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MOVEMENTS OF THE UPPER EYELID ASSO-
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OF THE EYEBALL.

BY

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SYNCHRONOUS or associated movements of the upper eyelids have recently attracted much attention. Numerous observations have been published of lid movements associated with movements of the jaw or with the act of swallowing.

Another form of associated lid movement has lately been described by Fuchs.¹ In this form the lid rises or droops when the eyes are moved laterally. Fuchs found but three cases hitherto published in which similar associated movements were observed. In five of his own cases the upper lid was raised when the corresponding eye was adducted, and in three the same lid movement occurred during abduction of the eye. He cites the case of Browning,² which belongs to the former variety, and the two cases (brothers) of Phillipps,³ belonging to the latter. These are the only cases recorded in which such observations have been described. In this paper I shall describe two cases which have come under my observation. Both belong to the second variety of the associated movements just mentioned.

CASE I.—Miss S. W., æt. eleven, came to my office July 6, 1891, complaining of slight asthenopia. The right eye appeared normal, but the left was smaller and lay deeper in the orbit. The examination with the ophthalmoscope showed that both eyes

¹ *Beiträge zur Augenheilk.*, ed. by Deutschmann, vol. ii., No. 11, p. 12.

² *Transac. of the Ophthalm. Soc. of the United Kingdom*, 1890, p. 187.

³ *Transac. of the Ophthalm. Soc. of the United Kingdom*, 1887, p. 306.

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were healthy. V R. E. with $+0.5$ D cyl. ax. vertical $\frac{8}{8}$ almost, V L. E. $\frac{8}{8}$, not to be improved with glasses. Besides this it was found that the movements of the left eye toward the nose were somewhat restricted, but that there was almost complete paralysis of the external rectus muscle. In testing these movements of the eyeball, the synchronous movements of the upper lid attracted my attention. When the eyes are directed forward the left palpebral fissure is $2-3$ mm narrower than the right. When the attempt is made to look to the left, the left upper lid is raised so much that the palpebral fissure is as large as on the right side. If the eyes are turned to the right, the left palpebral fissure becomes very narrow. The difference in the palpebral fissure in the two extreme lateral positions of the eyes is very great. This patient had binocular vision when the eyes were directed forwards. It was ascertained by the test with cylindrical glasses as suggested by Lippincott.¹

I have recently succeeded in securing a second and more careful examination (July 30, 1893), and I find my observations of two years ago almost unchanged. When the patient looks directly forward the right palpebral fissure measures 11 mm vertically, the left 7 mm. On looking to the right, the latter only measures 4 to 5 mm, while the former remains the same; but on directing her vision to the left, the left eyeball remains stationary in the median line and the lid is raised as high as on the healthy side. There is slight convergent strabismus when she looks directly forward (10°). This is a marked change since the first examination. When her left eye is used alone she can adduct it to 40° (measured on the perimeter), but when both eyes are open and the attempt is made to look in the same direction, the left eye is adducted but slightly and is turned upwards or downwards according to whether the plane of vision is slightly above or below the horizontal. When the left eye fixates the palpebral fissure widens, and when she attempts to abduct the eye the fissure enlarges sufficiently to expose sclerotica, above and below the cornea. If the eye is then adducted to the greatest possible extent, the eyelids almost close. There is no apparent effort at convergence, and the left lid remains stationary when the eyes are directed from a distant object to a near one. The left upper lid follows the upward and downward movements

¹ See Lippincott, "New Tests for Binocular Vision," *N. Y. Med. Journ.*, 1890, and my paper "Binocular Metamorphopsia Produced by Correcting Glasses," these ARCHIVES, vol. xxi., No. 2, 1892, p. 211.

of the eyeball in a normal manner. The pupil does not change during the lateral movements of the eye. The vision of the left eye can be raised from $\frac{8}{18}$ to $\frac{8}{12}$ by $+0.5$ Ds = $+0.75$ D cyl. ax. 30° n. The field of vision is normal. The test for binocular vision is successful only when the object is held a little to the right. No diplopia can be discovered in any part of the field.

In this case the ocular paralysis was congenital according to the statement of her relatives, and this is substantiated by the fact that the patient has an undeveloped eye and orbit.

CASE 2.—B. C., æt. seventeen (female, white), was treated at the City Hospital Dispensary during May, 1893, for vascular keratitis of the right eye due to granular conjunctivitis (limited to this eye). I noted complete paralysis of the left external rectus with very slight convergent strabismus (not more than 5° or 10°) when looking directly forward. The vision of the right eye was somewhat impaired on account of the corneal opacities, but the eye was otherwise healthy. The examination of the left eye with the ophthalmoscope showed no abnormality excepting a high degree of astigmatism. This accounted sufficiently for the diminished vision of this eye ($\frac{6}{36}$). Diplopia could not be produced in any way, either when looking forward or laterally. For this reason it was remarkable that the patient had the habit of turning her head a little to the left when looking at an object; her eyes were thus directed somewhat to the right—evidently in the interest of binocular vision.

When the patient's eyes are directed forwards, the left eye is slightly wider open than the right. The right upper lid touches the margin of the pupil; in the left eye about $\frac{1}{2}$ mm of iris is exposed between the margin of the pupil and the edge of the upper lid. The right palpebral fissure does not vary during the lateral movements of the eyeball, but the left changes considerably. When eyes are moved to the right or when the eyes are converged (adduction of the left eye), the upper lid falls about 2 mm—so that the pupil is half covered and the palpebral fissure is much smaller than on the right side. On moving the eyes to the left (the left eye does not move beyond the median line), the left palpebral fissure becomes so wide that about 1 mm of sclerotica is exposed above the cornea. Similar lid movements occur when the eyes are moved laterally, either in an elevated or in a lowered plane of vision. No pupillary changes were visible during these movements.

In this case likewise I believe that the affection is congenital. The patient has no diplopia, and does not remember ever to have had it. There is no secondary contraction of the antagonist—the internal rectus, a peculiarity of congenital paralyses.

It would be difficult to decide whether the paralysis in the two cases just related is nuclear or not.

Fuchs' cases, in which the lid was raised in abduction of the eyeball, are as follows :

1. Male, twenty-nine years ; ocular movements normal. On looking directly forward no difference is noticeable in the palpebral opening on both sides, but when the right eye is adducted the eyelid droops. The affection was probably congenital.

2. Male, forty-five, syphilitic. Right eye : Slight ptosis and paresis of the internal rectus, pupil dilated, and the accommodation paralyzed. This condition disappeared under treatment with potassium iodide, but at the same time the like affections appeared in the left eye. It was then that the left upper eyelid showed the associated movements under consideration,—it was raised in abduction of the eye, but drooped in adduction. A year afterwards the ptosis had entirely disappeared, and likewise the associated movement. There was absolute paralysis of convergence (though the lateral movements were normal), the pupils were unequal and stationary, and there was paralysis of the accommodation.

3. Female, æt. twenty. Paresis of the external recti muscles, especially of the right, and slight ptosis of both upper eyelids, slightest on the left side. (The ptosis on the left side soon disappeared.) In looking to the right, the eyelids remain in the same position, but in looking to the left the eyelids fall 2 mm. In convergence or when the eyes are raised or lowered, there are no peculiar movements of the eyelids. In this case there was relaxation of the right lid in adduction, and of the left in abduction.

Now all of these cases differ markedly from those I described. In the first there was no ocular paralysis, a prominent feature in both of mine. In the second there was paralysis—but of the *internal* rectus, and ptosis ; these symptoms, however, occurred during adult life—and were not congenital. The third case had paresis of both external recti muscles, but while the right lid drooped in adduction,

the left drooped in abduction. In the case of Phillipps, quoted by Fuchs (see above), the affection occurred in two brothers, aged seven and three years respectively, and was bilateral in both. There is no mention of any ocular paralysis.

A careful study of these cases shows that the peculiar associated movement under consideration may occur in a variety of conditions—without any paralysis or with paralysis of the external or of the internal rectus,—and that it may be congenital or acquired.

For the sake of completeness I shall refer briefly to Fuchs' cases in which an associated movement existed, opposite in kind to the form we have considered. In these cases the upper lid was raised during adduction of the eyeball. His five patients were all adults. In one only was the affection congenital. All had ocular paralysis (probably nuclear); three had paralysis of all the ocular muscles, one of the superior rectus and levator palpebræ, one of the superior and internal rectus with slight paresis of the inferior rectus). In three of the cases the contraction of the paretic upper lid was so great during adduction of the eye that it rose higher than on the healthy side. Two of the cases showed contraction of the pupil during adduction, and in one there were interesting rhythmic associated movements of the lid and pupil. To these cases we must add the last one of Fuchs' mentioned under the former head of associated movements, in which the right lid relaxed in adduction, while the *left relaxed in abduction*, and also the case of Browning referred to by Fuchs, in which there was a congenital associated movement in both lids—each was raised whenever the internal rectus of the same side contracted. As in the foregoing variety, it is seen that these likewise occur in a variety of conditions.

The associated movements which have been described belong, as Fuchs has already stated, to the same category as those involuntary movements which occur in paralyzes of the extremities.¹ The excessive nerve energy which is ap-

¹ Excepting, perhaps, such cases as Browning's, which, according to Fuchs, may be considered physiological.

plied to the paralyzed nerve overflows into another channel. Fuchs calls attention to the fact that this must occur in the nuclear centres of the ocular nerves, for if it occurred in higher centres the impulse would be directed to both eyes.

In conclusion the various forms of associated movements of the lids may be stated.

1. Contraction of the orbicularis associated with movements of the jaw or the contraction of various facial muscles (after facial paralysis).

2. Contraction of the levator palpebræ superioris associated with the act of moving the jaw or of swallowing; and,

3. Contraction of the levator associated either with abduction or with adduction of the eyeball.

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