

engaged in the rehabilitation services is required to take full advantage of the facilities provided by the government, local authorities and voluntary agencies.

Lastly and most important is the need for closer integration and consultation at all levels between hospital services, public health authorities, and the family doctor, as stressed in the Porritt Report. These bodies should get together in order to provide a comprehensive and dynamic national rehabilitation service. We in this country are I think ahead in this field at the moment and if we are to stay there, we must attend to these problems which are so important, for their satisfactory solution will enhance the already high reputation this country holds in this particular field.

Question : The speaker spoke of the Westcliff holiday home. What would be the procedure to get a patient there for a short stay?

Mr Evans: Make application direct to the Director, Dorincourt Estates, Leatherhead, Surrey.

REHABILITATION IN THE ROYAL AIR FORCE

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I am to talk on the rehabilitation services in the Royal Air Force, and a little historical background might perhaps be of interest. The idea of organized inpatient residential rehabilitation goes back to the end of the 1914-18 war when Sir Robert Jones opened in the basement of the Shepherds Bush Hospital an occupational therapy department, a *true* occupational therapy department where disabled soldiers actually used work for getting themselves better. Although a great pioneer achievement, this did not attract much notice, and between the two wars very little was done in this field, though there was a centre for railway workers in Crewe opened by H. E. Moore.

During the early part of the 1939-45 war, the Air Force was confronted with the problem of their pilots and other air crew, as well as ground servicing crews being off work for long periods through injury. The combination of outpatient physiotherapy and sick leave was not getting these people back to flying or to servicing

aircraft quickly enough. They might be off many months with simple fractures or dislocations, and indeed many of them might never get back to flying at all. It was in an attempt to get these people back to flying, and back to flying more quickly, that the experiment of starting residential rehabilitation centres was introduced during the war. The first centre was in the Palace Hotel, Torquay. There were a number of problems in the early days with these centres. Patients tended to be fêted and lionized by the local population, there was difficulty in keeping discipline, and there were a number of other problems which were gradually ironed out with the development of a corporate spirit in the rehabilitation centre. Such a centre became to a large extent self-supporting, with its own entertainments and its own committee running the place, and with its own atmosphere and spirit. So successful did this become that during the war seven of these residential centres were developed; 25,000 patients went through them, and of these 70 per cent went back to full duty, 25 per cent went back to some form of modified duty and only five per cent were invalided from the service.

The aim of these residential centres was an extension of acute treatment in the hospital. Rehabilitation is not a separate medical discipline or a separate specialty at all, but merely an extension of the acute treatment of injury or disease. For various reasons, for certain types of injury or disease and in certain types of community it is more efficient and easier to do this in a residential centre or in a day centre than by outpatient treatment at a hospital. Originally, the centres took only orthopaedic patients but as time has gone on more and more medical and neurological patients have been admitted, as it has been seen how well the régime can be applied to all types of medical, surgical, orthopaedic and neurological disability. In the Royal Air Force, because of geography and service factors we have residential centres which are not as near the main hospitals as we would like, but this is unfortunately impossible to arrange. However, consultants who refer patients from the hospitals to the residential centre make frequent visits to see their patients at the latter, and we in turn make visits to the hospitals to see patients in the acute stage.

Although what I am going to say this morning concerns residential centres, I do not wish to imply that these are in any way superior to day centres. Both types of centre have their respective advantages and the choice of residential centre or day centre depends largely on local needs and the particular type of patient one is dealing with. Dr Sommerville this afternoon will be describing his day centre, which is ideal for the particular circumstances of the type of patient he is dealing with. At the moment we have two rehabilitation centres, both very near here. One of them is Headley Court near Epsom, which is for officers and air crew and was given in memory of the

Battle of Britain by the Auctioneers and Estate Agents. It is a very beautiful building in superb country, showing the importance of the environment and the background for long-term rehabilitation. If somebody is to undergo many months of treatment he must be in congenial surroundings and pleasant country where he straight away develops the mood to want to get better. The other rehabilitation centre is at Chessington, where other ranks are treated. Headley Court has a 100 beds and Chessington has 200 beds. Most of the work is on inpatients but we take quite a lot of outpatients from the surrounding district, and we do take civilians by arrangements with the regional hospital board.

Centres are organized so that patients work in classes according to the geographical site of their injury and the stage which that injury has reached; they work under a skilled remedial gymnast who is picked not only for his technical ability but also for his leadership, interest, enthusiasm, and general rapport with the patient, so that he will be able to give the right sort of exercises and also inspire in the patient the right spirit and will to get better. For example, if the patient is admitted with a fracture of the lower limb in plaster, the first stages of his treatment involve correct walking in plaster, building up the power of muscles inside the plaster so that when the plaster is removed he will be well on the way to recovery; for this purpose he joins a static class where he does non-weight-bearing exercises in plaster, alternating with games and walking classes. At a later stage, when mobilization of stiff joints and general functional rehabilitation of the limb are needed, he will join a class where they do more weight-bearing exercises and games requiring movement of the joint. Finally, if the job demands a very high standard of fitness the patient may join a late class where he will do really intensive weight-bearing exercises. Similarly, after an operation on the knee, say a patellectomy, the first few weeks will be spent in a static class doing non-weight-bearing static exercises to get the quadriceps really strong. When the knee is stable and no effusion is present, he will then join a class where knee movement will be emphasized and finally again, if the job demands it, he will go into a final class where they will do really intensive weight-bearing, running and so on. The working day lasts about $6\frac{1}{2}$ hours and alternates between specific exercise periods and periods of games designed not only to relieve the monotony but also to continue to exercise the weak muscles or stiff joints. The day starts with a warm-up period, very often accompanied with music, to get the patients woken up and working as a group. Next comes a specific exercise period, with patients doing various exercises. One of the remedial games played is so-called sitting volley ball, where patients with lower limb injuries push a ball backwards and forwards across

the net as in volley-ball. They enjoy this game very much and although it represents a relief of the monotony, every time they lean forward to push the ball over they are contracting their quadriceps. The warm swimming pool is a most valuable part of treatment and essential for any rehabilitation centre. The buoyancy and warmth of the water relax spasm, make patients with severe muscle weakness able to walk when they cannot walk on dry land, and are very useful for mobilizing stiff joints and a host of other things.

During the day there will be periods of physiotherapy, occupational therapy, walks, cycle rides, swimming and so on, as required and as specified by the medical officer in charge. Physiotherapy in these centres is functional. We are concerned with the re-education of neuromuscular functions, gait training, development of specific muscle power, restoration of joint movement, and the teaching of severely disabled patients to be as independent as possible; a full range of aids to daily living is provided. There is no place for palliative physiotherapy in this sort of centre.

Occupational therapy is provided for three specific reasons. The first is to restore power to weak muscles or range of movement to stiff joints by specific craft work. Games are most important in occupational therapy, for if you are giving a full programme to patients who are in for many weeks or months on end you have to try to amuse them. The late Dr O'Malley, a great pioneer in rehabilitation, used to say when patients arrived at his centre, "I am glad to see you come and glad to see you go," but if you are pleased to see the patient come then you must make his stay as enjoyable as possible. The aim of a rehabilitation centre is to get the patient back to work as quickly as possible, but whilst he is there to make him enjoy his rehabilitation. One of the things we do is to invent little games, such as blow-football played with a ping-pong ball. The pitch is set out exactly as a football field with goals at either end, and the game is played with car battery syringes; people with stiff joints of the fingers or weak muscles in the hand squeeze the syringe to blow air down and move the ball from one end to the other. If you come to see one of these centres we will invite you to play this game and you will see that it is extremely hard work; at the beginning you can play only half a minute each way, and as time goes on you can gradually increase this. Another game we play is weighted draughts. These draughts are extremely heavy, and is a useful game for people who have weak hand muscles; we can make a diabolical refinement of this by making the board magnetic, so that they have to pull against a considerable weight.

The second aim of occupational therapy is to develop skills in normal work, so that the patient is fit to resume his job when he

returns to duty. The Royal Air Force is a highly technical service these days, and if we are rehabilitating radio engineers, electricians, and airframe fitters to go back to these jobs on their units, then it is very important to use these sorts of skills and crafts in their rehabilitation. This is what I mean by functional occupational therapy. When the patient goes back to his unit, not only is he fit to do his particular job, but his medical officer, who is equivalent to the family doctor on his unit, knows from our reports that the patient has been rehabilitated in his particular job and is fit to do it.

Finally, occupational therapy is used to assess the patient's functional abilities and disabilities after his injury and to see what alterations are necessary to his tools or to his living conditions to make his work possible or what sort of re-training is required. A good occupational therapy department must therefore contain light workshops for the development of power and the regaining of movements of stiff joints in the early stages, later concentrating on functional occupational therapy for a specific job and assessing the patient in specific trades. I would like to stress how very important it is to organize a rehabilitation centre towards a functional goal. The best results and the best atmosphere in a rehabilitation centre are obtained if the patients realize that the aim of the doctors looking after them is to get them back to their specific work, and attention is paid to their interests and to the work they are going to do when they leave the centre.

Another most valuable part of occupational therapy is the provision of prostheses for amputations or for loss of digits. I would like to quote two examples to give you an idea of the range and variety of work we expect from a good occupational therapy department: faced with the problem of a patient who had undergone traumatic amputation of the thumb and two fingers and had been a carpenter in the service, we made him a prosthesis from fibreglass and a leather block so that he was able to hold his hammer. We made in fact a variety of prostheses, all of which illustrate the same principle: one was for writing, one was for carrying heavy weights, and so on. These were very easy and cheap to make, costing only two or three shillings each, and he was able to go back to full duty as a carpenter with this range of prostheses. For another patient with traumatic amputation of all four fingers as a result of a circular saw injury, we made a cosmetic hand from fibreglass for wear in society, another of fibreglass with a screw for screwing in tools, and one made with flexed "fingers" which we found was the most suitable for carrying objects around in his job.

One of the valuable features of a residential centre is that one is able to study the patient's particular job at one's leisure and see just

what sort of prosthesis, gadget or appliance is required for his particular type of job. It is vital not to take a mass-produced attitude to things. It is no good ordering the same type of prosthesis for a particular injury—you must study the patient's particular job, his particular knacks and disability, and make it on the spot for him. Very often we find that patients design their own prostheses; they say, "What I want is something that does this particular thing", and we make it, and by trial and error we find the right thing for him.

A rehabilitation centre, therefore, offers full-time intensive treatment towards a clearly defined goal. Secondly, it offers an atmosphere away from the acute life-and-death atmosphere of a hospital and geared towards return to normal life; the atmosphere of the centre must be created by the staff and permeate the whole centre with optimism and a cheerful and practical approach to life. The patient, of course, must fully understand his problem and his condition, and it is very important to have full welfare facilities so that there are no worries or financial troubles. For long-term patients we arrange quite a complicated welfare organization with all sorts of trips and outings, for example, to race meetings, days on the river, to *premières* of films. By arrangement with the regional hospital board it is possible to accept civilians, and we have in fact three civilian doctors undergoing rehabilitation at this moment.

The comprehensive resettlement service is of course vital to get a patient trained and resettled into civilian life if he is going to have to leave the service. In this context I would like to pay a particular tribute to the workers at the Queen Elizabeth Training College, who have been of tremendous help to our young disabled who have been invalidated. About one-third of the severely disabled who leave our centre for civilian life go to some form of technical training, either here or at a government training centre, and I think it is in this field that these centres are so valuable.

It is also most important to use the facilities in a residential centre for assessing disability. I think the idea of acute treatment, residential rehabilitation or day rehabilitation, industrial resettlement unit, Government Training Centre, and then work, is too spread out. One can often co-ordinate all these at one level and by the judicious use of an occupational therapy department assess a patient's disability and his aptitude for training, and then get him to a training centre quickly, without necessarily having to use the full panoply of industrial resettlement units in between. As examples, I would like to quote three patients: one, a skilled tradesman, had one of the most severe injuries you can get in the hand, severed median and ulnar nerves and a completely paralysed hand. A month after secondary suture he had severe contracture of all the flexor tendons

at the level of the wrist, needing slow sustained stretches with serial plasters. This was done over a period of three months intensively. The patient finally went back to full duty after ten months with full function. Another patient had bilateral fractures of the tibia and fibula, compound fracture of the olecranon, partial median and ulnar nerve lesions, and severe concussion (he was unconscious for two weeks). Six months later, he had 90° movement in both knees, a somewhat stiff elbow, and a complete recovery from his nerve lesion, and is going back to full work.

One more case is of interest because this is the sort of patient that a residential centre can help so much. This patient had a severe motor-cycle accident with head injury, was deeply unconscious for two weeks with multiple ocular nerve palsies and a displaced sagittal sinus as shown on angiography, multiple limb fractures, and a subdural haematoma. He had a craniotomy, the subdural haematoma was removed and quite a lot of brain tissue was sucked out at the operation. He was in coma for several weeks, but gradually came out of this and was transferred to the R.A.F. hospital at Halton where he was quite disorientated, very dysphasic and incontinent. He came to us three weeks later, still in this rather strange condition. He stayed in the sick quarters and was given occupational therapy, attention of the education officer, welfare trips, general exercises and a full régime. For the first few weeks he remained pretty well like a vegetable, but gradually the team spirit and the interest of other patients got him to take more interest in life. Slowly but surely he ceased to be aggressive and difficult and became more and more social, and by Christmas of last year he was almost normally orientated in time and space. His memory was improving. Eventually an acrylic plate was put in his skull and he was fully tested psychometrically and found to be normal. He has now gone back to duty as a radar fitter. It is this sort of patient with severe head injuries and not only physical but mental disabilities who does so well from the disciplined environment that a full-time intensive programme can give.

Question: In view of the large number of trades now in the armed forces, what are the criteria for keeping a man in the armed forces or invaliding him out into the ranks of civilian industry?

Wing-Commander Wynn Parry: Very simply put, the criteria are: Is the patient able to do the job in competition with his fellows? If he is going to lose promotion prospects or his disability is such that he will be unable to serve in any part of the world, then one should seriously consider whether he would be better off outside. However, very often in the sort of disabilities of which I have been speaking, climate does not really aggravate the disability very much. Whether he is liable to lose promotion is most important. If, for

example, a patient with an arm amputation can do the job perfectly well with one arm and he has been tested out in our workshops and found fully able to do it, then we say he is fit. The more skilled the man before his disability, the easier it is to retain him, but if a completely unskilled lad who has just started his training has a severe motor-cycle accident with multiple injuries, it is probably on the whole better to let him make his start in civil life rather than run the risk of being behind in the very competitive field of service promotion. The more skilled the man and the longer he has been in, the bigger effort we make to keep him in. Very often it is possible to keep people with quite severe-looking disabilities in the service because disability and function are very often two entirely different things.

REHABILITATION OF THE ATHLETE

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I am including within my terms of reference concerning the rehabilitation of the athlete, the comprehensive treatment of athletic injuries, right from the start of the symptom through to the end when the athlete is rehabilitated to full activity. This means restoration of strength, stamina, speed and, as Ian MacQueen has said, "the other 's'—(p)sychological status".

The Southampton Football Club has the slogan "Treat and train", and this has always been our slogan too, so that whenever possible the patient is kept fit and in training while his injury is being treated. For example, there is the famous case of one of the British Lions rigger team in 1955 who broke his carpal scaphoid and his wrist was put in plaster; he became the greatest place-kicker in the team because for two months he did nothing but practise place-kicking.

We find also that athletes differ in their degree of fitness, according to that needed for their particular sport. For instance, the batsman does not require to be as fit as the fast bowler; and the professional rider takes a chance where the amateur need not.

Few medical practitioners have a clear conception of what is meant by the restoration of extensibility and flexibility of muscles. Often an athlete declares he has full range of movement in the elbow,