

Recent advances

Recent advances in rehabilitation

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In Western countries 13-14% of the population have some degree of disability.¹ The demand for rehabilitation services will increase as evidence accrues for their effectiveness and as more people survive longer with substantial disability. Current evidence strongly supports the provision of well organised, coordinated, multidisciplinary rehabilitation services based on a problem oriented approach.² In future, specific interventions will be more evidence based, leading to more appropriate use of interventions and more appropriate referrals to specialist services.

Rehabilitation has recently seen many practical innovations and new evidence for specific interventions, but the major advances in rehabilitation are conceptual rather than practical. Firstly, the approach to patients has moved from a predominantly medical one to one in which psychological and sociocultural aspects are equally important. Secondly, the need for organised specialist rehabilitation services—for example, for neurological disabilities—is being recognised.

Methods

This review concentrates on the conceptual basis of rehabilitation and some emerging principles; the scope of rehabilitation is too large to cover all major advances. We chose topics and papers on the basis of our experience.

Nature and context of rehabilitation

Models of illness are important.^{3,4} They form the basis for all decisions on the allocation of resources. They can help in the analysis and understanding of clinical cases and can form a framework for the research and planning of intervention, the construction of services, and the design of research. For effective disability services, doctors, healthcare professionals, politicians, and the general public need to understand the models.

The international classification of impairments, disabilities, and handicaps (ICIDH) was developed under the auspices of the World Health Organization and was first published in 1980.⁵ The development of this classification model and its worldwide acceptance is arguably the greatest single advance in the field of rehabilitation. There are many other models of disability and illness,^{3,4,6} but most are similar to the ICIDH model.

Recent advances

The World Health Organization has developed a coherent model of illness that helps to explain the origins and effects of disability and the nature of rehabilitation

Specialist, coordinated, multiprofessional disability services have now been shown to be effective and efficient

Rehabilitation has started to become an evidence based specialty

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The ICIDH has recently been revised.⁷ In the new version the emphasis on the personal, social, and physical context has been expanded. Some of the major terms have been changed to reflect the need for more neutral, less medically biased terminology: “disability” has become “activity,” and “handicap” has become “participation.” The outline of the revised model is shown in table 1; the basic model is described in more detail elsewhere.^{6,8,9}

The acceptance of this model has fostered more consistent communication among professionals from different disciplines. The model is useful for understanding and analysing patients’ problems, and it encourages a more systematic analysis of rehabilitation interventions. It also brings structure and order to research. Most importantly, it has facilitated the change of emphasis within rehabilitation from a mechanistic, medically driven process of “physical medicine” to a comprehensive, more socially driven form of rehabilitation. Finally, it has helped workers in rehabilitation to argue more coherently for an equitable share of health resources.

The model has some weaknesses, especially a failure to consider explicitly quality of life and to allow for patients’ subjective experiences. The model makes explicit, however, that quality of life is probably on a separate axis or forms a separate domain.⁶

The use of the ICIDH model has also fostered discussion of the nature of rehabilitation. Although a definition of rehabilitation has still not been universally agreed, it is now recognised that definitions may refer to structure (the operational characteristics of a

Rehabilitation model—framework of revised international classification of impairments, disabilities, and handicaps⁷

Term for level of illness	Alternative term	Comment
Pathology	Disease; diagnosis	Abnormalities or changes in the structure or function of an organ or organ system
Impairment	Symptom; signs	Abnormalities or changes in the structure or function of the whole body
Activity (previously "disability")	Function; observed behaviour	Abnormalities, changes, or restrictions in the interaction between a person and his or her environment or physical context (that is, changes in the quality or quantity of behaviour)
Participation (previously "handicap")	Social positions and roles	Changes, limitations, or abnormalities in the position of the person in their social context
Domain for contextual factors	Examples	Comment
Personal	Previous illness	Primarily attitudes, beliefs, and expectations, often arising from previous experience of illness in self or others
Physical	House; local shops	Primarily local physical structures but also includes people as carers (not as social partners)
Social	Laws; friends	Primarily legal and local cultural setting, including patients' expectations of important people in their life

rehabilitation service), process (how rehabilitation services work), and outcome (the aims of rehabilitation services) (box). The core skills associated with rehabilitation are probably goal setting¹⁰ and teamwork.

Many people, in particular those with a disability, are concerned about the "medicalisation" of disability.¹¹ One important consequence of adopting the revised model is that these concerns are acknowledged. The model emphasises the relation between disease and disability and sets the rehabilitation agenda clearly in a social context while still recognising that disease has an important influence on patients' levels of physical activity and social participation and on the process of rehabilitation.

Definitions of rehabilitation

Structure

A rehabilitation service comprises a multidisciplinary team of people who:

- Work together towards common goals for each patient
- Involve and educate the patient and family
- Have relevant knowledge and skills
- Can resolve most of the common problems faced by their patients

Process

Rehabilitation is a reiterative, active, educational, problem solving process focused on a patient's behaviour (disability), with the following components:

- Assessment—the identification of the nature and extent of the patient's problems and the factors relevant to their resolution
- Goal setting
- Intervention, which may include either or both of (a) treatments, which affect the process of change; (b) support, which maintains the patient's quality of life and his or her safety
- Evaluation—to check on the effects of any intervention

Outcome

The rehabilitation process aims to:

- Maximise the participation of the patient in his or her social setting
- Minimise the pain and distress experienced by the patient
- Minimise the distress of and stress on the patient's family and carers

The model shows that services and agencies must work together for rehabilitation to be effective. It also extends the boundaries of rehabilitation—from the few conditions where recovery is expected to any condition in which someone experiences disability or handicap secondary to (or as part of) illness. For example, people with multiple sclerosis, motor neurone disease, or rheumatoid arthritis are all potential clients of rehabilitation services.

Research and measurement

A second important advance in disability medicine has been the growth in high quality research. The national clinical guidelines on stroke cite 80 or more randomised controlled trials focused specifically on stroke rehabilitation.¹² Associated with this growth, the number of specialist rehabilitation journals has increased, and a Cochrane collaboration review group covering rehabilitation and disability has been founded. It is now accepted, particularly by the rehabilitation community, that the field is as amenable to scientific research as any other branch of medicine.

Research focused on disability requires special measurement tools. Techniques of clinical measurement in disability have greatly improved, and the ICIDH model has started to facilitate the development of even better measures.^{13 14} For example, the Barthel activities of daily living index¹⁵ is now widely used; mobility can be recorded by timing a 10 metre walk and using the Rivermead mobility index¹⁶; and tests such as the "short orientation-memory-concentration" test¹⁷ and the motoricity index¹⁸ can detect and quantify impairment.

Rehabilitation, however, is a complex and multi-disciplinary process. It is difficult to define the specific nature of interventions and to isolate the effects of specific interventions from other factors. When outcome is measured at the participation (handicap) level, factors such as employment status, housing, and social relationships are likely to be influential. Moreover, the measurement of participation is still a problem, especially as the nature and operational definition of participation is still debated.¹⁹ Handicap scales assess participation from an outsider's perspective; the need to assess perceived handicap has been recognised and is being addressed.²⁰

Evidence for rehabilitation

A meta-analysis of data from trials of rehabilitation in stroke units has shown that rehabilitation services in such units are effective at reducing both mortality and morbidity, possibly without any extra resources.² Furthermore, these benefits can be achieved in routine practice,²¹ and they may last for many years.²² The meta-analysis was especially important because it helped to characterise the probable important ingredients of rehabilitation: coordination, expertise, and education.

Evidence in support of specialist coordinated rehabilitation services is less strong in other fields, but trials have shown benefits for patients with multiple sclerosis,^{23–24} mild or moderate head injury,²⁵ and back pain.²⁶

Consequently, the presumption should now be that most patients with disability will benefit from being seen by a specialist, coordinated rehabilitation service. It is no longer tenable to depict rehabilitation as an expensive placebo service.

The evidence for each part of the process of rehabilitation is much more difficult to identify and evaluate. The evidence in favour of assessment and goal planning has been reviewed recently,^{10–27} and, although this evidence is not susceptible to meta-analysis and is difficult to review systematically, there is reasonable support for these aspects of the process.

Specific interventions

The evidence for specific interventions is extensive, but because it covers a huge range of treatments often not specifically tied to single diseases it is difficult to construct an analytic framework,²⁸ let alone access and review it. However, recent research, again mostly related to stroke, does support various hypotheses.

Firstly, even quite small levels of intervention can have quite powerful and specific effects,²⁹ and a dose-response relation may exist between intervention and outcome.³⁰ After a stroke, for example, an additional two to three hours of therapy focused on the impaired leg each week can significantly improve mobility, whereas giving the same amount of attention to the arm does not alter mobility.²⁹ No current evidence exists, however, to identify a minimum or maximum effective intervention.

Secondly, evidence is strong that assessment for and provision of simple equipment is extremely cost effective.³¹ In the study by Mann et al the health services paid for all aids that should have been provided, but weren't, by other agencies, illustrating how budgetary borders may hinder effective rehabilitation³¹; moreover, the costs to the health services were reduced.

Thirdly, some evidence suggests that even the provision of information may be effective.^{25–32–34}

Finally, high quality research in rehabilitation is possible using randomised controlled trial methodology. This finding and the recognition of it are two great advances.

Pharmacological treatment

Evidence now supports some specific pharmacological treatments for impairment. Injection of botulinum

Further information

- Cochrane Rehabilitation and Related Therapies Field (<http://www-epid.unimaas.nl/cochrane/field.htm>). The convenor is Dr Rob de Bie, Department of Epidemiology, University of Maastricht, PO Box 616, 6200 MD Maastricht, Netherlands (tel 00 +31 43 3882362 or 3882394; fax: 00 +31 43 3884128; ra.debie@epid.unimaas.nl)
- The Royal College of Physicians' national clinical guidelines on stroke can be found at www.rcplondon.ac.uk/ceeu_stroke_home.htm

toxin into muscle is a remarkably specific, safe method of denervating selected muscles for a limited time, and evidence strongly supports its use in dystonia and spasticity—for example, to help improve gait after stroke.^{35–36} This treatment will probably become much more widely used in most disorders of muscle tone following upper motor neurone damage, whatever the underlying disease. The full potential of the botulinum toxin will probably be known within the next five years, but as its injection into spastic muscles is a simple procedure, the intervention may well eventually be used in general practice.

Other pharmacological advances are less well supported but do hold hope. Amphetamine, for example, may facilitate motor recovery in the context of active rehabilitation,³⁷ but the role of this intervention is still controversial and needs further research.

Therapy

In neurological rehabilitation, evidence is emerging to support a pragmatic, functional, or task oriented approach in contrast with a theory based, impairment oriented approach.^{38–39} The first involves practising activities such as dressing, rather than trying to reverse the underlying impairment(s); gait retraining in a suspended harness after a stroke also seems to be effective.⁴⁰ Evidence from other fields emphasises



Gait retraining in suspended harness has been reported as an effective rehabilitation technique in some neurological conditions

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the need to use a psychologically based approach in all rehabilitation, not simply in neurological rehabilitation.

Conclusion

Advances in rehabilitation contrast dramatically with advances in all other medical areas. The advances have occurred in service delivery; no important advances in single treatments have occurred. Consequently, it has been much more difficult for rehabilitation services to maintain or increase their share of resources in the face of expensive but effective single treatment advances in other fields.

Competing interests: DTW is editor of a specialist rehabilitation journal. Both authors depend on continuing funding of rehabilitation services for their livelihood.

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Endpiece

When medical journals were much less boring

The following quotes come from Thomas Wakley, the founder and first editor of the *Lancet*. In the first he attacks James Johnson, surgeon to the Duke of Clarence (later William IV), proprietor and editor of the *Medico-Chirurgical Journal*, and an enemy of Wakley. The second is about Sir William Blizard, the arch conservative of the College of Surgeons. Both quotes are from Sir Peter Froggatt's article on Wakley.¹

"As a journalist [Johnson] had all the morality without a scintilla of the intellect of Machiavelli. . . . His bad faith as a controversialist was in a great degree neutralized by his [utter] feebleness, and his desire to make dupes of his readers was countenanced by his want of power to deceive. In his method of arguing he resembled a clumsy card sharper who, with all imaginable disposition to slip a card, had not sufficient quickness to elude the vigilance of the spectators. He was disingenuous without plausibility; and dishonest without dexterity. He had the wriggling lubricity without the cunning of a serpent. Such was the editor . . . of . . . the [*Medico-Chirurgical Journal*]." (Froggatt, 1977)

"The following case of misplaced viscera is particularly curious. We believe, however, that several examples of a similar kind are to be found among the members of the Court of Examiners at the College in Lincoln's Inn Fields—we anticipate, for example, that when a post-mortem examination of Sir William Blizard shall be instituted, that the liver of this bitter knight will be found in his cranium, for during the whole of Sir William's life, his mouth has been performing the office of a *ductus communis choledochus*." (Sprigge, 1897)

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