Grier (M. J.)

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OF SOME FORMS OF

SEXUAL ❋ DEBILITY

—BY—

ELECTRICITY.

Read before the American Electro-therapeutic Association at the first annual meeting, held at Philadelphia, September, 1891,

By M. J. Grier, M.D.,

PHILADELPHIA, PA.

Reprinted from The Times and Register, November 21, 1891.

PHILADELPHIA:
The Medical Press Company, Limited.
1891.

ERRATA.

Page 3, last line, "vertebra" should be "vertebræ."

Page 4, sixth line from bottom, "disassimulation" should be "disassimilation."

Page 6, sixth line from top, "center" should be "centers."

Page 11, third line from top, "gland" should be "glans."

Page 14, second line from bottom, "gland" should be "glans."

THE TREATMENT OF SOME FORMS OF SEXUAL DEBILITY BY ELECTRICITY.[1]

By M. J. GRIER, M.D.,
PHILADELPHIA.

OF the incidental inquiries presented to the physician—particularly if he is engaged in special work—many of them will refer to the derangements of the sexual functions. Few patients, however, present themselves for consultation and treatment of these ailments, although ultimately it will appear to have been the real intention. They usually seek relief from a neuralgia, pain in the back, muscular debility, or some other cause leading easily and naturally from the ostensible to the real object of the visit. This is generally the case with the younger subjects, who have become conscious of an appreciable physical failure, or who from the presence of some slight subjective symptoms are apprehensive that such failure will certainly occur. Another class will seek relief from conditions fully developed, and at once are freely communicative as to their condition and the causes. Both classes have generally acquired morbid ideas, as well as erroneous opinions, concerning their condition, and add this much to the difficulty of their management. Some of them have already been under treatment; the family physician has been consulted, and iron, strychnine and electricity have been continuously administered, but without the desired result.

My purpose is to consider some of the conditions most usually presented, and what may be done for them by electricity.

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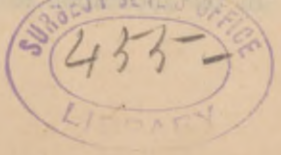

The larger number of such cases present a state of local and general debility resulting from excessive and long-continued stimulation of special nerve endings, with consequent exhaustion of the spinal and cerebral centers controlling the parts involved.

The neurasthenic condition of the patient will probably and justly demand our earliest attention. Whether it be the cause or effect of the sexual debility the progress and results of the local treatments will be much more decided as this state disappears. In one class—and, I think, a large one—it will be found to be a lowered functional activity of the entire nervous system, depending on preceding mental depression, caused by the gradually-developing consciousness of the diminution of the virile power and the fear of its complete abolition. In another class, of more mature years, we will find varying degrees of inability, ranging from actual impairment of function to complete loss of power.

In addition to the value of properly-directed medication, aided materially by the change in the morale of the patient, as we succeed in inspiring him with a hope of relief by demonstrating to him its possibility through the results of treatment, we shall find electricity a potent factor in his restoration. Without attempting in this phase of neurasthenia to differentiate the form as to its special character, beyond the recognition of the sexual disturbances, we may proceed to its relief at once by the employment of galvanism in the treatment of the head and spine. Cerebral galvanization, with its catalytic and alterative effects, will, perhaps, best meet the indications. The method may be varied to suit each particular case ; but, as a rule, the effort will be to bring the cerebral and spinal centers under its special influence by either increasing or diminishing their irritability. In the application to the head the vertex is well

moistened and a two-inch electrode placed on it and firmly maintained. The vertex is selected because the current is well borne at that point; there is less vertigo or other apparent cerebral disturbance. To diminish cerebral irritability, I use the positive pole on the head, as I am convinced, from observation, the effect is more sedative. The negative electrode is a slightly convex button of two inches diameter. For plate electrodes, I prefer pure tin plates, about No. 28 gauge, as they are soft and are easily moulded to any curved surface, and are always bright and fresh looking. These are covered with ordinary white, undressed muslin, such as cotton shirting. I have used such a covering for over twenty years, and prefer it, because it is thrown in the waste basket after one application; hence the electrodes are always freshly covered, and the care and risk attending the use of sponges and chamois skin are avoided. Perhaps equally important is the greater uniformity in the relation of the electrode to the skin as to distance; it never varies one-hundredth of an inch, keeping the current density quite regular; while with the sponges the ever-varying distance and pressure may be quite enough to convert an intended stabile to a labile application. Having adjusted the positive plate to the vertex, the negative is placed subaurally on either side; beginning with a minimum amount of current—say about two m. amperes—and a uniform pressure, the negative electrode is slowly moved down over the region of the cervical sympathetic nerves, until we reach the first dorsal vertebra, when we may gradually raise the current strength to five m. amperes, and pass slowly down each side of the upper spine. This current strength should be maintained, as the increased resistance of more tissue is brought into the circuit. As a rule, we need not pass below the dorsal vertebra, depending on the

catelectrotonic state induced below that point, and reserving the special lumbar and sacral centers for subsequent treatment.

Carefully avoiding any abrupt change of application and pressure, the positive may now be placed over the inferior cervical ganglion on either side, and the negative traced over the course of each dorsal nerve, thus influencing gently the sympathetic ganglia. What this influence is, or how it acts beyond the so-called catalytic change, we do not know. The effect of an interrupted galvanic current on the nerves and muscles has been fully established as laid down by the laws of Pflenger, giving us normal actions of contraction on opening and closing the circuit. It is probable in a labile application of the current, as above, the movement of the cathode over the tissues is equivalent to an opening and closing of the circuit, as each cell is successively subjected to its presence, and thus there is induced a momentary contraction or tonic state of the vascular muscles, resulting in the improvement of circulation and nutrition. Landois quotes Grutzner as saying that, "The constant current has no effect in vaso-motor and secretory fibers;" per contra, Erb says: "Of special importance is the demonstration of the vaso-motor effects of the electrical currents. The recent experimental researches of Löwenfeld, with regard to dilatation and contraction of the cerebral vessels upon transverse and antero-posterior passage of the galvanic current through the head, are valuable in this respect. Perhaps, also, the electrical actions upon trophic nerve-tissues may produce changes in the disassimulation of other tissues and organs of the body, organic metamorphoses, modifications of nutrition, which constitute a part of the 'catalytic' effects."

The general result of the treatment, after a number of applications, is apparent in the disappearance

of the sallowness of nervous depression, and a better cutaneous circulation, as shown by the improvement in the complexion; a more refreshing sleep, and less disposition to lag on rising; there is also an improvement in the digestive functions, and a general feeling of buoyancy. This gives us a much better foundation on which to build our efforts in the treatment of the local disturbances.

The loss of the erectile power is the most prominent of the local symptoms, and is that which naturally impresses the patient most forcibly, and impels him more than any other to seek professional aid; to him it is but a single fact; to his physician it is the evidence of the derangement of a complicated system of parts and functions, both local and general.

A brief statement of the mechanism of erection will aid us in the analysis of the symptoms and causes of failure, and, to a large extent, point out the indications for treatment. Erection depends upon the turgescence of the spongy bodies of the penis, and will be more or less complete according to the amount of blood passing into and retained there by the normal action of the mechanism, which retards its outflow. This will result from physical and psychical reflexes acting through the appropriate muscles. The trabeculæ of the cavernous bodies consist mainly of elastic fibers and erectile tissue, which are actuated to dilatation by the nervi erigentes under the domination of cerebral or reflex impulses; the consequent dilatation of these spaces permits an augmented supply of blood causing an enlargement of the organ, with an elevated temperature. Certain muscles during this period are brought into action, and by their compression retard the outward flow of blood, thus increasing both the volume and the density of the organ. In co-ordination of these parts the failure of one or more gives rise to some of the forms of impotence; these may be

broadly classed under two heads, the nervous and the physical. In the former we may have a physically perfect apparatus, capable of functional activity at times, but failing at others, which will depend on disturbed or perverted innervation, originating in the cerebral cortex, or in the center of the spine and medulla. Fright, certain emotional disturbances and personal feeling may act in this way; but these we need not dwell upon, as they may occur in the best of health. We will study the morbid conditions, which will be found to arise mainly from the irritation or sedation of centers caused by overstimulation, and will consider more in detail the physiology of the mechanism of erection, as far as it may aid us in explanation of the various forms of debility. The active dilatation of the cavities of the corporæ is effected through the influence of the nervi erigentes, described by Eckhard. They are formed by small branches from the second and third sacral nerves, and contain vaso-dilator fibers, which actively expand the deep arteries and enlarge the cavities of the erectile tissue. A center for these nerves has not been definitely proved to exist in the medulla; it is only surmised, but its existence seems to be fully justified; its action is opposite to that of the vaso-motor centers. In speaking of the probable existence of the vaso-dilator nerves Landois says, "If the nervi erigentes be divided there is no effect on the blood-vessels of the penis; but if their peripheral ends be stimulated with electricity the sinuses of the corporæ cavernosæ dilate, become filled with blood, and erection takes place."

These reflexes may be excited by physical excitation of the sensory cutaneous filaments; by volitional contraction of the genital muscles, and by the psychical activities of the cerebrum. If the activity of these centers be thus induced, the first result is that

of excessive dilatation of the arteries, and engorgement of the cavities of the corporæ, and the first stage of erection is produced; to maintain it the out-flow of blood must be retarded by the constricting action of the appropriate muscles. Failure of these centers to respond means absence of dilatation and its attendant engorgement, and the resulting inactivity of the retarding muscles, producing a not infrequent form of nervous impotence clearly referable, directly, to the functional inactivity of the nervi erigentes.

These cases I have found associated with long-continued continence, and in men of excessive mental application in whom the outgo of cerebral activity has been expended in other directions; also, in those who have become sexually morbid, having lost through exhaustion the normal psychical reflexes; usually they retain more or less of the physical reflexes and respond to stimulation of the local sensory nerves, thus proving that the spinal paths of the afferent nerves have not been impaired, or at least not to a very great extent.

In such cases the indications are to stimulate the nervi erigentes, and the upper centers acting in conjunction with them. An ascending current of about 5 milliamperes of galvanism may be passed from the perineum, from over the third and fourth sacral nerves, where the vaso-dilator branches arise, and from the genito-spinal center of Budge, at the fourth lumbar vertebra, successively; the negative electrode should be carefully applied to the back and sides of the neck and to the vertex, endeavoring to increase the excitability of the cortex in those in whom it has been depressed, and to quicken the responses of the lower spinal centers to their impress.

Eckhard observed erection to take place after stimulation of the higher regions of the spinal cord, as well as of the pons and crura cerebri.

We have another important set of nerves to consider in the vaso-motors. Their function is to maintain a normal tone or contraction of the blood-vessels and antagonizes the action of the vaso-dilators. Their general center lies in the medulla oblongata; stimulation of this center contracts the arteries and its paralysis causes relaxation and dilatation of them. In the afferent nerves there are fibers whose stimulation affects this center; some exciting and others depressing it. The primary stimulation of these nerves is attended by contraction of vessels, and over-stimulation by dilatation of them; there are also local centers in the spinal cord, each controlling certain areas. Under ordinary conditions the vaso motor nerves are in a state of moderate tonic excitement. If from irritation of these centers we have the vaso-motors over-excited, and a controlling influence exercised on the vessels supplying the erectile tissues, through their dominant control over the vaso-dilators, the engorgement of the sinuses of the cavernous bodies will be prevented and erection will be impossible. This happens in the earlier changes following excessive sexual stimulation, and is most probably the result of the irritation which precedes exhaustion of the centers. The excessive tone is shown in the diminished blood supply to, and the lowered temperature of, the pale and shrunken organ. In healthy but nervously excitable individuals under certain circumstances, emotional influences such as fright or fear may act in a similar manner, by producing a sudden temporary excitement of the vaso-motor nerves, to a degree sufficient to overcome the previously active vaso-motor dilators, and by thus cutting off from the cavernous sinuses and the retarding muscles the necessary blood supply, produce a sudden collapse with entire disappearance of the erection. In chronic hyperaction of these nerves, the lessened

blood supply to the secretory organs is shown by the diminished amount of their secretions, and the consequent loss of this source of stimulation. In such cases, galvanism as described in the application to the vertex and upper spine for neurasthenia will diminish the upper central irritability; and good results will come from a stabile application to the lumbar region with a current of 5 or 6 milliamperes through a positive 4x4 inch plate, one of equal size being placed at some indifferent point on the lower portion of the thigh. The extra current acts remarkably in many cases, and probably in the same manner as the continuous, temporarily lowering the activity of the constricting nerves.

I find the best results are produced by placing a moistened electrode, about one and a quarter inches square, against the perineum; this should be the positive pole; the negative may be a plate of three inches, held continuously against the sacro-lumbar junction, the cords should be connected with the terminals of the primary coil. Commence with the minimum strength and gradually increase it to as much as the patient can comfortably bear; the application will require from ten to fifteen minutes duration; the result varies with the patient's general and local condition; in some cases, usually those who are less nervous and irritable, the effects are noticed at the time of the application, others may not notice a change for half an hour or longer after the treatment. In those in whom the sensory nerves are not very much impaired the first impression may be a sense of tingling along the dorsal nerve of the penis, or it may be distributed over the inner surfaces of the thighs, through branches of the internal cutaneous nerves, often reaching to the knees. In a little time a warm glowing sensation will be felt mostly in the sacro-lumbar and gluteal regions; this being obtained,

the application should cease; this effect may last from a few minutes to several hours, and will be alluded to by the patient at a subsequent visit as causing a feeling of comfort and pleasure. The ultimate result is a restoration of the normal circulation, and an improvement in the nutrition of the parts, with increased local muscular power. In speaking of this particular application, I might add that occasionally a patient has reached the office at a moment when the cold stage of an intermittent fever was beginning. Without making any allusion to the expected effect, I have made this application, and have often succeeded in breaking up the paroxysm or materially lessening the usual duration of the chill; on several occasions the fever did not follow, although, in the subsequent return, two days later, the usual sequence was observed. It did not require any more time or energy of current action in these cases, judging by the disappearance of the chill and the restoration of color to the nails and lips, than is needed to get the pelvic effects in the other cases.

The opposite condition of vaso motor relaxation is frequently met with; it is an exhaustion following the state of irritability just described. It is a loss of that moderate tonic excitement, which is the normal state of these nerves, on which a healthy circulation and nutrition depend. When affecting the centers controlling the genital organs the result will be a passive engorgement, with a flaccid elongation; the temperature may be normal or lowered, depending on the sluggishness of circulation; the muscles are undernourished, and voluntary control of them is lessened; in many cases the secretion of the coronal glands is unpleasantly augmented. In the erectile effort the vaso-dilators may be sufficiently active to enlarge the cavernous sinuses and increase the flow of blood thereto; but the weakened muscles fail to

sufficiently retard the return of blood from them, and the result is a moderate increase of bulk, with a soft gland and an easily compressible body. The value of electricity is suggested by Claude Bernard's well-known experiment, where section of the cervical sympathetic nerve is followed by dilatation of the blood-vessels it supplies; and stimulation of the peripheral end causes the opposite condition of contracted vessels. As we cannot influence the nerves by direct contact, we will have to depend upon the application of galvanism to those parts which anatomy and experience teach us is the most available, and through which we can get reflex effects. A very efficient method will be the introduction within the urethra of an uninsulated metallic sound connected with the negative pole; the current of galvanism should not be over 2 or 3 milliamperes, and should be slowly broken, say about twice each second, for not over two minutes; the contact should last only during the instant of making, giving a short interval of excitation and a longer one of rest, thus securing the benefit of the reflexes, caused by the stimulation of this pole, without the risk of the increased exhaustion, which would constantly follow a stronger treatment. The improvement of repeated applications will be shown by the retraction of the organ to a normal size. The immediate effect of the application is due both to muscular stimulation and increased arterial contraction; but mostly to the latter, as the contraction is often to an extent beyond the capability of ordinary muscular action, the diminution being sometimes so great as to reduce the organ to half the size of healthful repose.

Two other methods may be employed to produce this stimulation. Galvanism applied to the surface of the inner side of the upper third of each thigh, with a bare negative electrode, kept slowly moving,

and using a current strength only sufficient to develop a pungent irritation of the sensory nerves; to use more would be to overtax and exhaust the vasomotor nerves still further, and we would fail to get the desired reflex effects on the higher centers.

The bare negative electrode of the induction coil may also be used over the same region, and for the same purpose. The vibrations should be slow enough to give perceptibly distinct shocks.

This latter treatment is in accord with the statement made by Kronecker and Nicolaides, quoted by Landois in speaking of the stimulation of the vasomotor nerves, that the maximum contraction of the arteries, as expressed by the blood pressure, is reached when ten to twelve strong, or twenty to twenty-five moderately strong, shocks per second are applied. In O. Naumann's experiments on the circulation of the frog, he found that weak electrical stimulation of the skin caused, at first, contraction of the blood-vessels, with simultaneous excitement of the cardiac activity; strong stimuli, however, had an opposite, or depressor, effect.

The positive pole in these therapeutic applications may be placed at any indifferent part, since the effect desired is the reflex action produced by the irritation of the negative pole.

In considering the mechanism of erection, reference has been made to the necessity of a restraining power, whereby the blood injected into the sinuses may be retained there. This is accomplished by the action of certain muscles, which are also concerned in the emission of the semen and urine. They receive their motor influences from the muscular branches of the pudic nerve. The bulbo-cavernosus or accelerator urinæ muscle acts on the bulb of the corpus spongiosum, and is thus concerned in the hardening of the urethral portion; the middle fibers are supposed by

Krause to assist in the erection of this corpus, by compressing the erectile tissue of the bulb; the anterior fibers are longer, and spread over the sides of the corporæ cavernosa, as they rise to be inserted into the tendinous expansion covering the dorsal vein of the penis. According to Tyrrel, the contraction of this portion assists in erection by compressing the dorsal vein, thus retarding the outflow of blood. This effect is materially aided by the action of the deep transversus perinæi muscle, which is perforated by the deep veins of the penis, and which are compressed between the terse horizontal fibers of the muscle when it is in action. The erector penis muscles also contribute efficiently to this retardation, as in contraction they compress each crus penis.

Dilatation and turgescence of the sinus of the corporæ having occurred, we can readily see how a partial or complete failure of these muscles to act will impair or prevent erection. Under certain psychical impressions their failure will aid in producing the erectile collapse we have alluded to when the vaso-motor nerves dominate the vaso-dilators. In their sexual activity these muscles, while partly under volitional control, are mainly excited by reflexes; and very readily in health become equally active under the reflexes resulting from stimulation of the sensory nerves of the penis and adjacent parts. These muscles respond more or less to the faradic and galvanic currents, according to their degree of health or exhaustion, and tests thus made may assist us in the diagnosis of their condition. A suitable electrode, insulated where it comes in contact with the anal margin, may be introduced in the rectum and pressed against the anterior wall; a small, flat electrode, connected with the negative pole of the extra current, should be placed against the perineum, and the current gradually increased in strength until the muscular action is produced, which, in health, is

quite strong. If the muscles fail, or respond feebly, the galvanic current may be substituted, observing the same polarity, making slow interruptions, with a feeble current, gradually increasing both the strength and rapidity of interruption. This proceeding answers very well for the direct treatment of these muscles. Decided contractions of the accelerator and compressor urethral muscles may be obtained by substituting for the perineal electrode an uninsulated metallic urethral sound, using an interrupted galvanic current. I have often seen the sound extruded by the contractions induced, and in other cases there has been a spasm, lasting two or three minutes, grasping the sound so tightly that it could only have been withdrawn by more than a prudent and safe effort.

These muscles being supplied by the muscular branches of the pudic nerve, indirect stimulation of them may be made by placing a positive plate electrode over the sacrum, the rectal electrode becoming the negative and remaining as before, using, if the muscles are very feeble, a short, constant current of not over two m. amperes, supplemented by twenty or thirty interruptions, occupying about one minute. A weak muscle of this class requires a longer duration of current action and short intervals of rest, if the current be of not more than the above strength. Vigorous treatment only seems to exhaust the already enfeebled parts. The rectal electrode may now be changed for a small perineal plate, and stimulation of the perineum and root of the penis may be made with a bearable strength of the extra current, slowly interrupted. This will produce both muscular and reflex effects.

Conjoined with defective muscular action, there is usually a lowered sensibility of the genital, cutaneous and special sensory nerves, caused by the exhaustion following excessive stimulation. This will be found most marked about the prepuce and the glands, more particularly around the corona and the papillæ be-

neath the meatus; also, if the anæsthesia be profound, in the frœnum præputialis. The cremaster reflex is sometimes diminished and may be abolished. Such cases may have a decided cerebral sexual activity with physical failure; or there may be a moderate erectile power, with loss of sexual pleasure and a retarded or incomplete orgasm. Sensibility of the surfaces may be quite decided under electric tests, and the tactile sensibility much enfeebled or lost, lessening the value of electro-diagnosis, excepting as to the condition of the muscles. As the local nutrition is usually impaired, resulting in relaxation of tissue and lowered temperature, we will meet both indications by the use of the galvanic current applied to the sensory parts most affected, by means of a small, bare electrode, placing a medium positive plate over the sacrum, to include the origin of the pudic nerve, from which is given off the dorsal nerve of the penis. This is a sensory, and hence an afferent, nerve, and, it will be noted, the direction of the current is in opposition to its normal nerve-current direction, so that while the current is passing downwards—that is, from the center to the periphery—it has, in relation to the normal nerve direction, an inverse course. My experience is, that in treating the lowered sensibility of such nerves the best results are obtained from a very mild current in this manner, and continued only long enough to produce the blush and a slight pungent sensation at the negative pole.

In the earlier changes of nerve excitability we often find an extremely sensitive condition—a hyperæsthesia, in which even contact of the ordinary clothing with the surfaces will suffice to produce erotic excitement. Preputeal and rectal irritation, as well as other local causes, may also originate it, and, in many cases, leads to direct stimulation of the genitals by touch, which, continued to excess, is a potent factor in producing abnormal excitability, and

consequent exhaustion of these nerve centers. It is also a frequent cause of premature emission. Having removed or corrected the exciting local causes, galvanism will aid us in removing the central irritability. We may use the sedative action of the anode, applied over the sacrum, using a stabile current of not over five m. amperes; the negative should be placed over some indifferent point, preferably to the lower limbs. It is essential to have a very mild current, free from any variation of strength, and to maintain the sacral pole evenly at one position and for a longer time than has been advised in other applications.

Having thus treated the centers, we may diminish the excitability of the nerve terminals by enveloping the penis with a soft metallic plate, thinly lined with moist absorbent cotton, to fill up irregularities and make more uniform contact. This plate should be the anode, and the cathode may rest on the abdomen. A mild, steady current through a sensory nerve for ten or fifteen minutes, traversing it in the normal nerve current direction, will lower the excitability of the nerve. Urethral irritability is a most frequent cause of morbid action of the genital centers, and gives rise to various degrees of nerve irritation or sedation. Premature and painful emission may also be traced to congestion and irritation of the vera-montanum.

Similar impaired functional activities may result from the reflexes induced by continued irritability of the urethral lining and its ducts. An anodic bare metallic sound, with a current of not more than one m. ampere, and a cathodic plate over the lumbar vertebræ, will diminish the excessive irritability of this membrane.

Many other points might be considered, but the general method of treatment and the reasons therefor are here outlined, and, I trust, may be of such service to others as I have found them.

1531 Spruce Street