

between 70 and 80, and then the drug must be left off for a few days. When the heart's beats occur in couples, as is sometimes the case, the drug should be immediately omitted for a few days. Other signs of sufficiency are severe headache, nausea, vomiting, and diarrhoea. Any of these call for suspension of the drug. After a physiological reaction of this description has been obtained, an attempt should be made to find the daily quantity of digitalis which will keep the heart about the normal rate. Patients can take small tonic doses for months without bad effect if they are instructed to omit the medicine for a few days occasionally. The patient's sensations are a good guide as to whether more or less of the drug is required, and some feel best when the heart's rate is kept as low as 50.

In heart failure from purely degenerative changes, in which the pulse frequently remains quite regular, the effects of digitalis are not so good. In these conditions digitalis should be given in the same doses with the same precautions as I have already advised. Mackenzie states\* that he has many times attempted to reduce the increased rate of the heart when the rhythm was normal, and invariably failed. This observation certainly applies to all febrile and toxic states. Here the heart muscle is poisoned by the bacillary or other toxin, and digitalis can have no good effect while this condition remains. It may be useful for the resulting heart weakness after elimination of the toxin. Sutherland † obtained reduction of the pulse rate after the temperature had subsided in rheumatic fever. Speaking generally, more good may be anticipated when digitalis slows the heart's action; a longer period of repose is followed by a stronger beat. Cases have been reported in which good resulted although no reduction in rate was obtained.

For pulse irregularities due to premature beats, which commonly cause intermission of the pulse, digitalis should not be given. The drug itself will occasion premature beats, and would certainly aggravate the condition where the tendency already exists. It is not a safe conclusion that because a heart intermits occasionally it is necessarily a weak heart. Digitalis is often wrongly given for supposed "weak heart." Our ideas are certainly clearer than they were ten years ago as to the cases digitalis is likely to relieve and those which it is not.

The paper was illustrated by lantern slides. For some of the subjects I am indebted to Sir James Mackenzie, Dr. Lewis, Dr. Price, and Messrs. Shaw and Sons.

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## THE TREATMENT OF SCIATICA BY GALVANIC ACUPUNCTURE.

BY

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The treatment of sciatica may be comparatively simple or very troublesome. Some mild cases, with rest in bed and sedatives, recover, but in others the whole Pharmacopoeia has no effect, for no known drug has any effect on neuritis or on the absorption of the exudation. Neuritis is usually divided into two types—the parenchymatous and interstitial—no local treatment can have any effect on the former; it is with the interstitial type associated with inflammatory changes in the sheath and connective tissue, and accompanied by exudation of cells, that we are concerned. There is reason for believing that this exudation is distributed not continuously along a nerve but in patches revealed by tender areas or by use of the faradic current. Treatment by acupuncture is particularly serviceable in these cases of nodular fibrositis.

\* *BRITISH MEDICAL JOURNAL*, January 29th, 1921, p. 152.  
 † *Ibid.*, vol. ii, 1919, p. 50.

Dr. Davis, formerly of Llandrindod Wells, first introduced and described this method in the *Bristol Medico-Chirurgical Journal* in June 1915, but it has been in use for twenty years in hundreds of cases of sciatica and other forms of neuritis.

It is not my intention here to enumerate the different causes of sciatica. I exclude all cases due to pelvic growth, bone disease, spinal cord disease (as locomotor ataxia), diabetes, venereal disease, etc. These have their own special form of treatment, and must be managed on constitutional lines. A definite diagnosis is as important in the treatment of sciatica as in any other ailment, for local treatment of sciatica when there is grave constitutional disturbance is bound to end in failure.

The aim of all the various forms of treatment devised for sciatica is to induce hyperaemia of the nerve. In the Scotch douche and radiant heat an endeavour is made to secure this by the varying stimuli of hot and cold water, or by exposing the whole limb to high temperature. A general hyperaemia of the skin and underlying tissues of the whole of the lower extremity may be obtained, but there is no guarantee that the nerve shares in this hyperaemia—often it does not; at any rate the method is empirical.

By acupuncture the hyperaemia occurs just where it is required, and it can be given in definite doses varying according to the response of the nerve. Again, when an electric current is passed through the tissues sodium hydrate is formed at the negative electrode, which in this case is the needle passed down to the tender spot on the nerve. This sodium hydrate has a caustic action on the tissues. In acupuncture only a small amount of current is used (3 to 6 milliampères) whereas in destruction of a naevus 20 milliampères or more are used. In the case of the naevus a large area has to be destroyed, but in the case of exudation in the nerve sheath the area is very small and the effect should be limited to the exudation. The effect of ionic movement in the tissues is involved also.

From one or all of the above effects it is maintained that by this treatment there is complete relief of pain, but the wasting of muscles with weakness of limb and lameness requires appropriate treatment.

Electrical acupuncture, if carried out according to instructions, is harmless. It must not, of course, be used recklessly with any strength of current, nor must the needle be plunged into any part of the body without consideration of the underlying parts.

### Method of Application.

The equipment necessary is:

1. Pantostat or other universal apparatus.
2. Insulated needles of various lengths with platinized points.
3. Holder for needles.
4. Button electrode.
5. Hypodermic syringe and 2 per cent. solution of novocain.
6. Sterilizer.

The sensitive spots along the course of the nerve must be found by means of the faradic current and each one separately treated. An indifferent electrode attached to the positive pole of the faradic current is placed below the knee or on the back. The negative pole is attached to a moistened wash-leather button electrode mounted on a handle.

The buttock is first tested; after turning on the current until the patient just feels it, the button is moved over the surface of the skin until a sensitive spot is touched; this is marked. Two or more of these spots may be found, and the most sensitive is first treated. The easiest way to find the most painful spot is to reduce the current until one or other of the spots is not felt. In neurotic cases it is a good plan to approach the spots from different areas to be quite sure it is properly localized.

The galvanic current is now used. An insulated needle, about 4 in. long, sterilized and attached to a holder, is connected up to the negative pole. The same indifferent electrode is used, now transferred to galvanic current instead of faradic. The skin over the area is painted with iodine and anaesthetized with novocain (2 per cent.). The needle is applied to the chosen spot and the current quietly turned on. I usually begin with about 2 milliampères. The needle is now passed through the skin and deeper tissues and more current applied. It is necessary for the patient to feel something, but it is unnecessary to produce pain. Good results can be obtained in some cases by using 2 milliampères; in other cases 5 or 6 milliampères may be required. If the patient complains of pain, then the strength

of current must be reduced. A reliable guide as to when the needle is in the right place is that the patient states that he experiences the same kind of pain as that of which he complains; the position is then correct and the treatment continued for ten minutes. If not found at first, then the needle must be moved about under the skin until it is. During this ten minutes it may be necessary to increase or diminish the current according to the patient's sensations. After the current has been passing a few minutes the pain often diminishes and the current can be increased. After ten minutes the current is slowly turned off, the needle removed, and the puncture sealed with collodion. No after-treatment is necessary. The spots are treated on alternate days.

It is not possible to say beforehand what strength of current may be required, but the treatment should not be painful. If too much current is used, then considerable pain may be produced and a great deal of reaction follow; the more tender the spot, the less the current. The nerves in different parts of the body vary considerably in the amount of current they take; thus, the nerves of the scalp readily take up to 5 or 6 milliamperes and the sciatic and its branches are nearly as tolerant. The number of spots to be treated in any given case of sciatica varies. There may be only one or two or there may be as many as seven, eight, or nine. The average is about five, but no case must be considered cured until every spot has been treated. This must be done systematically, beginning with the buttock and

following down the thigh, front or back, according to the distribution of the pain. Pain around the knee-joint is often troublesome, and spots for this are found about 3 or 4 inches above the patella on one or both sides of the quadriceps extensor tendon. For the pain below the knee, spots are sought for in the calf or front of the leg, also in the latter area for sensory disturbances over the dorsum of the foot.

Acupuncture will not cure the wasting that frequently accompanies long-standing sciatica, and it is important to warn patients of this. The treatment is introduced solely for the relief of pain. For the lameness, and wasting of muscles, the patient must be taught to walk correctly, and massage and electricity are used.

All the failures I have had have been in cases of very long standing in which probably the exudation has become organized or the nerve has been damaged by pressure beyond recovery. It is not possible to recognize these cases beforehand, for many cases of very long standing recover; one case I recall was that of a man of 50, who obtained complete relief of pain, although the nerve was so damaged that his patellar reflex on that side was absent.

The line of treatment described is applicable to any other accessible nerve with suitable modifications. The sciatic nerve is taken as an illustration only; equally successful results can be obtained in any other part of the body.

## LIGHT METAL LIMBS IN ABOVE-KNEE AMPUTATIONS.

BY

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The wooden walls of Old England in their day did excellent service; they were replaced by metal because of its greater efficiency. So it will be with wooden limbs; they will only exist for particular purposes. Among artificial arms that made of duralumin for lightness more than holds its own. For amputations of the thigh above the

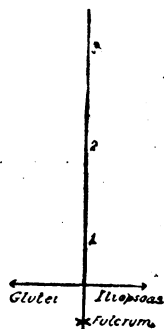


FIG. 1.—With the amputation at 1 there is little bony leverage to help the muscles. With the amputation at 3 there is much bony leverage against the muscles (like a high-gear machine going uphill). With the amputation at 2 the above two factors are more nearly balanced and the patient is best off.

—leverage and abduction.

At a discussion on the subject of re-education of the limbless, admirably introduced by Mr. Muirhead Little, at the Medical Society in March, 1920, the President, Mr. Warren Low, referred to the mental and moral deteriorations which follow the loss of a limb. These are sometimes great and sometimes small, but almost always present in some degree. The nearer to the trunk the amputation is, the greater would seem to be the change. This change is accentuated by the man's temperament and surroundings, being the greater with the larger mentality. To weight and handicap men who have gone through much with a limb which feels "too heavy" and,

though their capabilities may be great, exhausts them, is wrong. It is not clear whether these conditions result from the degenerative changes which occur in the central nervous system in association with the loss of the educative value of the limb. To remedy this the amputated man requires the lightest limb, a minimum of hospital life, and a rapid return to work and bright surroundings. At present this can only be obtained by the use of a light metal limb with quick fit, quick instruction and after-care. At present all these factors are lacking. Metal is chosen because in light limbs of wood the wood is so thin that it cracks and constant repairs militate against the original cheapness of the limb. A well-made metal limb needs a minimum of repairs, and thereby soon repays the initial outlay.

Owing to assistance given by the Red Cross and Sir Arthur Stanley, and to the kindness of Colonel Sir Lisle Webb and Sir Charles Kenderdine of the Ministry of Pensions, it has been possible to make experiments at St. Thomas's Hospital on these lines, and it is desirable that the results should be made as widely known as possible, since they bear out in practice all that has been prefaced in theory, and offer considerable hope of improvement to 90-95 per cent. of cases of amputation of the thigh. They are based upon observations made on over one hundred light metal limbs. The results of my experiences are shown in the following extracts.

Reports to Sir Arthur Stanley.

The first point to come out was that, although the (metal) artificial limb gave the amputé satisfaction, the metal limb was only a few ounces lighter than specially constructed wooden limbs. The satisfaction could hardly, then, be in the weight. (Light wooden limbs weigh about 5½ lb.; light metal ones 4½ to 5½ lb.) About 90 to 95 per cent. of men suffering from above-knee amputations are greatly benefited by these limbs.

- The universal statement is that they can do more work with a fraction of the fatigue.
- Men supplied with light metal limbs can learn quicker and more than can men with wooden limbs.

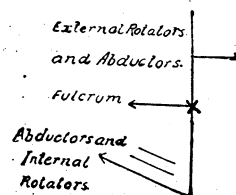


FIG. 2.—As the amputation is done higher and higher up the femur more and more adductors and internal rotators are cut off. The adductors and external rotators are strengthened by the exercise of wearing the artificial limb, and hence its non-fit after a few months' wear. This is more felt by those men of greater mentality. It occurs in the use of both wood and metal limbs and is often shown by the roll of flesh on the inner side of the bucket top.