# PRACTICAL ELECTRO-THERAPEUTICS

—IN—

# CHILDREN'S DISEASES,

—BY—

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# PRACTICAL ELECTRO-THERAPEUTICS IN CHILDREN'S DISEASES.

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IN commencing the consideration of such diseases of early life as are amenable to treatment by electricity, I shall follow the division of Dr. Charles West, and speak of them with reference to sensation, to motion and to the power of speech. In early life, pain is rarely if ever, a disease by itself; like the neuralgias of adult years, it is a symptom of disease. Our little patients cry or scream or whine, but never without cause, and the careful physician, who knows that a baby's language is as expressive in its way as his own, and who has learned to interpret its tones, will be sure to discover that cause before his search is done. To be a good child's doctor, requires a mixture of woman's tender tact and loving sympathy with man's trained perception and quick decision, a combination sufficiently rare, yet by no means unknown. The unformed baby brain can give no intelligent answer, can only send along the optic nerves such supplicating, pitiful appeals for help as touch the coldest heart, and make every watcher long to give the needed aid.

The nerve disorders of early life are apt to be severe in nature, serious in result, and it is perhaps well that they are comparatively limited in number. The child's nervous system is undeveloped, is in process of growth, and lacks capacity for serious injury as its osseous structure is incapable of complete fracture. There is within the nerve centres of the infant an excess of supply over use, the surplus going toward new cell formation as a regular process. But it results frequently that some interruption to the stream is followed by a damming up of energy which finds an exit in an explosive way, without any of the importance which a similar occurrence in an adult would carry with it. Indeed, Hughlings Jackson says that a child's nervous system is physiologically so unstable that the least excentric irritation may produce an explosion. It is necessary to bear these points in mind when approaching the diseases of nerves among children, as well as the fact that they are naturally far more excitable than their older brothers, as well as far more amenable to treatment.

Electricity acts upon children with peculiar force and in a peculiar way. Contrary to what one would naturally suppose, they bear currents of much greater relative strength than adults, only provided that no shock be given and that they be not frightened. Once a child has fear firmly impressed upon its mind, treatment is useless. To use force is simply to invite a series of hysterical events or even to induce convulsions of even more serious nature. There is never any need of this. The instruments are regarded with curiosity or amusement, the hum of the vibrating armature of the faradic machine is attractive, and if care is exercised in commencing the application, it will be enjoyable rather than frightful. I have found it always best in using a current for tonic purposes, to employ the bath. The flow is thereby evenly diffused over the surface, much higher potential may be employed, and the child will rarely notice that anything is being done. Only no salt must be put

in the water. The rationale of the proceeding is that the blood being a better conductor than fresh water, the current will traverse the body from pole to pole rather than go around it through the water. That this is true, experience has amply proven and a single experiment will demonstrate. The current direction is a matter of considerable importance in many cases, but no general rule can be given. One sponge pad, or what I regard as preferable, a round carbon plate, should be suspended at the head of the tub, a few inches from the patient's back, never in contact with it, and attached to the positive pole, the negative similarly arranged at the feet. With the switch pins and draw tube of Flemming's faradic machine a gradation of current may be obtained from the very weakest up to a strength as great as can be borne. There are few cases where galvanism is required, as there are in childhood few disorders of the nerve center, and the tonic influence of a mild fine faradic current, regularly and frequently applied, will usually be found quite sufficient to procure all possible results. In the frequency of treatments, lies the secret of success in electrical-therapeusis with children. Tissue change is progressing with such wonderful rapidity that the influence of this, or of any form of force, is rapidly dissipated—thrown off from the changing economy. Two or even three times daily is not too often to apply the electrodes—and it will be found that in a majority of cases, better results will thus be obtained than with fewer applications. It will be found important also to see that armature and platinum pin controlling the vibrations, are in a perfect state of cleanliness, or there will be occasional skips of current that are startling to an adult and correspondingly aggravating to a little one, who is all wonder at the strange doctor or the strange instrument. More than half the success attained in treating children electrically, depends upon tact, patience and care upon the part of the operator.

Pain is among children the leading disorder of sensation for which we are consulted, and is, setting one side disorders of digestion, usually in the head or legs. West, in his Lumlican lectures, says: "Pain in the head is almost invariably symptomatic of organic disease of the brain; in the legs with almost equal certainty—of hip joint disease." In point of fact, electrical treatment is, in my experience, never sought for infantile cerebral disorders, and they are therefore dismissed from our practical consideration. In many instances, however, I believe that it might very usefully supplement medicines and nursing, especially in those cases where the disease is accompanied by a high degree of nervous restlessness. And, as it is easily within the power of any general practitioner to try it, I advise the following method: At bed-time, after the child is prepared for the night, let its feet be placed in a basin of warm salt water, together with the negative pole of two Leclanche cells—the positive being attached to a large sponge also well wetted and applied to the vertex. Allow the current to flow ten minutes, or longer, until the child exhibits symptoms of sleepiness and quiet. This method is absolutely devoid of danger, and can scarcely fail to sooth enraged nervous action, besides being easy of execution.

But if pain in the head in children has never been submitted to me to treat electrically, the number of cases of pain in the legs is very large. Nor can I agree with Dr. West as to its invariable origin in hip-joint disease.

In a list of twenty cases of this class treated during the past year, I have not found a single one where a rigid examination could detect any pain or tenderness over the acetabulum. They were all of spinal origin and yielded to treatment

directed to that organ. When a child is submitted to expert examination for pain or lameness or loss of power in either or both legs, and these symptoms are concomitant, after the usual tests for temperature, state of reflex sensation, tendon reflexes and motility have been applied, the electric search for location of the lesion is thus conducted. Using a faradic current strong enough to cause firm contraction of normal muscle fibre, which can be tested best upon the operator's thenar prominence, apply small button electrodes to each superficial muscle in turn. If they respond normally to electrical stimulus and are silent to the call of the will, there is small doubt that the lesion is beyond the nerve trunks, that it is central. If they fail to contract, the disease is excentric. Of course, this is speaking broadly and the statement is subject to exceptions; but for our practical purposes, it is correct and easily explained. If the nutritive nerve of the muscle under test is intact it will of course respond to the electrical stimulus without reference to the absence of central genesis of nervous energy, while if the central cells are at fault, no amount of external irritation can supply the complete absence of motor supply. When we have thus satisfied ourselves that the location of the lesion is in the cord, it is a most important point to know as nearly as may be in which section it is, and this may be determined in most cases by the following method: Using at least thirty cells of a low tension series, connect both poles with small carbon buttons, thoroughly wet. Place one firmly upon the sacrum, and draw the other towards it along the spinal column with enough pressure to ensure thorough contact. If there is any point in the cord where organic change has occurred it will be promptly designated by the patient upon the arrival there of the mobile electrode. There is a different sensation at such points—sometimes greater pain being complained of, sometimes almost complete anæsthesia, and I have grown accustomed, without any definite pathological reason, to connect increased sense of pain with congested conditions, decreased with anæmic or sclerosed states. And the other symptoms very generally coïncide with such assumption. So, if upon reaching a point opposite the first lumbar vertebra, sudden sharp pain is complained of, which disappears as the downward sweep is continued past the second, I am in the habit of mentally locating an increase of blood or cerebro-spinal fluid, or both these—believing that only a predominance of conductivity of current can cause the sharply located pains beneath the electrode. And if upon continuing the examination with an æsthesiometer, there is increased reflex sense over the gluteal region, the scrotum and the antero-external aspect of the thigh, there will be but little doubt that inflammatory action is going on in that portion of the cord which supplies energy to the first lumbar nerves. For this method of mine in searching the cord for weak points, there is as yet no satisfactory demonstration upon the cadaver—so far as I am aware of, nor is it apparent how such an one could be made—but it is put into practical use many times daily at my rooms, and almost always with satisfactory results.

Care must be taken to explain to the patient that the process is but momentary, and will hurt severely, for the current from thirty cells concentrated upon small electrodes burns sharply wherever it touches and must not be stationary for a second.

And now let us take into consideration such disorders of motion in children as present themselves for electrical treatment. And more frequent than any other, first upon the short list, come convulsions. Of course the class of convulsive movements for which electricity is

sought are exclusively those which "recur at uncertain intervals without obvious cause," and which have received the name of epilepsy. In a portion of these cases, where grave doubt exists if the cerebrum be the starting point, where there is no evidence, other than the spasms, of central disease, we usually find that both mental and physical development are retarded, and to increase the growth of the body, while acting beneficially upon the mind through elevation of general tone, electricity is amply competent. For these cases, when the child is below five years of age, I find the faradic bath, as previously described, the best form of application; when older, galvanism takes its place and must be used centrally alone, after the method described in Article II. of this series. Excellent results have been attained in epilepsy in children, while the disease in adults has proven as refractory as in the presence of other remedies. The galvanic current employed must be of low tension, and a considerable number of cells may be employed. I am at present treating a child of nine years of age for epilepsy, who bears without flinching a current from twenty-five cells over the cervical vertebræ and solar plexus, which few men could bear for a moment. Let the current be perfectly steady, the electrodes motionless and repeat the applications at least daily for several weeks. Sometimes it will be found advantageous to intermit all treatment during alternate weeks, when the skin becomes so sensitive that it cannot be borne without great pain.

Case I. Ada V. G., age, two years, seven months. Father a robust Englishman with excellent family history, and mother an unhealthy Virginian, with consumptive history and diathesis. Six months before, the baby had been attacked with a cough while teething, followed in three or four weeks by convulsions, characterized by rigidity, inturned thumbs, bloody foam at mouth and deep sleep afterward. During the first twenty-four hours, four convulsions occurred. About ten days afterwards, baby began to fret in her sleep and have convulsions of the petit mal variety, which, however, did not appear during the day. When examined, electric muscular action was much impaired in thighs, and no current stimulus could produce the smallest contraction in the leg muscles. The child could neither walk, stand or creep, and was scarcely sensible to any external impressions. The examination, which was made in November, was followed by spinal galvanization daily, with applications of the electric cautery once a month over the sacrum. In February of the following year, the convulsions had disappeared, sensation and motion had returned to the affected limbs and Mr. G. reported his child well. This occurred in 1879 and up to the present date there has been no return of convulsions and development has progressed evenly throughout the body.

Chorea or choreiform convulsions is next on our list of this class of diseases applying for electrical treatment. And I am bound to say, at the very beginning, that but a very few of my cases have received any benefit whatever from electricity. There are certain forms of the disease, where the symptoms are neither very severe nor very light, in which I have occasionally succeeded. But my experience leads me to believe that electricity is chiefly useful in removing the sense of fatigue that follows a long siege of uncontrollable muscular action, sometimes amounting to actual paralysis, or in treating the actual paralysis that occasionally comes after years of illness from this cause. Every form has in time been tried, and many months spent in fruitless work, until at present, I am sure to say to a choreic patient who comes with high hopes, that the chances for cure by electricity are so small that it is scarcely worth trying. If, however, such trial is

demanded, and vital action is in a generally depressed condition, I employ general faradization, and am of the opinion that little else need be tried. Nor have I been able to find many well authenticated cases where more favorable results have been obtained.

Paralysis from various causes, most frequently among the sequelæ of diphtheria or scarlet fever, are presented in considerable numbers for electrical cure. And if we are nearly impotent in chorea, the reverse is true of paralysis, since in ten years but a single case has resulted unfavorably, out of a list of more than a hundred. When the cause is either diphtheria or scarlet fever, and there is no constitutional taint, a favorable prognosis is always given. The treatment is general faradization and central galvanism combined, and it is only necessary to persevere long enough to procure excellent results. If, however, the paralysis results from external injury, such as a concussion either of a nerve trunk or center, the case is altered and rendered doubtful of prognosis, and the same remark applies to the essential paralysis of infancy. In all cases of infantile paralysis by sequence, the electrical examination and treatment are conducted in the following manner: Each limb should be tested separately, as it often happens that but one of a group of muscles is affected, while the others remain intact. A few moments will suffice to determine the excentric nature of the affection by the method already described, and general faradization has procured the best general result in my hands. But it is by no means sufficient. Let each one of the impaired muscles be operated upon with a faradic current of sufficient strength to contract firmly a corresponding healthy organ for two or three minutes. This is best done by placing a flat sponge electrode, well moistened, at any indifferent point connected with the positive battery pole, and closing circuit with the negative, which should be a small button, over the point of entrance of the nerve into the the muscle, although it is unnecessary to be so accurate, as the second electrode may be placed at any point upon the muscle which will cause a contraction. Do not permit the tension of the muscle to remain complete, but, by interrupting the current at the screw-posts, or by any mechanical device, cause a series of waves to traverse it lengthwise, thus affording the greatest possible stimulant. It sometimes happens that no amount of faradic current that is bearable will call forth the smallest response, and electricity appears powerless. But before concluding that this is certainly so, try galvanism, and in many cases where the induced current fails, the constant will succeed. It is well to return, however, to the faradic machine as soon as possible, as the stimulant effect of its rapid vibrations are more profound and invigorating than galvanism; and to that end, the impaired muscles should be tested frequently with the former and the use of the latter abandoned as soon as the smallest response follows the test.

Naturally, cases of this kind are slow in the extreme, but it is wonderful what results patient continuance can produce. I do not call it a hopeless task to restore any muscle wherein I can obtain the smallest contraction with an interrupted galvanic current, although treatment may be prolonged for many months; but where not a sign of response follows careful and repeated examination, I think the case may be considered hopeless.

Case I. Willie F. B., aged 9, native R. I. Family history excellent. Willie was a healthy child until some four years ago, when he underwent a severe attack of typhoid fever, remaining in bed ten weeks. Directly after recovery his parents noticed a certain difference in the legs; the left being considerably the weaker, and were at that time advised by the

family physician to consult a specialist but deferred it, hoping that nature and time might prove sufficient. During the past year this weakness has steadily increased until, when he was placed under my charge, he could not walk upon a level surface without a marked limp, and cannot climb stairs at all without assisting the leg with a hand. Electrical examination gives complete loss of response in left rectus femoris and vastus internus. No loss of sensation nor difference in temperature. Left thigh three-fourths inch smaller than right. As the affected muscles absolutely refused to respond either to the induced or constant current, a bad prognosis was given, but the case was undertaken at the request of Dr. Carver, the attending physician, and the parent. After a month's daily application, I begin to see a change in the manner of walking, and hope that perseverance will at least arrest further atrophy and so develop the other thigh muscles as to take the place of those whose power appears to be lost.

Marasmus and tabes mesenterica have both been successfully treated by general faradization alone, the former in a number of cases. As before observed, by far the best way of applying this treatment to young children and infants is in the bath. For marasmus, a continuance of electrical treatment for six months making daily fifteen-minute applications, is usually none too long to accomplish a cure.

In tabes mesenterica, much longer time will be needed, for we are subjected to many vexatious interruptions from diarrhœal attacks or other intercurrent affections. It is always best to discontinue electricity when the bowels are loose, as their muscular action is always thereby increased, occasionally, to an alarming extent. But even in this intractable disease, some brilliant results have been obtained in my hands by patience and care.

Incontinence of urine has been effectually treated by simple faradization of the genitals, and may be cured, I believe, in many cases where there is no organic central lesion. It is usually the result of insufficient nerve control, aggravated by habit and fear of punishment for soiling the clothing. Probably nothing relaxes the sphincters so suddenly and efficiently as fear, and before electrical treatment for this difficulty is commenced, the child should be assured and convinced that it is not a fault nor a crime, but a species of disease which can be cured. The treatment is conducted by placing a wide flat sponge electrode under the sacrum of the child lying comfortably, attached to either pole of the faradic machine, the other connected with a soft sponge the size of a large orange, using a very fine and even current, stroke the scrotum and inside of the thighs for five minutes, and then pressing the sponge firmly upon the pubis, continue for ten minutes longer. This should be repeated daily, better at night, and it will not be necessary, in a majority of cases, to continue more than a month to obtain a cure.

Case I. James B., aet. 8, a healthy child of nervous family, had studied in public schools. For a year past Jimmie had wet the bed every night when he was not awakened two or three times, and for a month last past, had wet his trousers in school. Genital organs well developed, but the child was in a highly excited nervous condition, having evidently been scolded soundly and punished for what he was told was his fault. After a week's work to gain the child's confidence and convince him that he was sick, not naughty, I began treatment as above, and had the satisfaction of completing a cure in twenty-four applications. Two years have now passed without a single slip.

Loss of speech after fevers or in the course of violent attacks of chorea, is occasionally met with, although cases are rare. When a reasonable length of time has passed for nature to assert her repara-

tive force and no improvement is observed, electricity is clearly indicated and should be used as follows: Place one pole of a Flemming faradic machine over the fifth cervical vertebra, and slowly promenade the other, using an exceedingly mild and just perceptible current, over the sternum and on both sides of the larynx, observing that the throat muscles contract firmly. After ten minutes, change the neck electrode to one side of the larynx, with the other opposite and permit the current to traverse the neck as near as may be through the vocal chord. If after a week's faithful work, no benefit results, it is improbable that anything can be done and the case may be abandoned. Success in these cases is the exception. Children never stammer.

This closes the list of children's diseases that are usually considered proper cases for electrical treatment, and although the subtle agent has been fairly successful in cases of cholera-infantum, vomiting and in one case of capillary bronchitis, these must be, I think, regarded in the light of experments, not yet worthy attention in these papers, which are intended to cover only such points as have been demonstrated and are in daily practical use.

In closing this article, I desire to call attention to the unphilosophical method of treating nervous diseases of children at present in vogue with many physicians. The little one is regarded as a small man, whose mentality differs from his larger brother in quantity only. It seems to me that this is a fundamental error. With the child, reasoning powers are in undeveloped abeyance, perceptive faculties reign supreme and its world is solely that which surrounds it for the present moment. Impressions are fugitive and suffering is but one of its temporary surroundings, which passing, leaves no trace behind. Even death is but an unfeared episode in its small existence, and the exit from this untried world is unaccompanied by any of the physical symptoms of fear which obtain in later years. It takes pleasure, suffers discomfort with equal equanimity, and is susceptible to neither rebuke nor praise. In fine, it is yet in a state of chaos, through whose dark and turbulent clouds but slight and dim glimpses of the future can be seen. And yet some parts of its nervous machinery are strangely active. Whoever has watched the countenance of a sleeping infant and marked the sweet smiles that gently curved its lips, will easily believe the pleasant fancy of an old writer who said "A baby's soul is still so close to the heaven whence it came, that it yet holds loving communion with the holy angels left behind."

The thoughtful physician will remember that its brain is not yet fully formed —that building and repair are largely in excess of waste, and so frame his treatment of its disease as not to implant in the developing tissue seeds of injury or deformity.

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