision was entirely recovered in both.

Now if it is a good surgical procedure and common sense to open and aerate a closed sphenoid in order to do away with occipital neuralgia, why should one not perform the same operation, with equal confidence, in order to prevent blindness? This is, of course, no field for the tyro, and it imposes a most difficult task on one's depth perception. Of about

28. Sewall, E. C.: *Frontal Ethmosphenoidectomy*, Arch. Otolaryng. **8**:144 (Aug.) 1928; *Further Development of the Transsphenoid Approach to the Optic Foramen*, Ann. Otol. Rhin. & Laryng. **37**:839, 1928.

29. Lynch, R. C.: *Personal communications to the author*, 1928.

ten patients whom I can recall, not one has become blind, and all have retained fairly useful vision. These cases were practically all cases of low grade infections, with little if any visible pus, and nothing except occasional lateral pharyngitis and questionable roentgenologic manifestations to suggest sphenoidal involvement. Fortunately, these cases are rare, but I shall keep on operating as they occur, relying on the opinions of Posey, Knapp, Weeks, Luther Peter, Wilder, Ellett and other American ophthalmologists of wide experience. Peter<sup>4</sup> suggested "a frank conference between the ophthalmologist, the rhinologist and the patient, in which the dangers should be frankly discussed. If, by a process of elimination, the usual probable causes of uveitis can be excluded, especially when the ocular disease is unilateral, it would seem that conservative exploratory surgery will offer less risk to the patient's welfare than permanently damaged vision."

To amplify my limited experience and to help in this discussion, Drs. Mosher,<sup>30</sup> Skillern,<sup>31</sup> Hurd,<sup>32</sup> Beck<sup>33</sup> and Lynch<sup>29</sup> have recently been kind enough to favor me with brief comments based on their extensive work in this field. They have all seen numerous patients in whom the optic nerve was involved and in whom the visual disturbance was relieved by operation. Mosher, who now rarely operates in this region, cited the operative results of Leon White, stating that the latter always eliminated dental and tonsillar sepsis before attacking the sinuses. (This seems an order generally adhered to in the United States.) Hurd also emphasized dental sepsis, and Lynch that from the tonsils. None of them found that medical treatment of the nose gives more than passing help.

Agreeing with the observations of European pathologists, these observers find the gross pathologic changes slight, if visible at all; a purulent, draining sinusitis is almost never present.<sup>34</sup> Skillern found closed (or practically closed) cavities, which contained an acrid serous secretion rather than pus. Hurd and Lynch remarked on the low intensity of this ethmosphenoiditis without pus. Beck found little change on microscopic examination, even of tissue removed in his most startling case fifteen years ago; the patient was led in to him practically blind, and now has 20/30 vision. He maintained that blockage of a sinus without clinical manifestations is responsible for severe edema of

30. Mosher, H. P.: Personal communication to the author, 1928.

31. Skillern, Ross H.: Personal communication to the author, 1928.

32. Hurd, Lee M.: Personal communication to the author, 1928.

33. Beck, J. C.: Personal communication to the author, 1928.

34. Canuyt and Terracol (footnote 1), Beck, O.: Zur Pathologie der Nebenhöhlen der Nase bei der rhinogenen retrobulbaren Neuritis optica, Ztschr. f. Augenh. **53**:295, 1924. Syme, W. S.: The Sphenoidal Sinus in Relation to the Optic Nerve, J. Laryngol. & Otol. **39**:375, 1924. Lemaitre, F.: Les complications orbitaires des sinusites, Paris, Doin, 1921.

the optic nerve sheath, and that operation lessens this dangerous edema. The whole matter was recently presented before the Chicago Ophthalmological Society, and the question became greatly confused because tobacco amblyopia, pseudodiagnoses of multiple sclerosis, and like causes of disease of the optic nerve were brought into the discussion. Obviously, the ophthalmologist does not have accurate means of distinguishing between the appearances of the visual fields and the fundus caused by these various neural disturbances and must turn to the rhinologist, the dentist, the serologist and the radiologist for help.

Skillern advised resection of a large portion of the anterior sphenoidal wall and of those posterior ethmoidal cells nearer to the sphenoid; this is also the practice of Beck, Lynch and Hurd. The necessity for work on the septum is stressed by Beck, who avoids simultaneous work on the antrum and frontal sinus if possible. Lynch reported one case of blindness in which middle turbinectomy alone effected a cure.

None of these men had ever seen a patient in whom an intranasal operation seemed to make the eyes worse; and they agreed that imminent blindness is an indication for radical operation on the ethmoid, the sphenoid or both, and is a challenge to surgical judgment. Rare though these cases may be, they offer much greater hope of cure than any other sorts of optic neuritis, if diagnosis and operation are not delayed.<sup>35</sup>

The consensus of present American opinion would thus seem to favor intranasal operation for the relief of optic neuritis caused by congestive lesions of the posterior group of nasal sinuses. Such an operation should be only so radical as to secure decongestion, aeration and release of pressure but not so radical as to invade, traverse or inflame otherwise uninvolved structures. Surgeons performing radical and conservative operations have claimed equally brilliant results;<sup>36</sup> but, as Portmann<sup>37</sup> pointed out: "Les uns et les autres ne constatent le plus souvent rien d'anormal dans les cavités curettées: en effet, les sinus ne sont pas infectés, lla muqueuse est normale, l'intervention agit donc par simple saignée locale et surtout en aérant les cavités postérieures." (Neither finds, most frequently, anything abnormal in

35. Crane, C. G.: Relationship of the Posterior Sinuses to Optic Neuritis, Ann. Otol. Rhin. & Laryng. **36**:201, 1927 (bibliography). Carette, C.: Névrites optiques et sinus postérieurs, Arch. internat. de laryngol. **6**:537, 1927. Rouget and Lemariez: Névrite optique retrobulbaire chez un enfant de dix ans guérie par trépanation du sinus sphénoïdal, Arch. internat. de laryngol. **5**:683, 1926.

36. Lemaitre (footnote 34, fourth reference). Cantonnet, Mayet and Baldenweck: Névrite optique et sinusite postérieure, Ann. d'ocul. **162**:632, 1925. Marx, H.: Orbitale Komplikationen, in Denker and Kähler, Berlin, Julius Springer, 1926, vol. 2, p. 977 (bibliography).

37. Portmann, G., and Pesme: Reflexions sur un cas de névrite optique retrobulbaire, Tr. Congr. franç. O. R. L., 1923.

the curetted cavities; in fact, the sinuses are not infected and the mucosa is normal; the operation is effective, therefore through local blood-letting and especially by aeration of the posterior cavities.) One should heed Skillern's warning:<sup>81</sup> "Of course all these things depend upon the astuteness and manual dexterity of the operator, as well as his knowledge of the spheno-ethmoidal region. Take two similar cases: one man will make a cure and the other man a mess, yet both have attempted the same procedure." To the victim of rapidly advancing blindness we owe our highest duty as surgeons, realizing humbly that

"Oft expectation fails, and most oft there  
Where most it promises; and oft it hits  
Where hope is coldest and despair most fits."

—*Shakespeare, "All's Well that Ends Well," Act. II., sc. i.*