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One of the inherent dangers of the teaching of medicine in hospital is the isolation of the patient from his environment. The student, who has seen little of medical practice outside the ward, outpatient clinic or casualty department, tends to forget that in the patient's terms function may be entirely different from that assessed in the artificial context of the hospital.

"Function" is defined by the Concise Oxford Dictionary as "activity proper to anything; mode of action by which it fulfils its purpose." Any injury interferes with the activity, not merely of the part of the body concerned, but of the whole patient. The objective of treatment must be to restore him as far as possible to his former activity.

In an industrial society such as our own, accidents are commonplace and are becoming more common year by year, despite the stress laid on their prevention. We have almost come to accept this trend as inevitable; there are more vehicles travelling at higher speeds, and a larger number of people who use them. There is increasing use of mechanisation in the home, in the factory and on the farm. Until the last few years, fatal accidents in the home exceeded those on the road, but in 1966 the figures for the United Kingdom were almost equal, being about 8,000 in each case. It remains to be seen whether the apparent effectiveness of the breathalyser will cause a persistent lowering in the road death figures. At present accidents are the chief cause of death in males aged 1 to 35, and rank third after cardiovascular disease and cancer in the loss of years of life expectancy in males. Domestic accidents affect mainly the old and the very young, who are less able to protect themselves from hazards easily avoided by the fit and agile. Road accidents (apart from those involving pedestrians, when those at the extremes of life are again the victims) and industrial accidents, which account for about 1,000 deaths a year, take their toll from the young and healthy. But death statistics do not give the whole story. For every person killed on the roads, fifty are reported injured, twelve of them seriously. Similar proportions hold for other types of accidents.

When the injury is endangering life, emergency measures such as maintaining a patent airway or arresting and replacing blood loss must be carried out. The effectiveness of this treatment will depend on who is present at the accident, and on how quickly skilled help is available. When the injury is less severe, or when the critical phase is past, there are three main aspects of management concerned with the restoration of function. The first is the definitive treatment of the injured part, restoring anatomical integrity wherever possible. Secondly any complications causing further disability must be prevented. Then, if there is residual disability, the patient needs re-education and rehabilitation to enable him to adapt as a normal functioning member of society.

The injury may be trivial and require no treatment at all, merely reassurance and encouragement to use the affected part. The treatment may be a simple matter such as stitching a laceration or reducing a fracture, but even here complications may arise or evidence of further damage may be missed by careless examination or technique. A more extensive injury involving vessels, tendons, nerves or internal organs will require skilled surgical management, or in the case of burns, head or spinal injuries may be transferred to a unit where specialist staff and facilities are available.

The prevention of disabling complications is of importance in the management of all injuries, or the result after treatment may be worse from the patient's point of view than the original injury. An old lady with a Colles' fracture can be incapacitated by a stiff shoulder following immobilisation of her wrist. In general, positions which would be less acceptable in young patients are accepted in fractures in older people

for the sake of early mobilisation and return to function.

The hazards of prolonged bed rest are well known and again particularly affect the elderly, who are less resistant to infection and who are more likely to be suffering from concurrent disease which will further delay their recovery. They may become dehydrated and confused, develop venous thrombosis, chest or urinary infections, or suffer from bed sores, constipation, retention of urine, or contractures. For these reasons early mobilisation is important, although it may be at the price of internal fixation, as in fractures of the neck of the femur. Good nursing care is essential for the bed-ridden patient, and simple principles such as seeing that she has enough to drink and enabling her to move off pressure points should not be forgotten. The help of the physiotherapist is needed to maintain the mobility of joints and the power of muscles which would otherwise be unused.

The unconscious patient presents another problem in management, since he is helpless and has lost many of the protective reflexes against his environment. Correct positioning and regular turning is necessary to prevent pressure sores. The airway must be kept free of secretions, if necessary by a tracheostomy, and infection prevented or treated. Joints are put through their full range of movement daily to prevent contractures. Other measures include naso-gastric feeding, bladder and bowel management, and temperature control.

Rehabilitation has been defined as "the process of restoring the sick and injured in the greatest measure to health, working capacity, and social independence." (Medical Advisory Committee to the Department of Health for Scotland, 1946) It is a continuous process lasting from the time of injury to the final resettlement of the patient, and can only be carried out successfully when there is cooperation and understanding between the various services involved. Surgeons and nursing staff work in conjunction with physiotherapists, occupational and speech therapists, appliance technicians, psychologists, medical and psychiatric social workers, and general practitioners. Services are provided by local authorities and by Government and voluntary agencies.

Ideally the patient will be restored to his position before the injury, maintaining complete social independence and returning to full employment. However some disability may have to be accepted, and adaptations made to his own life and the lives of those around him. It is only comparatively recently that the disabled have been accepted as part of the community; in primitive times they were abandoned to their fate, while later societies allowed them to beg or took care of them in charitable institutions. We like to think of our society as enlightened but there is still a great need for education in our attitudes to the handicapped. Acceptance and encouragement are needed rather than misplaced pity.

The attitude of the patient to his own disability is of prime importance in determining how far he will be able to adapt himself to his new situation. He may be enthusiastic about returning to work and anxious to be reassimilated into normal society, or he may ~~be~~ enjoy being dependent on other people. A prolonged stay in the protected atmosphere of the hospital may make him afraid to return to the outside world. If compensation or legal issues are involved these may influence his attitudes to recovery. The disability itself may cause psychological upset, for example the loss of sexual function in a paraplegic, or following a head injury when there are often mood and personality changes.

However the injured may be at an advantage compared to those disabled by medical conditions. The disability is usually visible so that their limitations are recognised by other people. The fact that young people are often involved means that they will be more adaptable, with no underlying disease. Children are particularly remarkable in their ability to recover function, even after a serious head injury.

Spinal injuries provide a good example of how an injured patient can develop <sup>to</sup> his maximum potential within the limits imposed by his handicap. <sup>^</sup> There are two main categories of spinal lesion, the cervical

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and the non-cervical. In an injury below the level of the cervical cord, the patient has full use of his upper limbs from the start, but he has to develop muscle power so that he can use them to replace the function of his lower limbs. Thus he can lift himself off his bed to prevent pressure sores, and he can learn to move from his bed to a wheelchair. Then he is taught to balance by the use of long mirrors, and to walk, first with the support of bars and later with crutches. The ease with which he is able to walk will depend on the level of the lesion. With a cervical lesion the degree of disability again depends on the level. At C.4-5 the patient will be completely dependent on others but can usually be taught to sit in a wheelchair. Appliances can be of value when there is some muscle function, or the patient may learn trick movements which enable him to carry out actions with muscles which are still available. In selected cases tendon transplants can restore useful movements, such as opposition of the thumb in lower cervical lesions. When the lesion is low enough for triceps to be spared, the patient can propel his own wheelchair.

There are many types of appliance which can make life easier and increase personal independence for the disabled person. Aids to mobility range from walking sticks and tripods to crutches and wheelchairs. Motorised invalid carriages are provided by the Ministry of Health for certain categories of lower limb disability such as paraplegia, or where the patient needs to be mobile in order to obtain or retain employment.

Adaptations may have to be made in the home; these may be simple or involve reconstruction, and much depends on the local authority concerned. Housework can be simplified by making fixtures accessible and easily serviced. Extra manoeuvring space will be required in the bathroom, kitchen and toilet for those confined to wheelchairs. Appliances such as hoists to enable the patient to be lifted into a bath or a bed are of great value. Ideally the house should be designed on a single level, with wide doorways and ramps instead of steps, for easy access.

If possible, the disabled patient is encouraged to return to work, whether this is to his previous occupation or to some other employment more suitable to his handicap. Professional and sedentary workers will obviously find it easier to return to their former occupation than will heavy manual labourers. Adequate assessment of the patient's potential capabilities must be carried out by those concerned with his rehabilitation, both with regard to employment and to personal independence. If a change of work is necessary, retraining can sometimes be carried out in an Industrial Training Unit. The Disablement Resettlement Officer is employed by the Ministry of Labour to assist the handicapped to find suitable work. Following the recommendations of the Tomlinson Report, a Disabled Register was set up in 1944, and it was made statutory that industries should employ a "quota" from this register. Certain occupations, namely lift attendant and car park attendant, were reserved exclusively for disabled workers.

Should the patient be unfit for open employment, he may be able to find work in a sheltered workshop such as the Government sponsored Remploy factory, or a workshop run by a voluntary agency. More severely disabled patients can be usefully occupied at a day centre such as that run by the Simon Square Centre in Edinburgh.

The most handicapped patients are home-bound or looked after in special institutions, and here the objectives are more limited. Local authorities provide home helps and district nurses who can help to relieve some of the burden placed on the relatives. However such facilities may be limited.

The future development of services related to the restoration of function in the injured patient will depend on planning and cooperation between the various authorities concerned, both national and local. The Review Committee on accidents recommends a three-tier

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accident service; a Central Accident Unit in each area providing a 24 hour service for complicated injuries with specialist facilities, several fully equipped Accidents Units for the general treatment of major and minor injuries, together with a Peripheral Casualty Service for the local treatment of minor cases. An integrated rehabilitation service would include Hospital centres for in-patients, centralising facilities and staff, and community-based centres which would be incorporated in Health Centres, where the general practitioner would work together with trained auxiliary staff to carry out a rehabilitation programme for outpatients.

Knowledge of the needs of the individual patient and of the services available is essential if the injured are to be restored to their maximum possible function.

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