

is not straight lasted on the inner border, or the "swing" of the outer border is not very "full," as in the broad type of shoes, the toes will be increasingly cramped. Likewise the ball of the foot or cross arch in front will be depressed in accordance with the hollowness of the sole.

Patients have come to me unrelieved by treatments with plates and shoes recommended and given by orthopedic surgeons. Examination of the shoes, which often had been made to order at an expense of from \$18 to \$25 a pair, showed that the chief consideration had been to obtain a good grip of the heel and tilt it outward, and the toe of the shoe had been modified to placate Dame Fashion. They were made entirely too narrow to give relief from all symptoms, particularly those in the fore foot. There are many so called "anatomic," "orthopedic" and "foot form" shoes on the market which are designed without much consideration for the toes and fore foot except to be made a little wider, rounder, or of a more common sense type than the average shoes worn by women.

Many patients get relief at first because the change is radical; but if they have not been told to come back and have plates and shoes changed to meet the changes in the feet, they keep on wearing the same style and size of shoe because some prominent surgeon or orthopedist prescribed it. They do not realize that if a depressed arch is to be restored to normal and the arch plate and the shoe are to do any good except to relieve pain, the foot must become shorter and narrower. It cannot do this if the patient continues to wear a certain size plate in, say, a No. 5 shoe; when the normal foot measurement would call for a 3 or 4 shoe.

I have the same criticism to make in regard to stock or shoe store plates, which are indiscriminately prescribed and are even advocated and advertised in reputable medical journals. The average store plate is absolutely wrong mechanically. It is really a valgus shaped plate too long on the inner border and too short on the outer border. It usually has no lateral concavity and tips the foot inward into the opposite position from which it should be. To correct a valgus, the foot must be put in varus, a simple fact we all know. Yet I have seen surgeons prescribing and using plates that only increase the trouble. If the person with the flattened foot wears a No. 6 shoe, the clerk puts on a plate of corresponding size, which fits the patient and thus violates one of the commonest rules in orthopedic practice, namely, that patients should be made to fit the apparatus and not vice versa.

Certain conclusions must be drawn from such practices. The surgeon or practitioner is ignorant of the subject, or uses a stock plate because he can buy it cheaply in quantities and make a profit on it; or he is satisfied to have his patient obtain some relief from pain, to receive his fee and get rid of the patient; or he recommends certain plates and shoes because he sees them advertised in medical journals and demonstrated at medical conventions. Many seem willing to relieve pain and obtain fees rather than run the risk of losing a patient, especially a society patient, by insisting on what they know to be a correct shoe and what a normal foot should wear. They also neglect to follow up the foot needs until structurally it becomes as nearly normal as possible.

Now that the whole subject of body alinement is receiving attention, it seems to me that nothing should be more impressed on the general practitioner, the

surgeon, and the more inexperienced in orthopedic ranks, than the importance of foot posture and the correct surgical use of shoes. Furthermore, as much emphasis should be laid by them on the fact that they should expect and require their patients to use a correct shoe, when they prescribe it, just as they would expect them to take medicine prescribed for some functional derangement.

## THE ENDONASAL OPERATION ON THE LACRIMAL SAC\*

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To many it may seem a presumption for a rhinologist to enter the sacred domain of this section and discuss a subject so intimately the field of the ophthalmologist. The *Grenzgebiet* is still a cause for strife between surgeons as between nations. My own hope is that in the domain of medicine, at least, it may soon be transcended by that higher aim, "the ultimate good to the patient," just as in national life it may ultimately be a question of "the greatest good to the greatest number." Then will humanity and benevolence rather than selfishness be the guiding principle in men's lives.

The demands of modern medicine become each day more extensive and exacting, and the specialties each day more circumscribed in their limitations. Whereas, in this country at least, it is but a short cry back to the times when the same individual encompassed, or attempted to encompass, within his domain, the diseases of the eye, ear, nose and throat; such a condition exists as a rule today only in the relatively smaller communities. Ophthalmology has come into its own as a distinct specialty, just as otology bids fair to do in the not too remote future. This assumption of authority and finality in our own limited field makes us in a way more than ever dependent on help from our fellows, according to the extent to which that field affects or is affected by the field of our fellow worker. So the ophthalmologist, who calls in the rhinologist to perform an endonasal operation on the lacrimal sac, is no more of an anomaly than the internist who invites the technician of his field, the surgeon, to perform an operation for appendicitis; the surgeon who invites the otologist to perform an operation on the mastoid process; or the rhinologist who calls to his aid the dentist in his care of a diseased antrum, or to complete the result of his tonsil and adenoid operation by attending to the proper alinement of the child's teeth. Here is an instance in which team work and not selfishness, but mutual cooperation, spells success for both, and assures, or helps to assure, a successful outcome for the patient. My own cases are only those which have been referred to me by the ophthalmologists. In fact, I have no opportunity of seeing such cases in any other way.

Until a few years ago, according to West,<sup>1</sup> the treatment of dacryostenosis had made no real progress for a period of twenty-five years. In 1910 West published his paper entitled "The Window Resection of the Nasolacrimal Duct," and exhibited in all seven patients operated on by this method. This paper, as

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<sup>1</sup> West: Berl. klin. Wchnschr., 1914, 51, 1633; Arch. f. Laryngol. u. Rhinol., 1913, 27, 224, 504; Berl. klin. Wchnschr., 1913, 50, 926.

the title indicates, referred only to the operation on the duct, but laid no claim to being an endonasal operation on the sac. In three of the cases, however, the sac itself was really opened. West soon became convinced that the opening of the nasal duct alone could not be sufficient, and that any operation, to be successful, must concern itself rather with the opening of the lacrimal sac as well. He immediately set himself about the new task, and, through the generosity of Professor Silex of Berlin, gained access to an exceedingly rich clinical material. The results of his later endeavors he reported in 1913. At that time, he reported the investigation of over 300 cases of various diseases of the lacrimal apparatus, and the operation on the lacrimal sac in 130 cases by the endonasal method. He claimed a favorable result in over 90 per cent. of the patients so operated on.

West asserts that Caldwell was the first to open the lacrimal canal, in 1893, when he reported one case. Still later, Killian and Passow reported similar cases. The idea of reestablishing the connection between eye and nose, as a passageway for the tears, was known to the ancients, who were for the most part unsuccessful in their attempts. In 1863, Berlin had revived the extirpation of the sac from without, and this had remained the operation of choice almost to the present. In 1904, Toti published the results of his attempts to reestablish the natural pathway from without by means of a skin incision at the inner angle of the eye. In 1910, von Eiken published a paper in which the approach to the sac by way of the antrum was advocated. West performed his first operation in 1908.

The various operations, previously described, were successful only in a relatively small proportion of cases. The external operations often gave rise to fistulas, and, if successful, as far as the curing of phlegmon was concerned, necessitated later the excision of the lacrimal gland to get rid of the epiphora. The resulting scar, too, was often unsightly. West's earlier operations on the nasal duct were also unsuccessful, because the stenosis occurred at the inferior border of the sac, where it joins the duct. The operation was, accordingly, inferior to and outside the field of the real difficulty in a large proportion of cases.

West's modified operation concerns itself with the lacrimal sac alone, the duct being disregarded. The free opening of the sac itself he regards as essential, if a cure is to be expected. That the sac is really opened in all cases is shown by the fact that a probe introduced into the lower punctum passes horizontally into the nose. A minute knowledge of the anatomy of the parts is absolutely essential. The technic is as follows: A quadrangular flap, covering the end of the lacrimal sac, and extending well forward over the ascending process of the superior maxilla, is resected submucously, its base of attachment being inferior. After its resection it is turned downward out of the field of operation, this inferior attachment acting as a hinge. The denuded area extends vertically through a space roughly limited by an anterior extension of two lines, the upper marking the attachment, and the lower the inferior border of the middle turbinal. Neither turbinal is encroached on, unless an obstructing hypertrophy is present. By means of appropriate chisels, a portion of the posterior border of the nasal process of the superior maxilla is chipped away, and the thin bone, covering the sac, resected. The sac itself is then grasped with forceps and a large portion of its nasal aspect resected with a thin scalpel. The

submucous flap is now replaced, the posterior part, over the area of the resected sac, being first removed. The flap is held in position for twenty-four hours by packing of iodoform gauze. The after-treatment is exceedingly simple, and consists in keeping the nose free of crusts and granulations, and irrigating the sac by way of the canaliculus with a 3 per cent. solution of boric acid. As stated before, West claims favorable results in 90 per cent. of his cases.

The advantages of West's, over the previous methods, for the treatment of the various diseases of the lacrimal apparatus, he enumerates thus:

"1. The physiologic function of the path for the tears is again restored, so that not only a suppuration of the sac, a lacrimal fistula or a phlegmon is healed, but also the tears flow normally through the nose. A later epiphora is accordingly avoided.

"2. A so-called cure by probing is rendered unnecessary.

"3. The lacrimal gland is spared.

"4. A skin incision or a curetting from without, with eventual scar formation, is avoided."

This operation he has performed in every possible sort of disease affecting the lacrimal apparatus.

After the operation, certain persons, by sharply blowing the nose, can force air out through the canaliculus. West does not consider this a disadvantage, as the patients do not complain of it. Halle's suggestion for forming a valve of the mucosa, in order to prevent this, he regards as impossible of accomplishment.

A more recent endonasal operation on the lacrimal sac is that of Yankauer.<sup>2</sup> The latter considers the West operation unsatisfactory because of the tendency of the opening of the middle meatus to close, such objection being avoided by his improved operation.

In the operation of Yankauer, the horizontal incision is begun at the attachment of the anterior end of the middle turbinal and carried forward for a distance of 5 mm. It is then carried downward to the anterior border of the inferior turbinal and backward along its inferior, free border, for about 2 cm., or from one-third to one-half the length of the turbinal. The incision is carried well down to the bone and the roughly rectangular flap, thus outlined, resected submucously, its posterior attachment acting as a hinge. On this hinge it is folded backward and held in place by tucking it under the anterior free end of the middle turbinal. A part of this submucous resection consists of the mucous membrane and periosteum on both sides of the anterior end of the inferior turbinal to a point well back of the opening of the nasal duct. The bony portion of the inferior turbinal, so uncovered, is then resected with punch forceps. The bony covering of the canal and sac is now removed with chisel and punch forceps, and the canal at its extreme posterior aspect slit from the opening in the inferior meatus to a point well above the junction of the inferior portion of the sac with the duct. When the sac is found to contain pus, a portion of its inner wall is resected to allow for free drainage into the middle meatus. This opening into the middle meatus closes subsequently. The internal wall of the duct and sac are now folded forward and held in position by folding the previous submucous flap down on it. The latter flap is held in position by a single stitch as well as by packing. The subsequent treatment consists in removing the pack-

2. Yankauer: *Laryngoscope*, 1912, p. 1331, Vol. XXII, Tr. A.M. Laryngol., Rhinol. and Otol. Soc., 1913, 294.

ing after twenty-four hours, and irrigations through the lower punctum, the nose, of course, being kept free of crusts while healing is taking place.

Yankauer reports in all nine patients operated on by this method, during a period of three years: "Two were cases of mucocele of the sac; the other seven were suppurative. The suppuration ceased in all cases after the operation and has not recurred in any of them. The epiphora was relieved in all but one of the cases."

The most recent operation devised is that of Mosher.<sup>3</sup> This method of opening the sac and duct was come on, as it were, by accident from an observation of the specimens on the cadaver in the development of Mosher's operation on the ethmoid labyrinth and frontal sinus. After removal of the anterior end of the middle turbinal and free exposure of the processus uncinatus, Mosher's stiff probe is introduced through the duct into the inferior meatus, the canalculus having previously been slit. A roughly rectangular flap, limited anteriorly by the posterior lip of the ascending process of the superior maxilla and a portion of the superior border of the inferior turbinal, superiorly by the extreme limit of the middle meatus, and posteriorly by the extreme inner tip of the uncinate process, is now resected submucously and deflected downward and backward.

The inner wall of the lacrimal cell and bony covering of the duct are now broken through with an appropriate curet, the nasal process of the superior maxilla acting as a guide anteriorly. The fragments are removed with a conchotome. The inner wall of the duct and sac are now broken through by slowly withdrawing the probe, at the same time turning its tip sharply inward toward the septum. The probe is then reintroduced, and serves as a guide to the curetting away of the posterior tip of the ascending process of the maxilla, as well as the upper part of the processus uncinatus. The canal is subsequently widened by biting forceps after the probe is withdrawn, practically to double its previous width. A ligature is then passed through the nose upward and out through the dilated punctum, a piece of gauze being attached, kite-tail fashion, to its middle. This gauze is then drawn upward into the lacrimal sac, and the ends of the ligature fastened to the face with adhesive tape. The flap is now replaced.

After-treatment consists in removing the plug after two or three days, keeping the nose free from granulations and crusts, and keeping the passage free by passing the probe wherever it is indicated. Mosher asserts that the probe can be passed either from the nose or from the inner canthus. The operation "has been abundantly tried on the cadaver and three times on the living." Mosher admits that "it is too soon to say much about the results on the living, except that, so far, they are good."

From a review of the foregoing methods and operations it would seem that in the development and perfection of the endonasal method a possible solution of a difficulty, which has long been a perplexing one, may be reasonably expected. Certainly the external operation and its after-results have left much to be desired. The endonasal route obviates many of the disadvantages of the external operation. Whether or not the physiologic pathway for the tears into the nose can be maintained permanently in a sufficient percentage of cases at the hands of the average rhinologist is a question which time alone can answer.

3. Mosher: *Laryngoscope*, November, 1915, p. 739.

The results in my own series of eight cases have been fairly good. The West operation was that of choice in all but one. In this the Yankauer operation was done. In only one case was there a complete failure. In this case the antrum was accidentally entered. Whether or not this had anything to do with the unsuccessful outcome it is impossible to say. In three cases a secondary operation was performed, that is, the stenosed opening at the beginning of the middle meatus was enlarged. All were cases of dacryostenosis and cystitis, except one. This was a case of stenosis and epiphora following a permanent opening into the antrum for empyema.

My own technic differs slightly from that of West. After the submucous flap has been outlined and elevated, a probe is inserted into the canalculus, sac and duct. If this is difficult, the assistance of the ophthalmologist is summoned. This probe is held in place by an assistant. Its pressure renders the uncovering of the duct and sac easier. When the duct is freely uncovered, the point of the probe is directed inward toward the septum, thus bulging in its septal wall. A thin scalpel is now inserted between the probe and the lateral nasal wall, and the incision carried well up beyond the isthmus, so that the probe ultimately passes horizontally into the nose, as suggested by West. In this way a considerable portion of the duct and sac is completely removed. The infiltration of a few drops of 0.25 to 0.5 per cent. novocain solution, to the dram of which from 1 to 2 drops of epinephrin have been added, following the preliminary cocaineization renders the operation bloodless, as well as absolutely painless. The only pain complained of in any of my cases was that from the pressure of the lacrimal probe.

To many this operation from its description may seem difficult or impossible of accomplishment. It is difficult, and this difficulty I shall not attempt to minimize. The difficulty, however, is no greater than that attendant on the submucous resection of the nasal septum, and I can assert with firm conviction that any one who can perform a submucous resection can successfully perform the endonasal operation on the lacrimal sac.

In my hands the difficulties have been considerably lessened by the use of the modification of West's instruments, which I herewith present.<sup>4</sup>

#### ABSTRACT OF DISCUSSION

DR. HARRIS P. MOSHER, Boston: I have operated on nine patients. The results of four, after a year, are known. Three were operated on two years ago. When last seen the results were good. One recent case is still under treatment and the result is not yet apparent. One case was of mucocele of the sac. After nine months there was no return of swelling of the sac and the opening into the nose is patent. The second was of long standing, a suppurative sac, with a skin fistula. The eye is all right and the tears run over only when the patient gets cold. A third patient had a suppurative sac for seventeen years complicated by an infected mucocele of the ethmoid labyrinth. There is now a patent opening into the nose and the tears run over only on a cold day or in a strong wind. The fourth patient had a bony occlusion of the nasal duct which the ophthalmologists, after a number of trials, could not relieve. This man is wearing a style at the end of ten months, and with it there is no running over of tears except in a strong wind.

4. In addition to the references already given, the following will be found of interest:

Onodi: *Monatschr. f. Ohrenh. u. Laryngo-Rhinol.*, **46**, No. 4.

Mithoefer: *Ohio State Med. Jour.*, September, 1916.

Horgan, J. B.: *The Operation of Dacryocystorhinostomy: Its Indications and After-Treatment*, *Jour. Laryng., Rhinol. and Otol.*, London, June, 1916, 225.

As to technic, if there is deviation of the septum to the side of the diseased sac, the lacrimal operation should be preceded by a submucous resection of the septum. The easiest approach to the sac is through the thin bone of the anterior ethmoid region. The steps of the operation are as follows: The anterior end of the middle turbinate is removed and the slitting probe is introduced through the cut canaliculus into the sac and on through the nasal duct to the floor of the inferior meatus. Next, the anterior ethmoid cells are exenterated. Then a cut is made in the mucous membrane of the nose along the posterior edge of the ascending process of the superior maxilla, and the probe withdrawn to the upper margin of the inferior turbinate, and when clear of the turbinate the point is pressed upward and inward and made to break through the nasal duct into the nose. The tip of the probe is then slowly forced upward, all the while slitting the inner wall of the nasal duct. The upward excursion of the probe is finally stopped by the increased resistance of the superior part of the lacrimal bone. Experiments on the cadaver have shown that this manipulation opens not only the nasal duct, but the lower two-thirds of the inner wall of the lacrimal sac. Unless it is the purpose of the operator to exenterate the lacrimal sac intranasally, the operation is finished by inserting the silver style. This may be removed at intervals and cleaned. On evidence of closure of the duct the style must be reinserted.

DR. WILLIAM B. CHAMBERLIN, Cleveland: One point I did not have time to bring out in the paper is the subsequent closure. This is a difficulty in any endonasal operation. Three of my patients were operated on the second time; but the secondary operation is comparatively a simple thing. The probe is introduced through the sac again and at the point of stenosis you can see a slight bulging. It is a comparatively easy thing to resect this with the punch forceps. In the after-treatment, if one is careful in keeping down granulations, as in any other part, epidermization will not be retarded. In many cases a preliminary submucous resection, especially a resection as high up as we dare go, is absolutely essential. It is a *sine qua non* of the operation.

Another point Dr. Mosher brings out in the discussion is the resection of the posterior part of the ascending process of the superior maxilla, which makes a groove for the duct. This is dense, firm bone. It is for the resection of this ascending process that West has devised his chisels, and it is for the resection of this process that I have modified his chisels, making them very much thinner, and also putting on the handle, thus enabling one to see every step of the operation. The view is less obstructed than with the West chisels, and you can insert it under the bone, and if it does not make a clean cut the bone may be fractured by a twisting motion. The forceps are a modification of the familiar Gruenwald forceps for the ethmoid, and are quite as effective as the instrument which West has especially devised for the purpose.

**Managing Atypical Children.**—Atypical or backward children should not be coddled, but encouraged, and, like plants of slow growth, in some instances they may be "forced." This may be done by supplying favorable conditions for growth and development, and by directing their physical activities in the right channels. Comparatively poor health is not always a contraindication, but often a decided indication for this forcing process. Many a nervous child immediately begins to improve physically as well as mentally when well directed pressure is brought to bear upon him in psychophysical education.—G. Hudson-Makuen, M.D.

## THE REACTION AFTER INTRAVENOUS INJECTIONS OF FOREIGN PROTEIN \*

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During the last two years, intravenous injections of foreign proteins have been used as a therapeutic agent in various conditions. Satisfactory results have been reported in a variety of acute infections. In these reports the phenomena accompanying the injection are taken up as incidental to the presentation of the therapeutic results.

With the intravenous injection of a foreign protein, a certain reaction takes place which is fairly constant in all cases. For the purpose of observing the phenomena following the injections, careful records were made in the cases of acute articular rheumatism in which this treatment was employed. Observations were also made in a few cases of chronic arthritis and lobar pneumonia.

The foreign protein employed in these cases was typhoid vaccine. The vaccine was prepared from an active culture, grown twenty-four hours on agar slants, washed off with saline solution, killed by heating at

70 C. for two hours, and preserved by 0.5 per cent. phenol (carbolic acid). The vaccine was diluted so that each cubic centimeter contained 150,000,000; and injections of from 0.25 to 0.5 c.c. were used as the average dose.

Patients were taken as they entered the hospital with no selection except to exclude certain cases in which the vaccine was contraindicated, as will be shown later. Certain routine measures were taken

in the cases in which vaccine was given. The patient was allowed nothing to eat for at least one hour previous to the injection, so as to ward off nausea and vomiting. During the chill the patient was well covered with blankets. When the joints were acutely inflamed, from  $\frac{1}{6}$  to  $\frac{1}{4}$  grain of morphin was given to relieve the pain incident to the involuntary movements of the joints during the chill. The patient was kept in bed three days after all symptoms subsided. The vaccine was injected in the morning about three hours after breakfast, and the general symptoms, temperature, leukocytes and blood pressure were followed through the day and on the next morning.

### THE GENERAL REACTION

Certain general symptoms were noted following the injection. For from half an hour to an hour there is no apparent change in the patient's condition. Then a chill occurs, which may become quite severe, and is accompanied with the usual symptoms of cyanosis and rapid pulse. With the onset of the chill the patient frequently complains of a dull temporal headache; nausea and even vomiting may be frequent at this time. The chill lasts from fifteen to thirty minutes and sub-

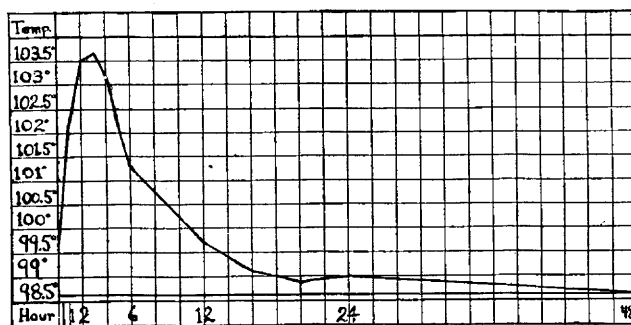


Chart 1.—Composite temperature curve following forty-seven intravenous injections of typhoid vaccine in twenty-five cases of acute articular rheumatism.

\* From the medical clinic of Dr. Joseph L. Miller at Cook County Hospital.