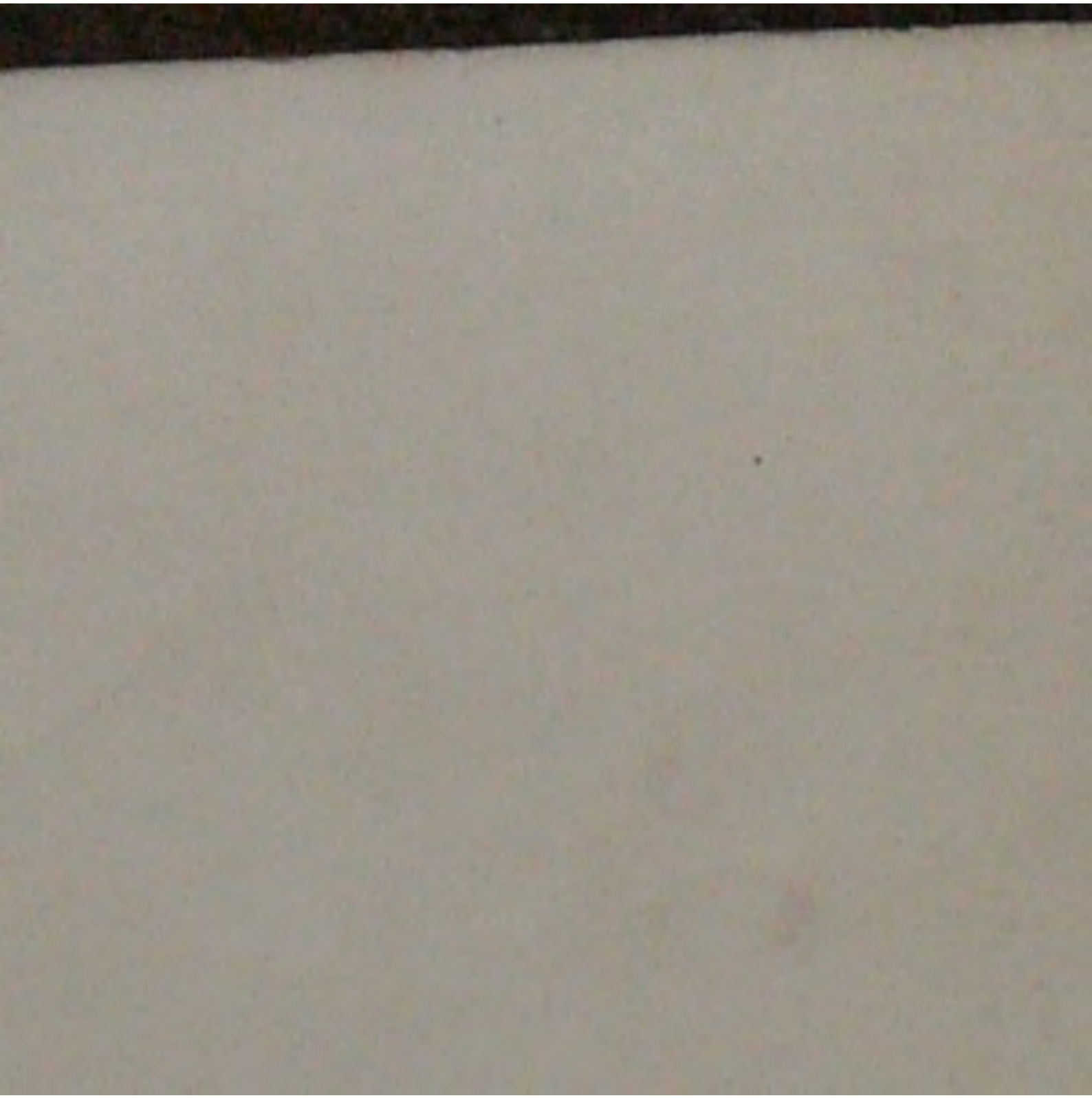
Stretching of the facial nerve for the relief of spasm of the facial muscles / by W. Allen Sturge and Rickman J. Godlee.



STRETCHING OF THE FACIAL NERVE

FOR THE RELIEF OF

SPASM OF THE FACIAL MUSCLES

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STRETCHING OF THE FACIAL NERVE

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STRETCHING the facial nerve for the relief of 'tic spasmodique' is an operation that has been but seldom performed. The condition itself is so distressing, and the relief afforded by the operation is, for a time, if not permanently, so complete that we have thought it right to bring the notes of the following case before the society.

Our patient was a lady, seventy-two years of age, who consulted Dr. Sturge at the recommendation of Mrs. Garrett Anderson. She came from a very long-lived family in which but little tendency to nervous disease had manifested itself. Her mother and her sister, however, appear to have possessed a nervous temperament, the latter having a distinct attack of depression and over anxiety about trifling things. Mrs. ——, had not been very strong as a girl, but enjoyed excellent health during the middle period of her life. She had been married, but had had no children, and lost her husband six years ago. This event caused her a considerable shock, and though she struggled against it, her health gave way and she suffered from great depression, with a feeling of powerlessness and a sense of difficulty in doing anything. This condition has very much passed off, but a very little will bring it on again, and when it recurs her memory, even for familiar things, becomes very imperfect. About the time of the onset of this fit of depression, twitching commenced round the right eye, and afterwards extended to all the muscles of the face. She has been under the care of eminent London physicians, who have administered amongst other things arsenic and opium, but without producing any effect on the

disease. A long stay in the country once almost led to an arrest of the twitching, but it again recurred, and for the last two months (before July) it had been getting rapidly worse. During this latter period she had been staying in London or the neighbourhood, but had not been subject to worry or anxiety. The twitching was worse immediately after meals, but about half an hour later it diminished considerably. Fatigue increased it. She complained of no pain except the discomfort resulting from the twitching, nor were we able to detect any tenderness on the superficial branches of the fifth nerve. The spasms prevented Mrs. —— from sleeping, but we have no evidence as to whether it continued during sleep.

The condition of things being almost unbearable, the patient was eager to submit to any line of treatment that gave the least hope of relief, and was quite prepared to exchange her spasms for a palsy.

On July 20, she was placed under the influence of chloroform, and it was noticed that the anæsthetic did not arrest the twitching. The nerve was then cut down upon by Mr. Godlee in the following way, adopting the method that was first described by Baum: an incision was begun behind the ear, about opposite the meatus, and was carried downwards and forwards to a point immediately below the lobule, and then it was prolonged almost perpendicularly, but slanting a little forward, nearly to the angle of the jaw. A small transverse incision was also made below the pinna. After exposing the edge of the sterno-mastoid and the parotid gland, these structures were separated deeply and were pulled respectively backwards and forwards. As soon as the edge of the digastric appeared, the knife was discarded, and the structures immediately above and parallel to the upper border of the muscle were one after the other pulled up with a blunt hook or forceps and cleaned with a steel director. When the nerve was reached and raised on the hook, the twitching at first increased, a somewhat firmer pull arrested it for a time, but it began again on relaxing the tension, a still firmer pull not only stopped the twitching, but caused the right side of the face to pass into a state of complete paralysis. After this had occurred one or two further pulls were given and then the wound was closed. It may be here stated that the operation was conducted antiseptically, and that healing took place without any suppuration and was complete on about the ninth day.

It may be well to add a few remarks on the subject of the operation. A large number of experiments had been made previously on the dead body, and it was found that while, in children and thin subjects, its performance was easy, in stout muscular people it became decidedly difficult. The amount of tension which the nerve would bear differed also very much; in some cases it resisted for an appreciable time the strongest pull one could exert, in others it snapped across with the greatest readiness. The line for the nerve is exactly parallel with the upper edge of the digastric, and it will be found about half down that part of the mastoid process which is exposed in the wound, viz. the free anterior border. The great auricular nerve will be in part divided. The posterior auricular vein very often occupies a position which would involve its division in the first incision. No normal artery of importance is likely to be met with in the deep parts of the wound, though considerable hæmorrhage may arise from glandular branches. The posterior auricular artery may be divided in cleaning the structures below the ear, but can give no trouble. In fact as long as the operator keeps in the same plane as the digastric muscle he can scarcely wound any vessel of importance. It must not be forgotten that the deep parts of the wound are in very close proximity to the internal jugular vein. The trickling of blood into the wound makes the operation much more difficult on the living than on the dead subject, and it is not advisable to undertake it without a good light and two pairs of hands to assist, one to hold the parts aside and the other to sponge.

The sequel of the case is shortly told. On the following day there was a good deal of pain, which was compared to toothache, all over the right side of the face, and in the ear. This pain seems to have been present in all the recorded cases, and in all, as in the present instance, lasted some weeks. She was seen occasionally up to August 19, when the paralysis of the face was still complete. A good deal of trouble was caused by the gaping of the eye and the consequent conjunctivitis, which was relieved by the application of mildly astrigent collyria, and holding up the lower lid with plaster, but beyond this there was nothing to record.

On October 19, we saw her together and made the following note:—Patient looks much better, stouter in the face, sleeps better, and says she has forgotten about the twitching; improvement began a month ago and has gone on rapidly.

Shortly before it began there was pain and tenderness on the side of the nose; now a similar condition is complained of on the supraorbital notch. The pain in the ear has quite gone, but lasted till a week ago. There are occasional neuralgic pains in different parts of the head. The forehead at rest looks equal on the two sides; there is no dropping of the eyebrow, perhaps the furrows are rather deeper on the left side. There is still considerable deficiency of movement both in elevating the eyebrow and in frowning. The eye can be closed completely, but less forcibly than the left. In winking, the right eyelid acts very little, the lower lid still drops a little and the patient complains of some epiphera. The muscles about the mouth have undergone a certain amount of postparalytic contraction leading to almost complete symmetry of the face at rest; there is however still marked deficiency of movement about the mouth, but in none of the muscles is movement absent.

Once during the examination after the patient had been laughing, there was a distinct slight twitching of the muscles at the side of the mouth, consisting of three or four little twitches rapidly following one another. The patient herself has noticed absolutely nothing of the kind, and of course we did not draw her attention to the occurrence. We shall hope before this paper appears in print to add a postscript giving an account of her condition some months later.

In conclusion it may be mentioned that four cases only of the performance of this operation appear to have been placed on record. A reference to them will be found in an article by James J. Putnam, M.D., in the 'Boston Medical and Surgical Journal' for August 26, 1880. The first was by Baum, who after exposing the nerve seized it with a pair of forceps, and not only pulled it in both directions but squeezed it forcibly as well; in his case the paralysis began to diminish in the second week, but did not completely disappear until several weeks later. A second was by Schüssler who used a hook, as has been done apparently by all subsequent operators. The third case is by Eulenberg, and the fourth by the author Dr. Putnam. Dr. Putnam's case did not show any signs of recovery from the paralysis for two months, and Eulenberg's not for four months, a fact of great importance and interest. In none of the cases had the spasms returned at the time of making the report.

Remarks by Dr. Sturge.—The question of nerve stretching for spasmodic muscular conditions has now been before the

profession for some time. Two or three years ago Mr. Barwell stretched the nerves of the brachial plexus in a case of muscular spasm of the arm. In this case no good result followed the operation. In another case of spasmodic action of the arm Mr. Lister stretched the cords of the brachial plexus, and in this case also the result was negative.

On the other hand every one of the five cases of spasm of the facial muscles, that have hitherto been treated by stretching the facial nerve has been, at any rate for the time, cured. I think that these facts may help us in obtaining some clue as to the rationale of the treatment, and as to the class of cases in which the operation of nerve stretching is liable to prove efficacious.

The case of muscular spasm of the arm which was operated upon by Mr. Barwell, was characterised by spasm in muscles, supplied by many nerves. The spasm was not constant, but was only brought on in connection with certain co-ordinated movements. Certain other movements could be performed without the production of spasm of any kind, and there was likewise no spasm when the arm was at rest.

The case of spasm of the arm upon which Mr. Lister operated was primarily one of extremely severe clonic torticollis. Having begun as usual in the muscles concerned in rotating the head upon the neck, it subsequently involved the right arm, the muscles of the back, and other groups of muscles. It was, in fact, a case of wide-spread spasm, involving muscles supplied by many nerves and having a tendency to increase both in area and degree.

In the case of facial tic, on the other hand, the spasm is confined to the muscles supplied by one nerve only; every muscle supplied by this nerve is affected, as a rule, in about an equal degree. The spasm takes place without any reference to movements or other actions on the part of the patient; the spasmodic action being an unmeaning contraction of the facial muscles strictly analogous to that which would be produced by a faradic current passed through the facial nerve.

In considering the positions in which a lesion, whether a so-called functional or a so-called organic lesion, may conceivably be placed to produce a symptom of this kind, we must mention the following:—

(1.) The muscles themselves.

(2.) The nerve trunk.

(3.) The centre from which the nerve takes its immediate origin, *e.g.*, in the case of the facial nerve, the facial nucleus in the medulla oblongata.

(4.) Cortical centres for governing the movements of individual facial muscles.

(5.) Coordinating centres for various movements in which the face is implicated, presumably situated in the grey matter of the pons Varolii, crura cerebri, or great ganglia at the base of the brain.

That the symptoms are due to a primary muscular lesion may, I think, be denied on account of the way in which the spasm is confined to the distribution of a certain nerve. Neither is it easy to imagine any morbid state of the trunk of the facial nerve which should be capable of keeping up an almost constant clonic spasm for so long a time. Movement cannot orginate in nerve fibre alone, the function of the fibre being to conduct impulses originated elsewhere, but not to originate them itself.

We are thus reduced to the consideration of lesions seated somewhere in the grey centres connected with movements of the facial muscles. With a view to aiding this consideration I will examine briefly the various forms of movement of which the face is capable.

(1.) There is the movement of a single muscle under the direct influence of the will. Certain persons possess the power of moving individual muscles of the face in a high degree; others have the power only slightly developed.

(2.) There is the movement of groups of muscles to produce coordinated action, each muscle being contracted to the extent only that is necessary for the harmonious association upon which the success of the action depends. This form of movement is seen in the semi-automatic facial movement of every-day life.

(3.) There is the gross incoordinate action in which all the muscles supplied by the facial nerve take part together, no muscle being more active than another. This is the type of movement seen in the form of facial tic of which our patient offers an example.

There are two sets of nerve centres connected with the facial nerve, about which we are justified in speaking positively. These are:—

(1.) The small nucleus in the medulla oblongata, from which the facial nerve takes its immediate origin and with which the whole, or nearly the whole, of the facial nerve is

connected. A lesion involving this nucleus might be expected to produce effects upon the face, the distribution of which would be the same as those arising from a lesion of the nerve; destruction of the nucleus would be followed by total paralysis of that side of the face which it supplied; irritation of the nucleus would result in spasm of all the muscles under its influence—a spasm affecting the muscles in about equal degree with no attempt at coordinated distinction between them.

(2.) The other set of centres are those in the cortex of the brain, situated according to Ferrier over a wide area consisting of the lower part of the ascending frontal, the back part of the third frontal, and the lower part of the ascending parietal convolution. Here, the fibres passing up from the facial muscles have spread themselves out widely, and experiment proves that the cells with which these fibres are connected are intimately associated with governing movements other than those of the face. The nerve centres governing the facial muscles have ceased in the higher regions to be collected into one compact group; and any lesion involving these widely scattered centres in such a manner as to affect all the facial muscles would be sure to affect also functions other than those of the face.

The question arises whether there may not be centres connected with the face between these two extremes situated in the grey matter of the pons Varolii, crura cerebri, lenticular nucleus, caudate nucleus, or elsewhere.

Ferrier says, speaking of the corpora striata, 'They form, as it were, the centres of automatic, or subvoluntary integration of the various motor centres differentiated in the hemispheres.' This statement probably applies with equal truth to the masses of grey matter in the crura cerebri and the pons. The functions of these various centres have not been fully made out; but they will probably be ultimately found to be connected with coordinations more or less elaborate, involving muscles supplied by totally different nerves, such coordinations for instance as those involved in sipping, drinking, mastication, deglutition, &c. If this be so, an irritative lesion of these centres would give rise to spasms affecting coordinated movements allied to chorea, rather than to the kind of spasm seen in facial tic.

It will, I think, be evident from these considerations, that facial tic probably depends upon a lesion of the nucleus of the facial nerve in the medulla oblongata.

Now, the rationale of nerve stretching must be sought for in the profound shock produced on the nervous system by the operation, and this shock may be supposed to act on:—

(1.) The nerve fibres themselves.

(2.) The centre from which the fibres take their immediate origin.

(3.) The higher centres to which the nerve passes after leaving the centre just named; the effects of the shock ultimately making their way to the cortical centres themselves.

It is perfectly evident that the parts which will suffer most will be the fibres of the stretched nerve and the nerve cells from which they take their immediate origin. The cells in the higher centres will be less and less affected in proportion as they are farther and farther removed from the nerve trunk, the cortical being affected least of all.

From this it would follow that those varieties of spasm which depend upon a lesion of the lowest centres, as shown by the simplicity of the spasm and the complete absence of any attempt at coordinated movement, are more likely to be influenced by nerve stretching than those which, by their complexity and coordination, point to a lesion of one of the higher centres.

I think therefore that in examining cases of spasmodic action of muscles, with a view to treating them by nerve stretching, it will probably be found of the utmost importance, so far as prognosis is concerned, to examine carefully whether the spasm is confined to simple incoordinated contraction of the muscles supplied by one on more nerves, or whether it be a complex coordinated action allied to those seen in chorea, athetosis, or the condition termed hemi-kinesis.

With a view to clearing up this point, I think it very important that all cases where nerve stretching has been employed without success should be reported, and that in all such cases an accurate description of the kind of movement present should be given, that we may be able to judge of the relative action of nerve stretching on the various forms of spasm.

Report on the further progress of the case.—May 27, 1881.—Since October last, when our paper was read, the success of the operation has been for the most part maintained. When last seen, about a week ago, the face was quite free from twitching, and the action of the muscles in ordinary movements of the face was almost equal on the two sides. Within

the last month, however, there has been an occasional slight twitching of the right side. The first return of spasmodic action was clearly traceable to a depressed state of general health, associated with supraorbital neuralgia. The patient was advised to keep perfectly quiet in a darkened room; a blister was applied over the right supraorbital nerve, and three grains of quinine three times a day were prescribed. Under this treatment the patient lost her neuralgia, and with it disappeared the slight twitching that had been present. A second return of twitching, still very slight, has since occurred, and in this case also it was dependent upon a depressed state of general health, due to the fact that the patient had been subjected to severe mental strain, attended with anxiety.

The patient finds that a cold wind makes the right side of her face feel stiff, as though the muscles were contracted. This is especially noticeable in the eyelids when the eye is exposed to cold. This partial contraction under the influence of cold is avoided by wearing large protecting spectacles.

Mention was made in our first communication, of a patient who had suffered from twitching on both sides of the face, and on whom Mr. Godlee had a few days previously stretched the left facial nerve. This patient was subsequently shown to the society about thirteen weeks after the operation, when the paralysis induced by the stretching had just begun to disappear. It was hoped that an account of his case might be added to this communication, but as it does not yet seem ripe for publication it is proposed to defer it till next session. It may, however, be here stated that his right facial has since that time been stretched, and that the right side of the face remains paralysed, while the left side has regained its power completely. It cannot be said, however, that he remains altogether free from twitching; there is an occasional slight spasmodic action about the orbicularis palpebrarum, and he finds it difficult to open the eye if he closes it when exposed to a cold wind.

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