ON A
NEW METHOD OF TREATMENT
APPLICABLE TO
CERTAIN CASES OF EPIPHORA.

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THE most common cause of obstruction to the flow of the tears into the nose, is inflammatory thickening of the mucous lining of the excretory channels, with accumulation of morbid secretions in the sac. But there are other causes, affecting only the puncta or canaliculi, yet equally preventing the escape of the tears, and therefore quite as annoying and as detrimental to sight. It is to certain examples of this latter kind, that the present brief communication refers.

Among these may be mentioned, *displacements* OUTWARDS of the puncta, generally the lower one, so that the tears no longer reach the orifice, and of course cannot enter the canal; and *closure of the puncta or canaliculi*, following mechanical injury or ulceration.

Of the displacements of the puncta, a common one is that which attends ectropion, in which the mucous membrane of the lid is thickened and often cuticular, and the tarsal margin, including that part surmounted by the punctum, becomes rounded and flattened, and the punctum thrown out of the course of the tears. The mucous lining of the

canal and sac here often participates in the inflammatory thickening.

The treatment of this displacement may sometimes resolve itself wholly into that of the ectropion, and the punctum, when restored, as far as possible, to its proper direction, may, in a great measure, resume its function. And I have remarked, that in some instances of old standing ectropion, although the punctum continues displaced, yet the *stillicidium lacrymarum* gradually subsides, apparently in consequence of the diminishing sensibility of the mucous membrane as an excitant of the lacrymal secretion, under its long exposure to the air, and slow approach towards the characters of skin. Indeed, it is singular how little these patients sometimes suffer from the obstruction, except when the secretion is augmented by a cold wind, or other accidental cause.

In other cases it will happen, that after the ectropion is cured by one of the various operations in common use, the epiphora remains,—the punctum either continuing a little displaced, or at least surrounded by tumid tissue, and irreparably altered in structure. If it should appear that the sac is itself healthy, the mode of treatment presently to be described will then be applicable.

But there is another and a much simpler displacement of the punctum than that which accompanies ectropion, and which, as far as regards the arrest of the tears on the front of the eye, is even more incommodious to vision, inasmuch as the lid itself, retaining nearly its natural position, holds up the tears upon the front of the cornea, where they occasion false refractions of the light, which are not common in the epiphora of ectropion. Moreover, the secretion of tears seems to be maintained at its usual rate, and is not diminished as it often is in chronic ectropion.

A close examination is necessary to detect the cause of the epiphora in these instances. The lid is either in natural contact with the globe, or only slightly recedes from it in certain positions, as when the eye is turned upwards. The natural prominence on which the punctum is placed, is

however, wanting, and, instead of it, there is a flattened or rounded cutaneous surface, on which the orifice may be discerned (though with difficulty) at a little distance from the mucous surface of the lid, and much reduced in size, being in fact never wetted by the tears, but dry and contracted.

When the situation of the orifice is discovered, a probe may be easily introduced into the sac, which is itself empty, proving the integrity of the apparatus, except as regards the position of the punctum.

There appear to be at least two causes of this displacement of the punctum: one, a slight chronic inflammation of that part of the conjunctiva lying near the punctum, producing thickening and consequent eversion—(this may exist alone or in connection with any of the chronic ophthalmiæ, especially those of the lid),—the other, a chronic affection of the skin of the lower lid, somewhat resembling eczema, by which a general but moderate contraction of it is produced, and the punctum is drawn outwards.

It is a remarkable fact, that an extremely slight displacement outwards, will destroy the function of the lower punctum, and the following considerations are offered in explanation of it. The puncta are naturally so placed, as to be either altogether on the conjunctival aspect of the lid (as in some of the lower animals), or else (as in man) at the very margin at which the skin and conjunctiva blend. Now skin differs from mucous membrane, in the superficial layers of the cuticle being rendered greasy by the sebaceous secretion, so that they throw off water as greased paper does; whereas, the corresponding part of mucous membrane is moist, and water adheres to it. To apply this to the eyelids, and their relation to the passage of the lacrymal fluid:—the tears have to be directed towards the puncta, and to enter these orifices; and if the skin were not greasy up to the margin of the lids, the tears would be very apt, indeed would be certain, to ooze over the tarsal margin on to the cheek. The skin of the lids is, however, exceedingly delicate and thin, and deficient in sebaceous follicles. But to supply this want, there is a great development of sebaceous

glands, placed so as to pour their secretion on the margin of the lid, close upon the line of junction of the skin with the mucous membrane—on that part where there must be a constant tendency for the moisture of the mucous membrane to soak through and wet the surface of the cuticle, and yet where it is so essential to the retention of the tears, that the skin should be greasy. So that I regard the meibomian glands as existing, not for the purpose, as stated in anatomical works, of preventing the agglutination of the lids when closed, (which would be no more likely to happen here, without sebaceous matter, than it is to occur between the lips of the orifice of the urethra,) but for the purpose of maintaining that greasy state of the surface of the cuticle at the margin of the lid, which prevents the tears from escaping over the cheek. And I may add, that the probable use of that sebaceous gland, called the caruncle, is to throw the tears into a little pool above it, where they may be taken up by the puncta; for even the lower punctum glides above the caruncle in the winking movements of the lids. Now it appears, that the punctum, though situated on the confines of skin and mucous membrane, partakes only of the character of the latter. Its margin is always naturally moistened by the tears, and is not greasy. The mucous surface on its inner side, over which the tears approach it, is also moist and conjunctival. Now in the cases to which attention has been called, the punctum has its margin greasy and cuticular, as a consequence of its displacement and exposure, and the membrane on its inner side is similarly changed, so that the tears are prevented from coming up to it, and do not wet it, but collect in a drop at the caruncle. And if the punctum is pushed back into contact with the tears, its margin instantly throws off the moisture, and cannot be wetted by it. In some cases, a margin of $\frac{1}{60}$ th of an inch of greasy membrane on the conjunctival side of the punctum, is sufficient to destroy its function.

I had seen instances of epiphora depending on the structural changes now adverted to, which resisted all treatment short of operation, and in which no operative procedure like

those in common use—such as removal of a portion of mucous membrane—seemed to promise a good result, when the following case presented itself:—

A woman, æt. 43, came to be relieved of chronic ophthalmia in the left eye. The upper lid was a little deformed between the punctum and sac, owing to its having, as she said, been injured when she was eight years old. On examination, the canal was found to have been torn completely across, yet the orifices to have remained open, so that a probe introduced through the punctum, emerged near the caruncle, and could be reintroduced at the lower orifice (which was of ample size), and carried forwards into the sac. No epiphora existed.

A second case, much resembling this, occurring some time afterwards, led me to reflect whether a somewhat similar division of the lacrymal canal might not be artificially made with advantage in some inveterate examples of epiphora, so as to remedy all the inconveniences of the affection, by giving the tears a new way into the sac; for these instances seemed to show, that such an orifice in the canaliculus would not be disposed to contract, as it might have been expected to do from the analogy of other mucous ducts, while it would probably serve as well as the original punctum to convey the tears. This idea was tested in the following manner:

A young man, engaged in a warehouse in the city, had suffered for two years, from constant watering of the eyes. The skin of the lower lids seemed to have been affected with chronic eczema—it was red, shining, and contracted. The lower lids at the inner canthus were a little separated from the globe, so that the puncta had not their proper backward direction, but appeared flattened and slightly everted. The tears, collecting at the inner canthus, did not touch the puncta. The upper puncta were similarly flattened, and were small and indistinct. A probe passed readily through all the puncta into the sacs.

14th Feb., 1850. Introducing a probe into the left lower punctum, I cut transversely upon it, midway between the punctum and caruncle, on the conjunctival aspect, and

brought out the probe at the wound. I then slit up the canal a little way towards, but not quite up to, the punctum. This wound of course did not completely cut across the canal. It was made where the tears collected, and I hoped that it would remain open and allow them to enter the canal. But though I kept it open by separating the edges daily, and afterwards by passing a thread through the punctum into the canal, and bringing it out at the new opening, the tendency to close was so great, that on removing the thread ten days after, the wound immediately healed, and the operation proved unavailing. While the thread had remained, however, he had experienced great relief, and the tears had hardly accumulated.

On March 9th, the canal was pervious to a probe from the punctum to the sac, without obstruction. Despairing of keeping open an orifice thus made in the side of the duct, I determined to attempt the same object in another way, viz., by slitting up the canal from the punctum, for a length sufficient to carry backwards the orifice on to that part of the mucous surface, where the tears collected. This I did with a scalpel, by the aid of a punctum probe introduced as a guide. On the following day, the section being adherent in its whole extent, I broke through the adhesions with a probe, and repeated the same process a few times, so as to prevent union of the margins, while the wound was healing. On the 20th, the canal was converted into a groove, and the edges showed no further disposition to adhere. The tears found their way from this groove along the remaining part of the canal into the sac, and the epiphora was almost entirely relieved. I was therefore encouraged to perform the same operation on the opposite lower lid, and was pleased to see it followed by the same satisfactory result. In July, the parts remained in exactly the same state. The epiphora was quite removed. He could pursue his employment with comfort. I have recently seen him, and found the cure satisfactory.

The experience afforded by this case, led me to reject the plan of dividing the canal transversely, as first suggested by

the cases of accidental injury, and to adopt the more simple expedient of slitting it up for a short distance from the punctum, on the conjunctival aspect.

In thus destroying the punctum, I was not without some misgivings whether the tears would be taken up by the new orifice thus artificially made, at a part of the canal unprovided with the same structural arrangements which it is usual to attribute to the puncta. These fears were unfounded, for the tears entered the canal perfectly at the intermediate point. This result renders it probable, that too much importance has been given to the punctum by writers on the lacrymal apparatus, and perhaps also to that three-sided channel which is said to be formed between the margins of the lids and the globe of the eye, when the lids are closed, and which is supposed to be useful in directing the tears towards the puncta. In the sheep, the orifices of the puncta are obliquely placed on the flat, or slightly rounded, margin of the lids, and the shape of the meibomian margin does not admit of the formation of any such triangular groove as that now alluded to. In the human subject, also, I believe it will be found, on close examination, that the edges of the lids are not so bevilled as to form a triangular groove by their apposition in front of the globe. When the lids are closed, they touch each other by the posterior or meibomian, and not by the ciliary, lip of their margin. Indeed, the position occupied by the meibomian orifices would prevent this supposed channel from playing the part usually assigned to it.

It is interesting to notice the difference in the tendency to contract manifested by the new orifice, according as it is made by a total transverse, or by a partial longitudinal division. In both cases, the divided tissues of the wall probably undergo the same kind, and most likely the same degree of contraction; but when the division is transverse, a slight contraction in the circular direction will close the canal; whereas, when it is longitudinal or oblique, a corresponding amount of contraction of the divided margin of the wall cannot close, or even much constrict, the entrance to the canal, because the wall is only divided along one side of its circumference, and the rest is left uninjured.

In fact, the analogy of the urethra guided me in this respect, where, in the able hands of my friend Mr. Fergusson, I had seen a longitudinal division of the canal from the orifice which remains after amputation of the penis, obviate that most troublesome of the results of this operation, the tendency to a stricture at the point cut across. Both canals are allied in structure and function, as ducts of glands, and both possess in their walls that muscular element which seems the seat of the slow contraction, following division, to which allusion is now made.

Of course I should not advise this operation to be performed in *recent* cases of displaced puncta, nor in any in which other and milder treatment seemed available. It is well to remark, however, that no visible deformity results from it, and that no one would be aware it had been performed without an accurate examination of the part.

The following is another instance in which it has been at once successful in relieving a long-standing case of most annoying epiphora.

A clerk to a shipping-agent, æt. 57, caught slight cold in the right eye two years and a half ago, and since then the tears have always run over the cheek, especially when exposed to the cold air; at times the eye has been inflamed in a trifling degree. He has been annoyed with having to use the handkerchief constantly through the day, and his sight has been much troubled by the continual suffusion of the eye with tears.

I found the sac and lacrymal apparatus quite healthy, except that the border of the lower lid, in its inner half, was rounded and slightly flattened, so as not to fit accurately to the globe. The punctum, instead of being at the summit of the usual angular projection, lay forward on a flat surface, and was hardly visible. The skin around it was dry and cuticular, and the tears never reached it, but accumulated about the caruncle and along the margin of the lid. I passed a probe with ease through the punctum into the sac; there was no obstruction.

I slit up the canal for one eighth of an inch, on a probe, and along the mucous aspect. Two days after he came to

have the margins of the slit separated. They were adherent and filled up by lymph, which I broke through. He had experienced no relief as yet. Two days afterwards I found the slit permanently established, its margins healed, and the orifice carried backwards on the conjunctival surface for one eighth of an inch to near the caruncle. He was greatly relieved. He had been out much in the air in the prevailing east wind the previous day, and the eye had scarcely watered at all. In the last two days the eye had been better than for two years and a half. Since this I have frequently seen him, but no further interference has been required. He seems entirely cured.

At the commencement of this communication I alluded to cases of epiphora, depending not on displaced but on *obstructed* puncta or canals. Such cases do occur every now and then, either by simple contraction or stricture of the canal, or from ulceration or accidental injury. It is remarkable that the tears do not always accumulate in these cases, either from the remaining punctum doing double duty, or from the ordinary secretion of tears being scanty. My friend Dr. Budd sent me a patient suffering from the secondary effects of concussion of the eyeball. I found, besides, that the lower canal had been divided about the middle, and that it was completely obstructed at the seat of the cicatrix. There was no stillicidium. But, in general, such a condition is attended with weeping; and in some of these cases, a modification of the operation I have described may be applicable. The proposals of Monro and Petit, to make new conduits, by carrying a thread, or making an incision, into the sac, have long since been forgotten. Such artificial passages close as soon as the seton or the bougie ceases to be inserted. It seems essential to the object of restoring the course of the tears, that the caralculus should itself furnish the channel; and this can be accomplished only in those instances in which the point of obstruction is sufficiently far from the sac to allow of the canal being slit up in the interval, and through the conjunctiva. Two methods of operating offer themselves: the first, by cutting transversely across

the direction of the canal, close to the obstruction, on the side towards the sac, and then slitting up the canal on a probe introduced at the wound made; the second, supposing no orifice can be found after this transverse section, by opening the sac below the tendo oculi, and then slitting up the canal, near the obstruction, on a probe run into it from the sac. The orifice of the canaliculi within the sac is so large, that I have no doubt a skilful surgeon could readily do this, if he had previously taken pains to acquaint himself with the anatomy of the parts. I have found it easy in the dead subject, but have not yet had a case in which to test its feasibility in the living. Of course the canal in these cases must be slit up through the conjunctiva, near the caruncle, or the tears could not find their way into it.

In conclusion, I would observe that there are cases of epiphora depending on obstruction of the canaliculi close to the sac, in which this operation would be out of place. The sac itself is empty; a probe passes easily along the canal from the dilated punctum, and is arrested at the entrance to the sac. If forced against the obstruction, the outer wall of the sac, with the skin over it, is moved towards the nose, and the surgeon experiences an elastic resistance; whereas, if there is no such stoppage, and the probe enters the sac, it comes into contact with the inner or osseous wall, and the skin over it is not moved. As the distance between the punctum and the inner wall of the sac is just half an inch when the canal is stretched by drawing the lid outwards, a probe covered with gold for that length will prove a useful help for determining whether the probe has actually penetrated the sac. In these cases, it will be remarked that the punctum is wetted by the tears; and it seems to me that that not uncommon dilatation of the orifice and of the canal, usually attributed to paralysis or relaxation, is, in fact, the consequence of the stricture—the tears constantly filling those parts on their way to the sac, but being unable to pass onwards.