

THE CHANGING FACE OF PHYSICAL MEDICINE<sup>1</sup>

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For many centuries some form of physical therapy has been practised by one individual on another—for example, poultices, fomentations, rubbing, sunbathing and exercises, to mention the most commonplace. Hippocrates and Herodotus advised the use of the sun's rays. There is ample evidence from Roman times in Britain that heat treatment was used, and many of the spas of England and the Continent have their origin in the Roman expansion. Not so many years ago rubbing and beating with bones fashioned to a suitable shape were methods of producing an erythema or skin reaction, with histamine release by friction. With the discovery of electricity further interest was aroused, and from this developed the era of electro-medical treatment. Twenty years ago, when I first interested myself in the subject of physical therapy, many of the British workers, known as electrotherapists, were mostly interested in treatment by electrical means.

About this time Philip Bauwens, now director of the Physical Therapy Department at St. Thomas's Hospital, was working with Mennell, in charge of physiotherapy treatment. With the doyens of electrotherapeutic treatment, massage, manipulation, exercises and movements sometimes took a secondary role and were often left to the discretion of the massage staff. Many of these men have now passed on, but others, such as C. B. Heald, with the orthopaedist Jenner, were interested in the field of sport and industrial injuries. Their enthusiasm helped the development of rehabilitation as we know it today, under the driving force of that great personality Sir Reginald Watson-Jones.

The first World War established that branch of surgery called orthopaedics on a

sound scientific basis, with Robert Jones, Morton Smart and Bristow taking leading parts. The last two named made such use of the faradic or induction coil for stimulation of wasted and weakened muscles that it was known as the Smart-Bristow coil.

This coil, with its trembler, was not regarded as producing the ideal form of current, so methods of increasing the rapidity of make and break were devised. First this was done mechanically by a rotating contact in a mercury bath, and later by means of the thermionic valve. It was known that the electrical reactions of innervated and denervated muscles were distinctive, and the use of the Bristow coil and the interrupted galvanic current gave these tests a place of importance in the diagnosis, prognosis and treatment of nerve injury. Again improvements were developed, with moving parts, cams and interruptors giving multi-wave forms, with a lavish display of controls, recording instruments *et cetera*, all very confusing and not of any proven value superior to the more simple machines.

We are now faced with another difficulty in nerve lesions. It is known that daily, or twice daily, treatment of denervated muscle prevents atrophy, but the burden of transport and cost of treatment is beyond most economic standards.

Advances in the technical side of electronics gave us such magnification of small currents that today we have the electroencephalograph, electrocardiograph and electromyograph. The old chronaxie and rheobase methods, using a series of condensers, have been replaced by strength duration and intensity-time curves.

In 1933, in London, we heard of the latest development of diathermy in Germany, short-wave therapy. This was a big change in treatment. By means of

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stepping up the frequency a deeper penetration and a better distribution of heat in the tissues was obtained. At first this was achieved by using spark-gap machines, as in ordinary diathermy, but later greater efficiency was obtained with valve machines. The technical knowledge of physicists and the better production of more robust valves soon perfected these machines to the sturdy, efficient and versatile units of today. At first many of the European workers claimed not only heating, but also some biological effects, but American research workers have established that short-wave therapy is only a heat therapy.

Over the last few years we have seen further development in the form of microwave therapy. This is a still higher frequency, and it appears that this method has some advantages, although perhaps some disadvantages, in that it is not quite so fool-proof.

In recent years we have heard and read of ultrasonic therapy. Specialists with any experience all over the world are still very sceptical of its value. In 1951, Sidney Licht reported that workers in Oslo were not impressed. This year one of our members reported that even in Germany it was not thought to be of great value. From the same source we understand further improved techniques are soon to be available. Ultrasonic therapy is as yet in its infancy, much experimental work will be done, and much experience of its use gained over the next year or two. It took some years for short-wave therapy to be stabilized both technically and in its practical application. Ultrasonic therapy and microwave diathermy should not be used except under the very closest supervision of the specialist in physical medicine, as they are potent weapons not devoid of risk.

Let us now review the scene of twenty to twenty-five years ago

Rheumatic disease gave an enormous scope for physical therapy, and the British Red Cross Society established a clinic for rheumatism at Peto Place. This was attended by such eminent men as Copeman, Heald and the late Matthew Ray. At Pimlico, the late Sir Leonard Hill, with Bach and Elman, conducted a similar

department. Hydrotherapy, as used in the spas of England since Roman days, was available to Londoners. In Germany at this time I was amazed to see huge departments where the machinery required was colossal. A patient could be made red all over by giving him a spraying of poppy-seeds from a spray gun, which propelled these little seeds with great velocity onto his bare body. These seeds were collected, dried and sterilized over and over again.

For hot sand baths the patient would lie in a bath and be covered in hot sand up to his neck. This sand had to be gathered up again, washed free of sweat and detritus, dried, sterilized, and then elevated into containers and so used again. Steam was available for both local and general steam baths. To see a patient with a painful back sitting on a stool, with a jet of steam squirting him from behind, was commonplace.

Wax baths were in most departments and are still a valuable treatment, while peat baths, mud baths, saline baths (both plain and aerated), and whirlpool baths (local and general) were all fashionable and still have their uses. The luxurious foam baths, Wildes's vapour bath, and Turkish, Swedish, peat, mud and sand baths are all forms of mild pyrexial treatment.

With malarial therapy, fever therapy soon became a method of treatment of resistant Neisserian infection, and of *tabes dorsalis* and general paralysis of the insane. Many cures were obtained in those days, when certain death would have otherwise occurred in two years. With the advent of sulphonamides and antibiotics, fever therapy is now rarely used except in resistant cases. In fact, fever therapy never became universally adopted, in this country at any rate, because it was not well known to the profession, and was not easy to administer without special apparatus and trained personnel.

The first attempts at regeneration of muscle strength were thought to be best made by using all sorts of mechanical devices to move joints and limbs. This was, as you will realize, mostly passive.

Re-education of muscle function became the particular work of the re-educationalist, a masseur with a knowledge of functional anatomy. Active movements were given at first, then assisted, and later resisted, this method being found most satisfactory.

Special carefully controlled movements and exercises, Guthrie Smith slings and De Lorme exercises have come into popular use in departments of physical therapy. De Lorme conceived the idea from the training required for the profession of weight-lifting, and it was found that muscle power could be developed quickest and best by the principle of exercising against heavy resistance, while repetitive exercise without resistance increased endurance but not power.

The second World War established the value of physical therapy, for it was found that trained physical therapists were able to produce results. In the rehabilitation centres the full use of physical therapists, gymnasium instructors, occupational therapists, vocational guidance officers, psychologists and medical officers achieved results not otherwise possible. In some countries the adaptation of these centres to the rehabilitation of the injured in industrial and civil life is an actual fact.

Much can be done by physical therapy in the field of preventive medicine. Neglect and delay may lead to irreversible changes. This is to some extent minimized in England in three ways: (i) By instruction in various home remedies to be carried out in addition to regular attendance at a department of physical therapy. (ii) By transport being arranged to and from the hospital by a vehicle under the control of the London County Council. (We have in Melbourne a similar service by the Red Cross Transport.) (iii) By the use of a private organization supplying a mobile physiotherapy service at the home. (We have a State service of this nature for poliomyelitis.)

In the last few years the union of physical medicine and rehabilitation became established with the holding of the first sessions of the Section of Physical Medicine and Rehabilitation in the American Medical Association in June, 1950. Its

journal is the *Archives of Physical Medicine*. In England the Section is still that of Physical Medicine, and its journal is the *British Journal of Physical Medicine*.

In this country we have our own Section of Physical Medicine in the British Medical Association, and almost every hospital has its department, but I see no signs of any young men coming on to fill the gaps which must occur in our ranks sooner or later. Unfortunately, there is practically no undergraduate or post-graduate teaching of physical medicine in Australia, and yet the general practitioner has to see so much that requires physical therapy in his daily routine. There is an enormous industrial field rapidly growing in Australia, and requirements for physical therapy cannot possibly be supplied by the few specialists, nor by the physiotherapy staff whom we train, as there is a big loss through marriage.

In England, physical medicine is now well recognized and plays a part in both private practice and the National Health Service. In most of the big English hospitals there is a specialist in physical medicine in charge, usually with an assistant or assistants, registrars, teachers, qualified therapists and students. The number of patients treated may be up to 700 a day.

Many physicians have qualified for the Diploma of Physical Medicine, and about 20 sit each year. There are 120 members of the British Association of Physical Medicine, and more than 12,000 registered physiotherapists. The numbers in our own Australian Association of Physical Medicine in the British Medical Association total 36.

Physical medicine is so broad and embraces so many branches of medicine that the specialist in physical medicine can almost be regarded as a specialist general practitioner. The dermatologist has used methods of physical therapy, such as carbon dioxide snow and radiation therapy. There is some help to be obtained for the chronic indurated ulcer with local treatment, using ultra-violet, massage and pressure bandage. I refer to the Bisgard treatment.

In medicine, the common rheumatic disease is no longer an unwanted orphan.

It has now its own team of specialists, the so-called rheumatologists. This, like physical medicine, could be a broad specialty, for the rheumatologist must be highly trained and of wide experience in general medicine. To do justice to his patients, he must know his physical medicine, some of the principles of orthopædics, so as to enlist the aid of this specialist, and, with the newer concepts, he must know biochemistry, biophysics and endocrinology.

There is work in common with the neurologist, who may require electrical reactions in a case of palsy, and here the new work of electromyography and intensity-time curves may alter the outlook. Much can be done to help the spastic patients and those with cerebral palsies; all cases of peripheral neuritis require physiotherapy to a degree previously not imagined.

The psychiatrist, in the treatment of general paralysis of the insane and allied disorders, has need of malarial therapy or artificial fever therapy, induced at first by electrical means and later by a completely controlled air-conditioned cabinet. This method became a safe and scientific method of treatment, with little risk and with results comparable with any other. However, the advent of antibiotics in conjunction with, or in place of, fever therapy has taken an important place in the treatment of these scourges. If a knowledge of psychological medicine is taken up too enthusiastically, many of our pains may be regarded as psychosomatic in origin and not treated effectively. On the other hand, it is necessary for the specialist in physical medicine to understand and inquire into the psychological background, so that a proper appreciation of the patient's threshold of pain is obtained, perhaps to act as a curb on unnecessary or over-treatment with physiotherapy. The patient may even use physiotherapy as a means to an end. Further, to be giving physical therapy for its psychological effect, which is sometimes requested, is not always good physical medicine, but it is sometimes helpful in functional paralysis.

The use of short-wave therapy and local ultra-violet light has perhaps become more

popular as a further conservative aid, along with the "wonder drugs" *et cetera*, in the battle against the problems of sinusitis. The frequency of nasal surgery has dropped considerably.

Obstetricians have need of the trained physiotherapist for the teaching of both pre- and post-natal exercises, and more recently that of relaxation in the act of parturition. Intrapelvic diathermy has for long been proven of great value in pelvic sepsis, and now only made more effective with the antibiotics.

The new specialty of industrial medicine has need of physical therapy in the management of the injured and of the absentee.

Surgical specialists rely greatly on the physiotherapist in thoracic and plastic surgery and in the treatment of burns. Pre- and post-operative exercises have lessened the risk of pulmonary complications and have diminished the time in hospital after simple operations, such as tenotomy, transplantation of tendons, and meniscectomy, to mention only a few.

The whole programme of rehabilitation took such an important part during the wars that tremendous advances were made, and it was realized that the benefits could also be applied to civilian life. A national fitness campaign is as essential for peace as for war. With the increasing importance of man-hours in the economy in this and other countries there is the necessity for an immense programme of physical therapy in the rehabilitation of the injured by accident and disease. Rehabilitation centres giving all phases of medical treatment, with social and vocational adjustment, must begin to play a part in our community life, with sheltered workshops under medical and vocational supervision as the next step back to full and useful employment. In any programme of State or national medicine there is a need of expert advice and personnel, much the same as was used in the army rehabilitation centres during World War II. It has been said that "the functions of the physical medicine specialist may be roughly summarized as follows:

(1) The promotion of positive health and preventive medicine.

(2) The diagnosis and treatment of disorders of the locomotor system.

(3) The rehabilitation of the sick and injured.

(4) The re-vocation of the permanently disabled."

By some there is an emphasis on active and progressive exercises, but there is, and always will be, the necessity for the use of massage and electrical treatments where directed and given by the specialist in certain selected cases.

Finally, to quote "The principles behind physical medicine are old, but the concepts new Those who are anxious to do the

most for their patients have come to realize the value of these principles in restoring function to the highest pitch. In a modern community, under present economic circumstances, these principles are of enhanced importance. The restoration of the worker to a high pitch of efficiency, or his adequate re-vocation in industry, will help the difficult manpower situation, while pre- and post-operative measures may reduce the total time spent in hospital, thus relieving the urgent problems of bed accommodation.

The science of physical medicine as we know it today is young, but this does not detract from its importance"