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REHABILITATION IN THE E.M.S.

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The Oxford Dictionary defines "rehabilitation" as "restoration to privileges." In the medical sense this would signify restoration to the privileges of health, so far as this is possible. In considering the rehabilitation of an individual it is logical to include not only the whole therapeutic procedure but also the mental and material environment to which he is subjected from the moment of the onset of his disease or the infliction of his injury. In the more restricted sense of the term, however, which alone is brought under survey here, efforts to rehabilitate can be considered under the heads of passive physical therapy or the application of physical agents, active (volitional) exercise, and productive occupation.

In many instances the whole of the programme may with advantage be started as soon as the patient arrives in a hospital bed. In general, it can be stated that, if there are no indications to the contrary, the earlier this special rehabilitation treatment is begun the better. Thus, for example, a patient who is admitted from the waiting-list for an abdominal operation will often benefit from pre-operational abdominal and general exercises; the precursors of an operation for an internal derangement of the knee may very usefully be faradic and "active" (volitional) contractions of the thigh muscles; while an individual with a lower limb in plaster ought to begin weight-bearing exercises as soon as he is ambulatory.

In the past a prescription of "rehabilitation" therapy has too often been made out with a view solely to recovery of the diseased or injured region, to the neglect of the general mental and physical make-up. Recent conceptions of the aims of treatment render it improbable that this error will persist; indeed, the danger is that the pendulum should swing too far, to the neglect of those other, equally indispensable, extrinsic factors—massage, electrotherapy, thermotherapy, etc.

Aims

In the strict sense of the term there is no form of treatment which can be designated "curative"; in choosing any therapeutic or prophylactic procedure, one's aim ought always to be to elicit such responses in the tissues and in the mentality of the individual as are likely to assist in the recovery or maintenance of health. To no part of medical or surgical treatment does this apply with greater force than to so-called "rehabilitation" therapy; the physical agents employed can, without gross exaggeration, be looked upon as tissue "insults," and it is necessary to be continually alert lest the insult be so gross, or the tissue so debilitated, that the latter is incapable of response, and consequent harm result.

The therapeutic effects of almost all these physical agents depend primarily upon a stimulation of the peripheral circulation—venous and possibly lymphatic in some cases, arterial in others. As regards massage, this is obvious. To the effects, however, of electrically stimulated muscle contraction a similar statement applies, and this therapeutic measure is an excellent instance of the ease with which the optimum dose of the tissue stimulus may be overstepped. Until recently the therapeutic effectiveness of this stimulus has been in dispute. Magladery and Solandt (1940) have, however, demonstrated that the wasting of denervated muscle can be retarded by such

stimulation, properly applied. They have further shown that the maximum effective "time" dose is of the order of "a stimulus which is interrupted for 5 seconds every 5 seconds and applied for two minutes three times a day." This is in contradistinction to the method usually taught, in accordance with which a current of almost maximal intensity of stimulus is applied at a rate of about 2 per second with no prolonged pause, the whole treatment lasting up to 10 minutes or even longer—a total of stimulation time incomparably greater than that of Magladery and Solandt's maximum. This matter is worthy of stress, especially as, in a recent article (Gutmann and Guttmann, 1942), the statement appears that "the galvanic exercise treatment is the more successful the more the individual [denervated] muscles are exercised." Over-stimulation of such wasted and grossly abnormal muscle is entirely comparable to the administration of large doses of strychnine to a failing myocardium. A similar caution is relevant to all physical, as indeed to all therapeutic, agents. The dose must be graduated in accordance with the residual capacity of the individual and of his tissues to respond; an adequate dose for one would constitute gross over-stimulation in another.

Certain conditions also are notoriously sensitive to excessive active use: that in which the danger is most commonly recognized is dislocation of an elbow, especially in children or adolescents, though certain derangements of the knee are also susceptible. On the other hand, the safe or rather optimum degree of activity can often be assessed only after trial, under skilled medical supervision. Every rehabilitation department ought therefore to be continually supervised by a medical man skilled in the use of physical agents. Reference will be made later to the lack of this feature in the majority of hospitals otherwise well equipped, and to the reasons for this defect.

There is a growing tendency to decry the value of so-called passive therapy and to depend almost entirely upon the therapy of active function. Both are indispensable and can often be usefully employed concurrently at certain stages in the history of an injury or an ailment. Where normal tissue function is for any reason suspended, and tissue nutrition, through defective blood supply, is in consequence suffering, artificial stimulation of functional and vascular activity may partially replace normal conditions. One of the most striking and tragic illustrations of neglect of this principle is the permanently board-like hand which may result from the complete immobilization, with weight extension and without physiotherapy, of an upper limb for a high humeral fracture. "Passive" and "active" therapy do not constitute stages in treatment. Voluntary effort ought to form part of rehabilitation treatment at as early a stage as it may do so with safety, and passive therapy is with advantage often continued long after recovery of function has begun.

Provision in the E.M.S.

In the Emergency Medical Service there is very extensive provision of facilities for all these activities. Because in time of war the great preponderance of disability in the Services is due to injury, while in totalitarian war a large proportion of civilian disability is also due to enemy action, the earliest hospitals in the E.M.S. to be fully equipped in this respect were the so-called orthopaedic centres. At each of these there have for some time existed departments of physiotherapy, of

local and general remedial gymnastics, and of occupational therapy. At every such centre which has been enlarged by the building of hatted extensions these activities are housed in several specially designed huts; while at those centres at which the original hospital buildings did not necessitate this enlargement, suitable indoor spaces have been allocated to these purposes and the appropriate structural alterations made.

It was, however, obvious from long before the beginning of the war that these comparatively few orthopaedic centres would be insufficient for the numbers of war casualties which occurred or arrived in this country. The next step, therefore, was a much wider provision of rehabilitation facilities in the Service, in accordance with a decision of the Minister that every Class I E.M.S. hospital of 300 beds and upwards should reserve and prepare enough space to accommodate physiotherapy and indoor treatment by remedial exercises.

Later still, three types of fracture department, "A," "B," and "C," were selected—"A" and "B" as parts of general hospitals for long-stay and short-stay fractures, respectively, while the "C" departments, for civilian out-patients, are situated partly in hospitals and partly in certain clinics. In connexion with the "A" departments, as full provision for rehabilitation treatment, in proportion to size, is being provided as at orthopaedic centres; while "C" hospitals and clinics have been chosen because they already possess rehabilitation facilities adequate to their functions.

The *housing accommodation* for such a rehabilitation department at a large, hatted orthopaedic centre consists of the following: (1) A building, 144 ft. by 24 ft., for massage, electrotherapy, radiotherapy, thermotherapy (including short-wave therapy in some), and the earlier stages of remedial exercise; at one end of the building are "offices" for the staff. (2) A gymnasium, 60 ft. by 24 ft., for more advanced local and general rehabilitation gymnastics. (3) A room or rooms for handicrafts and carpentry.

Outdoor space is generally available for the more active forms of therapy, and full use is made of this, and especially of football, cricket, tennis, and even golf facilities. Stereotyped "P.T." is dead.

In *equipping* these departments with technical apparatus, at first only the most simple types were provided, and particularly such types as would be in greatest demand for the treatment of battle and bomb casualties. Gradually, however, it has been possible to supply some of the more specialized forms of equipment, and the rehabilitation departments are becoming more and more elaborately set out, while at the same time the provision of unessential varieties of apparatus is avoided.

The *technical personnel* which are recognized as being necessary to carry out the varied treatment belong to three groups—namely, members of the Chartered Society of Massage and Medical Gymnastics, male physical-training instructors, and occupational therapists.

With such facilities as have just been briefly outlined, rehabilitation activities at a large orthopaedic centre are obviously extensive, complicated, and diverse. The simplest of these begin in bed, and it is now the routine in E.M.S. hospitals for every patient who is confined to bed to perform at stated times during the day such exercises as are medically advisable, so that when confinement to bed is no longer necessary the individual ought to find himself at a much more advanced stage of general fitness than he would have been under the former regime of almost complete passivity. Pre-operational exercise and muscle stimulation are also coming more and more into use, to the obvious advantage not only of the muscle groups at the site of operation but of the patient's general tone and resistance.

All those who are ambulatory ought to attend the various departments. In the so-called "physiotherapy" department the members of the C.S.M.M.G. not only administer the various therapeutic agents there in use but also supervise the earlier stages of remedial exercise, with patients singly or in groups and exercising either freely or by means of gymnastic apparatus.

Many large hospitals are now provided with physical-training instructors, in the majority of instances supplied by the Army gymnastic staff and consisting of N.C.O.s who, in addition to their instructional training, have undergone a special course of remedial gymnastics. As soon as a convalescent

is capable of doing so, he joins one of the carefully graded groups for physical exercise. In its nature this is entirely divorced from the old "physical jerks," and is made up of a combination of more or less formal physical training with indoor and outdoor games. In the winter much of this treatment is carried out in the gymnasium, already described; but advantage is taken of any out-of-door space, and at many of the E.M.S. hospitals it is possible to make use of football, tennis, and golf rehabilitation.

Occupational therapy is a standard part of treatment at all orthopaedic centres and at every hospital with a "Group A" fracture department, and trained personnel for this work are increasing in numbers, the Ministry having instituted an intensive course of training at one of the orthopaedic centres. The remedial aspect of productive occupation is partly physical and partly psychological, and the occupations consist of light crafts such as weaving, basket-making, and wool-mat-making, as well as of heavier work, mainly carpentry. In addition to these, at many centres the hospital gardens function as remedial agents.

The fullest advantage cannot be taken of such a complex organization, in which the same patient is undergoing treatment in all the three main divisions of rehabilitation, unless there is an efficient system of timekeeping, and at some large E.M.S. hospitals such a system is in use. This is under the supervision of an *organizer*, whose duty it is to see that every patient observes his therapeutic time-table.

Medical Personnel.—It must therefore be obvious, and it is now officially recognized, that *specialized medical supervision* of these activities is essential to the complete efficiency of a rehabilitation department in order to ensure the correct application of all the methods and physical agents used and, of even more urgent importance, to hold the proper balance between activity and rest in a population consisting not only of convalescents but of convalescents at varying stages of recovery. This medical supervision, however, has provided the most difficult of all the problems in connexion with the organization, and it would be idle to suggest that the difficulty has been overcome. That it has not is due to the very great expansion of rehabilitation facilities under the Emergency Hospital Scheme—at the newly established orthopaedic centres, in all Class I hospitals of 300 beds and over, in the special fracture hospitals, and at certain other special centres, such as neuroses centres, head centres, etc.; whereas it is almost literally accurate to say that before the war there were no specialists in physical medicine attached to hospitals outside the Metropolitan Area and the comparatively few large provincial centres. Even in London a typical "sector," with a teaching hospital at its apex, might furnish one or at most two such individuals in normal times attached to the teaching hospital, while with wartime expansion there have sprung up in the sector four or five other centres each of which may at present contain two or three times as many casualty beds as its parent and each of which ought to be provided with a physical medicine specialist. In the extra-metropolitan "regions" the situation is even worse, and is being progressively aggravated by the withdrawal into the Army of ever greater numbers of medical men. This withdrawal threatens to render futile, owing to lack of candidates, a scheme for an intensive course of training of medical men in rehabilitation therapy set up under the Emergency Medical Service. The desirability of such medical supervision, now officially recognized, ought to be obvious; its virtual indispensability, however, is fully realized only after comparing centres where it exists with those where there is no such unified control.

The policy of the Ministry is, at any rate at present, not in favour of the setting up of rehabilitation "centres." After the war, however, it is almost certain that such institutions will be found necessary, and the present emergency might, if the individuals were available, lead to the equipment of a number of men and women with a training which would render them competent to supervise a form of therapy whose post-war establishment will represent a great and long-advocated advance in the treatment of injury and disease.

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