Section of Rheumatology & Rehabilitation

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President's Address

Some Psychosocial Aspects of Rehabilitation and their Implications in Research

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Both the Tunbridge and the Mair reports on rehabilitation were firm in their demand for more research into rehabilitation. Tunbridge (Department of Health and Social Security 1972) said that 'research and development in all branches of the rehabilitation service has been seriously neglected in the past in spite of the fact that research is the prerequisite for advance in medical treatment'. Mair (Scottish Home and Health Department 1972) drew attention to the '. . . vast field (of rehabilitation) which still remains to be cultivated'. But Mair had defined rehabilitation as the whole process of restoring a disabled person to a condition in which he is able, as early as possible, to resume normal life, implying restoration of patients to their fullest mental and social capability. This definition is so wide that it includes virtually the whole of clinical medicine. At best it is an appropriate term to embrace the many physical, social and organizational aspects of the after-care of patients who require more than acute, short-term definitive care and, like nursing, has an emotive rather than a scientific meaning (Hockey 1974).

The effects of rehabilitation derive from a variety of people (doctors, physiotherapists, occupational therapists, nurses, social workers, resettlement officers, rehabilitation counsellors, instructors, administrators, psychologists, orthotists and prosthetists) and a variety of situations. Furthermore, rehabilitation is usually a group activity, so each patient is in contact with others who are better or worse, who have improved and responded to the programme, or who have not responded.

In a much more restricted setting, the conventional physiotherapy 'treatment' involves an ambulance trip, time in the waiting room, a warm relaxation under the heat lamp, a comforting discussion with the physiotherapist, some not too taxing exercises, a cup of coffee in the hospital canteen and a chat with the hospital social worker. For an elderly patient with painful degenerative arthrosis of the knee or hemiplegia, who may spend many hours of most days pottering about a lonely and uncomfortable old house, this is a day of excitement, bringing contact with ambulance drivers, receptionist, outpatient nurse, physiotherapist, secretary and social worker, and fellow sufferers. What chance have we got of assessing the real value of 20 minutes static quadriceps exercises or the comparative value of short wave diathermy and ice?

I want to draw attention to some of the 'psychosocial' aspects of rehabilitation and explore the problems they present when attempts are made to evaluate the effectiveness of rehabilitation procedures.

Outcome Measures in Rehabilitation

The first problem we face is that of defining the outcome measures which we can use. There is a smooth continuum of change from normality to abnormality in the manifestation of most diseases, and the spectrum of pathological change in a single disease varies greatly among individual cases (Fletcher & Oldham 1959). Consequently most clinical conditions do not fit precise definitions, and symptoms and signs do not match with demonstrable pathological changes. The clinician or therapist will frequently rely upon experience and clinical acumen, but in research it is necessary to pay attention to repeatability, validity and the discrimination of signs and tests that are used. Without diagnostic criteria and definitions of disease severity which are appropriate and precise it is impossible to embark upon acceptable clinical research.

In rehabilitation medicine it is a patient's functional response to illness or injury which is of especial interest. The clinical condition is of course the main determinant at the outset, and the institution of appropriate treatment the first and often most important aspect of rehabilitation. Whether optimal functional recovery occurs may, however, be a separate problem.

In research in this field it is therefore essential first to establish the diagnostic criteria and the appropriate clinical outcome measures. Then it is necessary to define the appropriate functional outcome measures. For example, the criteria established by the American Rheumatism Association for definite or classical rheumatoid arthritis are widely accepted for clinical trials, and to follow progress these features are quantified. Unfortunately there is often little correlation between these criteria and the patient's performance. It is often pain which determines function, and pain is a personal psychological experience; an observer plays no legitimate part in its direct measurement (Huskisson 1974); it is a subjective outcome measure. In a somewhat simpler situation studies of rehabilitation of patients with fractures of the tibia and fibula are concerned with the outcome measures of union of the fractures and the patient's return to work. But estimation of clinical union is based upon a feeling of 'springiness' (or lack of it) at the fracture site and our assessment of X-ray consolidation, both very subjective measures as far as the clinician is concerned.

Functional outcome of rehabilitation is usually measured in terms of time off work, hospital attendance, daily living activities, social activities; all of these are related to psychological, social and cultural factors. Return to work is such a complex activity, depending upon the patient's work record and the availability of work, that it is unwise to treat employability as a main criterion for recovery. Hospital attendance is more appropriately regarded as a characteristic of the health service than of the patient.

As regards daily living activities there are two ways of assessing a patient's functional physical capabilities: he can be tested in the activities of daily living – and the batteries of tests recommended, their scoring and selection are almost as numerous as are occupational therapy departments; or he can be given an activity questionnaire which can be validated within certain broad limits (Bennett *et al.* 1970, Bennett & Garrad 1971). But there are likely to be wide discrepancies between achievement in activities of daily living and clinical recovery from the underlying condition. For example, in our own studies of the painful stiff shoulder we have been able to demonstrate that, although discharged as 'cured' and not complaining of disability, 20% of patients have significant restriction of movement six years after the initial acute condition (Clarke *et al.* 1975); they have functionally adapted to their physically measurable disability.

Although functional activities (mobility, self-care, with or without help or aids) are frequently used as outcome measures, they are relatively insensitive to the middle range of disabilities and when carried out under test circumstances are unrelated to achievement in the natural environment. There is further evidence that, although functional tests have good repeatability for the less severely disabled, the more disabled the person and the more the activities depend on aids and equipment, the less repeatable they are, i.e. there is a 'severity component' and an 'equipment component' (T Meade & D S Smith 1975, personal communication).

To overcome these difficulties it has been recommended that the measurement of motor capacity by concentrating on underlying physical capacity excludes the influence of such factors as intelligence, motivation and environment (Sainsbury 1974). To this end, Margot Jefferys and her co-workers (1969) designed a battery of physical tests. But there is still the problem that achievement in these tests may be unrelated to independent activity in a normal environment, for all motor capacity depends upon the patient's cooperation and therefore upon personality and the attitudes which make up motivation.

To be satisfactory, any measurement of functional incapacity must reflect the wide variety of difficulties which disabled persons may experience and which may vary according to age, sex, marital status and family commitments as well as the clinical conditions. Furthermore, it does not follow that those who make progress in the protected environment of a rehabilitation centre will be equally active on their return to the community. Many factors in the environment can hold back the level of functional independence, but even the most favourable home or work environment cannot provide the same stimulus as a team of enthusiasts well versed in the problems of rehabilitation (Christmas *et al.* 1974).

Cost benefit analysis is clearly one suitable outcome measure (Williams 1974), but there are complications. In the early 1970s the Social Rehabilitation Services of the US Department of Health, Education and Welfare funded seven rehabilitation centres to develop model regional systems of rehabilitation after spinal cord injury. An attempt was made to design methodology for measuring the benefits of establishing the system (Charles *et al.* 1974). The authors found that many of the benefits of improved patient care are impossible to convert into cash benefits – pain, suffering, embarrassment, dependence upon the family, social activity and psychological adjustment.

Attempting to evaluate the contribution of community hospitals, Bennett (1974) wryly comments that we are still left with a 'tangled web of effects which would at best serve only to identify elements for further study'. 'Only studies of *patients* can show the problems associated with long term care, the effect on the day to day lives of patients and the quality of life . . . thus patients' own assessments of relative advantages and disadvantages of care and non-care should be among the criteria on which decisions about care are based . . . ' (Cartwright 1974). Certainly a patient's mental (psychological) state and his assessment of his 'care' is important if it reflects a genuine change in his behaviour or his medical state, but by itself it tells us very little.

We are thus left with the uncomfortable conclusion that traditional clinical measures of outcome are unrelated to functional capacity, and that we must combine all our clinical measures with functional, economic and social measures if we are to attempt any evaluation of rehabilitation. And where we talk about 'functional activities' clinical psychologists would refer to 'behaviour'. If we accept that rehabilitation is part of patient management and care then we can begin to talk about the patient's 'clinical' response to treatment and his 'functional' or 'behavioural' response. The patient who suffers a broken leg demonstrates his clinical response by the union of the fracture, recovery of muscle power and joint mobility; he demonstrates his behavioural response by walking without a limp and returning to work.

For patients with chronic and severe disability the behavioural aims of rehabilitation assume a greater importance and include the use of many nonclinical techniques such as provision of aids and appliances, house adaptations, and provision of supporting services. We can now distinguish between the 'behavioural' aims of rehabilitation: increased personal independence in activities of daily living; increased social and leisure activities; return from hospital to community; return to work. It now becomes much more obvious that we are seeking to achieve different outcomes for different patients and outcome measures must be related to both the clinical and the behavioural goals of the rehabilitation programme.

Bias

Because rehabilitation medicine is so concerned with behaviour, bias becomes a particular problem in research. In the physical sciences experiments can be mounted which have no direct influence on the materials being studied, but in clinical and behavioural research there is little doubt that the research workers influence the responses they are trying to measure. All would-be researchers in rehabilitation are recommended to spend some time browsing through Rosenthal's book 'Experimenter Effects of Behavioral Research' (1966). There are four main sources of bias in trials of rehabilitation:

(1) There is likely to be a strong bias in the treatments we select for evaluation. We are all familiar with the 'pilot study' followed by exploratory analysis. But Rosenthal likens these to 'fishing expeditions', and pilot studies like fishing expeditions rarely take place in randomly selected ponds. No clinician will intentionally select a procedure likely to show his hypothesis to be in error; similarly, no therapist is likely to give a treatment which she believes to be irrelevant. Thus there is often a biased selection of treatment procedures for evaluation, depending upon the doctor's and therapist's experience and beliefs.

(2) This affects results because specific expectancies can be communicated to the patient. One person's expectancy about another person's behaviour may contribute to a determination of what the behaviour will actually be. Indeed, Merton (1948) refers to 'self-fulfilling prophesy'. Clinicians use this to enhance the therapeutic effect.

Expectancies are conveyed in many different ways over and above verbal communication. This was shown by the classic study of babies (70% less than 1 year old) who developed preferences for orange juice or tomato juice according to the preferences of those who were feeding them (Escalona 1945). Coffey *et al.* (1964) showed that the expectations of vocational staff may well lead to commensurate performance by the clients (patients). Certainly we can all think of the centres where the enthusiastic director achieves a level of staff commitment and patient response which are unequalled by others in the same field. Indeed, some trials of rehabilitation are clearly descriptive studies of an enthusiastic organization which naturally produces excellent 'positive' results through their personal or organizational charisma.

(3) We are attempting to evaluate, at least in part, the outcome of the most emotion-charged 'experimenter-subject' situation – the doctor/patient and therapist/patient relationship. In psychological and behavioural studies the assessor's attitudes are known to affect the subject's response. Factors of relevance in rehabilitation include sex, age, race, intelligence, social status, experience and anxiety. Furthermore, the response is highly influenced by the situation. Because of

this bias no doctor or therapist concerned with the patients should ever be allowed to participate in evaluation of therapy, as his evaluation will be biased because of his own expectancies.

(4) The introduction of new techniques into a treatment programme may introduce subtle differences in patient care over and above the specific treatment under investigation. In a classic study of factory workers it was shown that any alteration in their routine, including changing back to their old routine, produced temporary improvement in output. This 'Hawthorne effect' is a response to attention and status (Brown 1965). Such an effect will occur after any change of treatment, but when a new treatment is introduced the effect may be even greater. Thus if new treatment is compared to old, there will be a bias against the old treatment because patients in the latter may receive less attention and lower level of care.

The introduction of immediate postoperative fitting of artificial limbs is an interesting example. In order to carry out the treatment, special teams of surgeon, limb-fitting doctor, prosthetists, theatre and ward staff practised special techniques. Possible postoperative dangers necessitated an increased level of patient supervision. Thus the total level of patient care was considerably higher than previously managed in the conventional situation. Similarly, the clinic teams developing powered artificial arms provide a level of patient care quite unmatched in conventional prosthetic care. So any comparisons are confounded by the bias in favour of treatment. This is the modern version of Osler's dictum advising the need to hurry to use a new drug while it still worked.

Randomized controlled trials: For all these reasons randomized controlled trials have become an essential feature of clinical research, but they present many problems when applied to rehabilitation medicine. Most of our difficulties stem from attempts to define clinical conditions which are often no more than conglomerate syndromes (e.g. backache, neckache, painful stiff shoulder, 'stroke'), and to clarify outcome measures (e.g. return to work, activities of daily living, or reduction of pain). In order to collect the large numbers of cases necessary for significant results, multi-centre trials are often advocated, and these bring complex logistic and administrative problems. The longer a trial proceeds and the more patients, therapists and centres involved, the more problems arise from changes in available services, changes in attitudes of patients, staff and colleagues; collaboration wanes, and more patients drop out because of intercurrent illness, dissatisfaction, lack of cooperation, and increasing disability.

Control groups: Many of the major studies of rehabilitation can be described as either 'before and after' studies or 'with and without' studies. 'Before and after' studies draw a comparison between medical care delivered to a defined group of patients before and after the introduction of a treatment policy change. But such studies have disadvantages, particularly in the passage of time, which make comparison of outcome measures difficult to evaluate. Similar criticisms apply to comparisons of 'with and without' studies the main disadvantage in this instance being the comparison of patients drawn from different geographical communities.

Eric Copp's (1966) review of the effectiveness of rehabilitation is an excellent example of a 'with and without' trial, but the control group controls only for passage of time; it does not control for 'attention' or for any of the factors in which we are really interested. All the patients admitted to the rehabilitation centre, and their medical advisers, were entitled to expect some improvement. We have already drawn attention to the effects of expectations and attitudes: such studies indicate only that care and attention will alter behaviour.

Another interesting 'before and after' study of severely disabled patients is the evaluation of the feasibility, social acceptability, and cost of introduction of a new provision of home care for a small group of 20 patients with respiratory insufficiency requiring mechanical respiration, following poliomyelitis (Adler *et al.* 1974). It demonstrated that home care was cheaper than hospital care, but most of the information could have been obtained by comparing the hospital group with other 'responauts' already being cared for at home. Indeed, as Sir Cyril Clarke said (1974), there are a large number of 'natural' experiments going on in this country.

The real impact from the responaut study was the financial facility for bringing about considerable changes in care of a specific group of patients. Often one of the greatest fringe benefits of a clinical trial is that it is a potent technique for changing habits and attitudes.

It is perhaps not too difficult to introduce 'control' groups in drug trials but when we are considering physical treatment (e.g. physiotherapy) or even more sophisticated and complex treatment programmes, such as inpatient rehabilitation programmes, the problem of a control group presents many difficulties, particularly if one is trying to ensure that each treatment group receives the same amount of care and attention. For in rehabilitation there is always the problem of the integral relationship between the therapist and the therapy. Shapiro (1969) has shown that there is a good correlational evidence associating warmth, empathy, and genuineness with therapeutic improvement in a wide variety of patients and therapists in the field of psychotherapy. Furthermore, the experimenter can also influence physiological data. For example, in experimental studies of dogs' heart rates it was noted that the rate dropped significantly when one particular experimenter was present (Gantt 1964), and similar effects have been recorded in human studies (Engel & Chism 1967). Perhaps we should direct our attention more towards measuring the 'warmth' of a physiotherapist, and its effect on the patient's disability, than the heating effect of short wave diathermy, wax baths and exercise.

As we are so concerned with the therapist/patient relationship and its effect upon outcome it is necessary to investigate it. We can do this by taking measures of the patient's evaluation of the therapist, and the therapist's evaluation of the patient. These measures can then be correlated with objective patient outcome measures. It is then possible to answer the question whether a good therapist/patient relationship contributes to a good outcome. We are attempting this evaluation in our current study of outpatient treatment of chronic bronchitis. A second approach is to manipulate the level of the therapist/patient contact across a number of treatment groups and compare the outcome measures. Because of the widely different views which therapists hold about personalized and depersonalized treatments (e.g. proprioceptive neuromuscular facilitation, and apparatus-resisted exercise for increasing muscle power) this is an interesting field for experiment.

One area of considerable confusion for the novice research worker in rehabilitation medicine is that of controls and placebos. A control condition is introduced into an experimental design when one wishes to control for the effect of a particular factor upon outcome measures (the dependent variable). Common factors demanding control are: passage of time; being given treatment of any kind; recurring care and attention from therapists and others; keeping a record of symptoms and signs (i.e. giving care and attention to oneself); being put on a waiting list.

Placebo is literally something which pleases the patient, a treatment upon which the patient can hang his hopes and expectations. Maxwell (1969) suggested that its essential features are that it is identical to the treatment under test in every way except for the presumed active principle. In drug trials it is easy to arrange for inert tablets to be made which are identical in appearance with the active ones. The situation is very different and much more difficult when applied to physical treatment, and there is a tendency to confuse 'palliative physiotherapy' with placebo treatment. In rehabilitation trials there is a need to introduce treatments in which there is no active component, and where the only effect is a psychological one due to the patient receiving attention; the term 'attention placebo' is a useful one.

A patient may feel his treatment is good because it genuinely produces an improvement in his physical state or functional capacities, or because it is comforting or an impressive form of treatment. The psychological and physical component of treatment must not be confused with the psychological and physical components of outcome. There is a need to assess rehabilitation both in terms of objective measures, e.g. disease processes, economic, social and functional effects; and *via* subjective self-report measures, e.g. satisfaction with the treatment. It is necessary to comment here that 'psychology' deals with both outward behaviour and inner mental state. The patient's self-report of his mental state and his assessment of treatment and outcome are subjective. But behavioural and social activities are objective. There is not necessarily a direct one-to-one relationship between psychological aspects of treatment and psychological measures of outcome, or between physical aspects of treatment and objective measures of outcome.

Components of Rehabilitation

Rehabilitation is a compendium of many components – medical treatment, physical treatment, functional assessment, retraining and resettlement. Each component has many integral parts. For example: physiotherapy includes pain-relieving techniques, exercise to increase muscle power and joint range, activities to increase agility and coordination, and retraining with or without aids to achieve functional (behavioural) results.

The patient who develops an acute infection can be given antibiotics and the course of infection monitored without the patient or medical staff playing any part in the ensuing drug trial. But it has been pointed out that the time away from work varies after uncomplicated appendicectomy, and that it is the surgeon's whim or the ward sister's practice which determines the length of time in hospital and often time off work as well (Wright 1963).

A patient who suffers a crush injury of the hand at work is asked to collaborate in an intensive activity programme involving discomfort and effort which may culminate in an early return to an uncongenial, stressful work situation which, on his last attendance, led to a painful, frightening injury for which he may or may not get compensation.

As Gardner *et al.* (1968) pointed out, there are two main constellations of factors related to the period away from work after injury: those associated with the type of injury, and those associated with the individual patient. But the factors were complex – relating mainly to injury and its complications, and the type of work. The availability of temporary placement in modified or alternative employment was an important factor in early return to work (i.e. special factors were important).

Camden Road Rehabilitation Centre records show an interesting change in the total disability period for fractures of the shaft of the tibia and fibula, which increased from 32 weeks in 1960 to 40 weeks in 1967; this increase was unrelated to the clinical problems but appeared to be related to changes in the Earnings Related Benefit, Industrial Injury Benefit, and tax-free sickness benefit; the changes meant that patients drew maximum benefit for a longer period (Sommerville 1970; 1974, personal communication). But for all these patients, although of similar age, the duration of total disability is two or three months longer than that for patients at the armed services rehabilitation units, where the disability time for tibial fractures is 25–30 weeks, depending on the type of fracture (Nichols & Parrish 1959).

Most patients seem to want to get better and appear to be most keen when given good treatment and sympathetic understanding by medical staff. The crucial period is usually the early weeks of incapacity – before the patient has had time to relinquish hopes of recovery and become accustomed to the role of invalid. Indeed, delay in making clinical and administrative decisions about a patient's management is a potent cause of morbidity and reduces the chance of early return to work (Brewerton & Daniel 1969).

The advantage of organized rehabilitation appears to lie in its ability to combine an integrated medical and functional assessment with the coordination of activities of the many agencies concerned. On this basis it has been estimated that one in three patients discharged from hospital would benefit considerably from a period of rehabilitation to speed recovery of function and confidence, and to allow for realistic planning for return to work. The benefits to the individual patient from such a rehabilitative period are complemented by the economic advantage to the community (McKenzie *et al.* 1962). It is in this sense that rehabilitation can be said to bridge the gap between hospital bed and the workbench or kitchen sink.

Psychological Factors

It is likely that people suffering from any physical disability are prone to adjustment problems and that work capacity, functional ability and social adjustment are probably more strongly related to psychological state than to organic disease. Furthermore, psychological factors are likely to influence the person's response to specific treatment, whether for temporary or chronic disability.

In a study of a mixed group of rehabilitation clients (patients), including some with temporary and some with permanent disability, Eber (1967) found that the long-term outcome was more strongly related to personality and the short-term outcome to intelligence. Lowman *et al.* (1954) claimed to show that successful rehabilitees (rheumatoid arthritics) usually had less severe disabilities; had a higher verbal intelligence; tended to accept their disabilities; and had specific and realistic goals, in contrast to the unsuccessful who were confused and unrealistic in their attitudes.

In industrial rehabilitation, Wing (1966) showed that lack of confidence was an important feature. Powerful influences for rehabilitation were practical demonstrations of a patient's capability in a realistic situation and the perception by the patient of a rehabilitation community where self-confidence in face of severe disablement was valued. Indeed, a rehabilitation centre is a form of therapeutic community. The therapeutic community has been subjected to considerable study and evaluation in psychiatric literature (Mandelbrote 1972), and it has many obvious parallels in rehabilitation medicine.

In two entertaining and provocative papers George Day (1959, 1962) drew attention to fears, phobias, and anxieties of convalescence from physical disability. He described the therapeutic value of the rehabilitation community, the therapeutic value of clinical examination, and the value of simple progressive activity. He envisaged rehabilitation as a form of 'white magic' overcoming the restrictive spells of hospitalization. Such spells are imposed by unnecessary bed rest, the over-cautious attitude of junior hospital and nursing staff, unnecessary treatment of any kind. Active rehabilitation consists of encouraging patients to overcome their physical disability by increasing their own physical attributes (strength and range of movement), or by changing techniques of accomplishing specific activities (e.g. dressing, walking). We could learn a great deal from modern psychiatric techniques grouped under the general heading of 'behaviour therapies'. They have two common features: their derivation from certain learning principles revealed by psychological experiments and their aim to modify certain 'target symptoms' (Gelder 1972). The progressive regime for exercise and activities of daily living so characteristic of all rehabilitation programmes is analogous to the anxiety-reducing desensitization techniques used in psychiatry. Most remedial therapists grade their attention to patients according to progress, providing encouragement and gradually withdrawing support and treatment as the patient improves. The more a patient produces symptoms, the more likely is he or she to be given attention even in the absence of objective clinical criteria. But experience in operant conditioning implies that it could be more appropriate to give more attention to patients seeking, achieving and maintaining independence, than to those who demand assistance.

Much of the art of teaching remedial classes at rehabilitation units derives from unstructured application of these techniques. The employment of praise, ridicule and the establishment of a system of 'privileges', real or imagined, common practice in remedial classes, are all part of operant conditioning. The physiotherapist treating an individual patient in a conventional treatment cubicle has none of these advantages. Indeed she is often working a reverse system by having to devote more and more time and attention to the patient who is less and less inclined to take an active part in his or her own rehabilitation.

Conclusions

In any specific set of circumstances, whether clinical or organizational, it is necessary to ask some simple basic questions: Does rehabilitation alter the natural history? Does it alter morbidity? Does rehabilitation alter the patient's behaviour and attitudes, or his expectations? If any of the answers are positive it will then be necessary to determine the rehabilitation programme components in order to study the elements responsible for the various effects, physical, psychological, or social; e.g., care and attention, specific activities, counselling, therapeutics.

We must test the hypothesis that some elements of physical treatment can affect the pathological conditions in muscles and joints, and ask the specific question: is there a specific tissue response to certain specific physical factors? Such studies must be directed towards the pathophysiological response and not to symptom response. In addition we need to probe the psychosocial elements of the treatments and the psychosocial elements of the outcome, both behavioural and subjective. But above all we must not confuse the two.

Techniques of evaluation in medical care can be classified into three broad types: descriptive studies, comparisons before and after changes in care have been made, randomized controlled trials (Adler *et al.* 1974). Descriptive studies provide a detailed and accurate account of current medical care. Such studies may indicate which method of care is best, may often define problems for further study, and will often provide the essential basis for further studies. Indeed, there are situations in which anecdotes (case histories) of greater or lesser elegance are actually more valuable than formal experiment. Furthermore, in the Health Services we are dealing with open systems in which the individual components are frequently changing and the service itself is capable of considerable variation in response to a large number of variables (Luckman & Stringer 1974). In rehabilitation medicine we tend to provide blunderbuss treatment consisting of a mixture of enthusiasm, evangelism, and pragmatic problem-solving, founded upon empiricism, mythology and personal experience.

The technical difficulty of relating objective standards to subjective variables is compounded because the evaluation is often threatening to the individual concerned (Mason & Simpson 1974). The therapists provide what they believe to be valuable treatment, and the patients respond to the care and attention provided. We have reached a time when we must seriously attempt to evaluate our contribution to medicine and attempt to separate the psychological from the physical, both with respect to components of therapy and in regard to assessment of outcome. We have now come almost full circle. In order to help define the goals of rehabilitation we have found that clinical measures are frequently of little value in assessing functional capability, and we are increasingly turning to behavioural and social criteria. In the behavioural and psychiatric field research workers have been seeking physiological and objective data against which to compare behavioural and social measures as well as the subjective assessment of patient and therapist. Many of these are described by Lader & Marks (1971). Indeed we are all seeking measurable objective data, whether physiological, behavioural, social or economic.

We must study the attitudes, beliefs and expectations of patients and their families. Their attitudes – towards disability, towards treatment, towards their therapists and other clinical staff, towards aids and appliances – must contribute to both short-term and long-term outcome. As a corollary we should also study the beliefs and attitudes of the therapist towards the patient, the disability, the treatment, aids, and drugs. The therapist's estimation of the patient's motivation and of the ultimate possible outcome are also relevant. We need to develop techniques of assessment of the psychological state and cognitive functioning which are comprehensive, acceptable and relevant to patients with minor or major disability.

We need to study techniques of learning new motor skills in order to help us to develop and evaluate the techniques used by physical therapists. We must plan more reliable comparative trials of rehabilitation techniques, and these trials must pay much more attention to the quantity and quality of the nonspecific care involved as well as the specific treatment given.

Such an approach to rehabilitation research requires close understanding and collaboration between all members of the rehabilitation team, and also with psychiatrists and clinical psychologists. Perhaps many of our problems could be resolved both in the therapeutic field and in research if we regarded rehabilitation as primarily a behavioural process with aims which are predominantly behavioural, social and economic. In this way we can separate it from clinical medicine, in which the aims are primarily medical; or better still, we can regard rehabilitation as being particularly concerned with the behavioural aspects of recovery from any illness or injury or of response to deformity.

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Cases

Renal Involvement in Progressive Systemic Sclerosis

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Mrs M T, aged 37. Housewife
The patient first presented in November 1973 with a six-month history of Raynaud's phenomenon and dysphagia. On examination there was sclerodactyly, sclerodermatous thickening of the hands and forearms, early facial changes and diffuse alopecia. Full investigation revealed normal hæmatology, biochemistry and serology, but a barium swallow demonstrated disorded œsophageal motility. Skin biopsy showed histological changes compatible with scleroderma. Labile crosslinks in the dermal collagen were detected in the skin biopsy using the technique of Bailey *et al.* (1970). This technique provided evidence of active proliferation of new collagen as reported in scleroderma skin by Herbert *et al.* (1974). Progressive systemic clerosis (PSS) was diagnosed and treatment commenced with D-penicillamine 250 mg/day.

Over the next two months the skin changes and grip strength improved. Skin collagen analysis