THE ORGANIZATION OF A SPINAL INJURIES UNIT

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The Cape Province Paraplegic Centre was established at the Conradie Hospital, Pinelands, in June 1963. In March 1964 I undertook a special study tour of units in England and on the continent of Europe to study the organization and function of similar units. In this article I propose to discuss the physical layout and function of such a centre.

THE PLANNING OF A SPINAL INJURIES CENTRE

It has been recognized that a spinal unit, which naturally always serves a greater community, can, and indeed should, be a section of a general hospital. Various services of the hospital complex can be shared and where there are certain special requirements for paraplegic patients, especially as far as the buildings are concerned, these requirements are quite acceptable for a general hospital. Because of the nature of the work in the treatment of the paraplegic patient the whole general hospital becomes rehabilitation-minded and this fact alone is of the greatest benefit to a general hospital.

A. Ward Accommodation

The best arrangement of all accommodation in a paraplegic centre is at ground floor level. There is, however, no legitimate reason why wards cannot be at higher levels provided that suitable lift services are provided. This can nevertheless lead to congestion, and it is felt that ground floor accommodation makes for more efficient and easy organization and easier administration.

The ward unit should consist of approximately 32 beds. These should be divided into 7 four-bedded ward units, 1 two-bedded ward and 2 one-bedded wards. Smaller wards are required for long-term patients who spend a minimum of 6 months in hospital, and who require a certain amount of privacy. Acute cases can be put together in smaller wards, where patients with similar lesions can be grouped together. Septic cases can also be separated from clean cases and this is important since sepsis is such a danger to the paraplegic. Furthermore, psychologically paraplegics differ much from case to case and in smaller units patients with the same temperament can be put together. In a country such as South Africa the ward unit should have central heating and ventilation. It is a well-known fact that paraplegics cannot tolerate extremes of temperature well and it is necessary to keep the ward at a constant temperature.

B. Ward Ancillaries

The usual ward ancillaries are required with, however, the necessary alterations to certain rooms. The following rooms are standard as in any hospital ward: Duty utility room, sister's office, sterilizing room, doctors' office, linen room—since these wards usually carry more linen stocks it should be slightly larger than usual—kitroom, equipment storeroom and ward kitchen. Another type of storeroom which is of great use in a paraplegic unit is a wheelchair storeroom where wheelchairs can be kept when not in use.

The passages in the whole unit should be fairly wide to allow for wheelchair and trolley traffic. Wheelchair traffic in the unit is high, and if passageways are not wide enough to cater for this traffic as well as the normal hospital traffic, congestion can occur.

The bathroom complex should be especially planned for the paraplegic patient. The bath should be in the centre of the room with an overhead ladder or chain to facilitate the getting in and out of the bath. In a unit of 32 beds there should be at least 3 baths for patients. In the bathroom complex, which should be fairly large, there should be provided 6 hand wash-basins to the unit. These should be cubicled off so as to allow for privacy and the basins should be just low enough to allow wheelchairs to fit in underneath and to allow the patients to be comfortable when doing their toilet. Above each basin should be a long mirror at an angle of 25° since this allows for better viewing.

Toilets should also be specially planned for these patients. The toilet pan should stand away from the wall so as to allow a nurse to be able to reach the patient from behind. Next to each pan should be a hand rail and also an overhead chain to allow the patient to assist himself. The toilet should be wide enough to allow a wheelchair next to the toilet pan. The pan should have a rubber padding, and a padded back rest is also a great advantage. An emergency bell should be next to each pan to summon the nurse if an emergency arises.

In the toilet complex a special room for bladder expression should be provided. It should have a slop hopper in it, so that patients can empty their urinals themselves and a wash-basin and urinal rack should also be provided.

It is felt that the provision of a large shower room to take the patient on a specially designed wheelchair, on which he can sit and shower, is also a great advantage to the unit. Hot water in the shower and bathrooms should be thermostatically controlled so that the patients who cannot feel do not burn themselves.

The provision of a patients' sitting room, opening onto a stoep and patio, is of great importance in a unit of this nature. Many of the patients are up the whole day and lead a very normal life and they should have an area where they can relax when not actually receiving treatment.

A telephone booth with the telephone at the correct height should also be provided in any ward unit.

In planning the ward unit, attention should be paid to the following fittings: Light switches should be at the correct height so that wheelchair patients can reach them with ease. Sliding doors to all rooms used by patients are considered a great advantage. All hot-water pipes should be insulated so that the patients cannot burn themselves on these. It must also be remembered in the planning that the bed space required in the unit is more than that in a normal ward since it must allow space for a locker on the one side and a space for the wheelchair on the other. The space between beds should be 10 - 12 feet. Overhead chains must be provided at each bed and each bed must be fully curtained off. Where ramps have to be built in the ward unit the fall should not be more than 1 in 10.

The provision of a genito-urology section in close relation to the paraplegic wards, and to serve all the paraplegic patients, is considered an essential part of the paraplegic unit. In this section there should be a cystoscopic room with 2 Young's tables for cystoscopic and roentgenographic procedures. All diagnostic and transurethral operative procedures are performed on these tables. On the one side this room should be connected with a darkroom and on the other side with an operating room. This unit has its own scrub-up room, sterilizing room and central supply room.

Where the paraplegic centre is attached to a general hospital, use can be made of the general outpatients facilities. At the outpatient department special parking facilities for cars of paraplegic patients should be made available. A good idea is to provide a special electric bell within easy reach of a car window so that the patient can announce his arrival.

C. Physiotherapy Department

Since this department plays such an important part in the treatment of the paraplegic, a well-planned department is one of the most essential requirements of a paraplegic centre. The following accommodation is considered necessary:

1. *Treatment Area*

(a) *Gymnasium.* The size of this naturally depends on the number of patients treated in the department. Where the department has to serve a paraplegic unit as well as a general hospital with a total beddage of ± 600 beds the gymnasium should be at least 100 ft. x 40 ft. and the height from floor to ceiling should be 15 feet. One side should be divided into cubicles for individual treatment—each should be 8 ft. x 8 ft. to provide sufficient space for a treatment table and equipment and to allow the physiotherapist to work on either side of the treatment table.

(b) *Electrical treatment rooms.* Two separate rooms each with two cubicles should be available in the department for

individual treatments. These rooms need not be very large—approximately 20 ft. x 12 ft.

(c) *Plaster room.* This room should be approximately 15 ft. x 12 ft.

(d) *Hydrotherapy room.* A hydrotherapy pool is most essential in any paraplegic centre. Careful consideration to the shape of the pool, water supply, drainage, chlorination plant, changing and heating of water, should be given. The hall housing the bath should be approximately 60 ft. x 35 ft. x 18 ft. The size of the pool itself should be approximately 40 ft. x 18 ft. and the depth should vary from 3′ 6 in. to 5′ 6 in. The following additional accommodation is required in the hydrotherapy department:

(*i*) Office accommodation is required for the senior physiotherapist in charge of the pool and for the physiotherapists working in the department.
(*ii*) Change room for staff.
(*iii*) Sun lounge—12 ft. x 35 ft. Used for patients to rest in and sun themselves after being in the pool.
(*iv*) Toilets for patients—males and females.
(*v*) Shower rooms—for males and females.
(*vi*) Towel and linen storage room.
(*vii*) Staff toilet.

2. *Non-treatment Area*

(a) *Patients* require: (*i*) reception and waiting areas of good size to accommodate wheelchair and stretcher patients, (*ii*) change rooms, (*iii*) toilets accessible to wheelchair patients, and (*iv*) refreshment facilities.

(b) *Examination room.*

(c) *Staff* requirements are: (*i*) a change room, (*ii*) toilets, and (*iii*) a common room.

(d) *Offices.* One office is required for the senior physiotherapist and one for the clerk.

(e) *Storage room.* This is comprised of: (*i*) a linen room, (*ii*) a general store for crutches, calipers, wheelchairs and other equipment not in use, and (*iii*) a records room.

In the planning and construction of this department the following should be kept in mind. The whole department should be on ground level and should have an outside terrace or patio for walking exercises. All doorways in the department should not be less than 40 in. wide to allow for wheelchairs and stretchers, and photo-electric control of all doors is a great advantage. Corridors should not be less than 5 ft. wide and should be equipped with hand-rails.

Three considerations should govern the choice of floor covering, viz. safety, cleanliness and comfort.

Heating of the department should be provided, while a constant supply of fresh air without draughts is essential.

D. Occupational Therapy Department

This department in a paraplegic centre has two main functions, viz. to teach the patients the activities of daily living and to test patients' work tolerance and build up their work tolerance.

The following accommodation will be necessary.

1. Large general work room:
   This room should be approximately 70 ft. x 35 ft. It will be used by patients doing weaving, basket work, shoemaking as well as other trades.
2. Room of approximately 25 ft. x 15 ft. to be used for typing and study room.
3. Plaster and pottery room with the necessary water-points and sink. Approximate size 18 ft. x 12 ft.
4. Large room 40 ft. x 20 ft. for carpentry.
5. Large room 40 ft. x 20 ft. for light engineering and metal work.
6. Kitchen. This is required for the training of patients. It should have low work tops for wheelchair patients, a stove, a refrigerator and a pull-down ironing board.
7. Patients' bathroom—with bath in centre and overhead chain and a hand rail.
8. Patients' toilet—planned as previously described.
9. Bedroom for training purposes.
10. Staff change, rest and tea-room—to accommodate ±15 occupational therapists.
11. Staff toilet.
12. Office for senior occupational therapist.
13. Clerk's office.
14. Large storeroom.

E. Sport Facilities

The provision of sport facilities for paraplegic patients is considered a very essential part of their ultimate rehabilitation. The paraplegic patient must be given something to strive for and in the practising of sport he, as a sportsman, always strives to win or improve. Psychologically this has a great stimulating effect on the patient. Where the weather permits sport should be practised as far as possible in the open air. Facilities for indoor sport should, however, be available and the requirements for this will be the following:

1. Sports hall—size 100 ft. x 40 ft. x 20 ft.
2. Billiard room—large enough to allow free movement of wheelchairs around the table.
3. Patients' lounge and rest room.
4. Kitchen with cupboard space.
5. Toilets—for males and females.
6. One office for sports officer.
7. Change room with showers.
8. Storeroom for sports equipment.

EQUIPMENT OF A PARAPLEGIC UNIT

I shall not attempt to give a full list of the equipment required in such a unit. The basic equipment in a paraplegic unit is the same as in any general hospital with certain variations in type of equipment and in amount of stock allocated per bed. As it is impossible to enumerate all the items, only some of the more essential items are described.

Type of Bed

An adjustable head end to the bed is essential. This is required so as to be able to raise the patient slowly in a sitting position. The bed must, of course, have castors so that it can be moved easily from one place to another. However, at the foot end the bed must be able to be lowered off the castors when required.

Overhead patient lifting chains should be attached to every bed in the unit. The bed pole to which the chain is attached should be able to swivel from side to side since this allows the patient a greater range of movement.

The Everest Jennings wheelchair appears to be the most suitable type of wheelchair. The chair should in the main have the following features:

(*i*) It should be easily propellable by the patient.
(*ii*) Construction should be as light as possible.
(*iii*) It should be collapsible.
(*iv*) The large (driving) wheel should be at the back.
(*v*) Pneumatic tyres are essential.
(*vi*) Armrests must be removable.
(*vii*) Backrest should be vertical—18 - 20 inches high.
(*viii*) Legrests should be adjustable for length.
(*ix*) Footrests must be able to be folded back and should be detachable.

Rubber packs. At Stoke Mandeville Hospital Dunlopillo foam-rubber packs are in general use. These packs have a very great advantage in preventing pressure sores.

The supply of bed linen and blankets to the unit should be higher than that generally supplied to hospital wards.

A breathing apparatus should be immediately available to the unit. The Radcliffe intermittent positive-pressure pump seems to be most suitable for this purpose.

Motor transport for patients is essential.

STAFF REQUIREMENTS OF A PARAPLEGIC CENTRE

1. *Medical*

When the medical treatment of paraplegics is discussed, the first and most important fact to understand about these patients is that the paraplegic condition in man cannot be subdivided according to various specialties and subspecialties of medicine and surgery. Each case must be assessed individually and such assessment can best be done by the doctors who have gained experience by continuous contact with these patients over many years. It is therefore understandable that

a good deal of knowledge is required of those who are in key positions with regard to various aspects of neuro-anatomy, neurology, neurosurgery, plastic surgery, surgery, urology, orthopaedics, internal medicine, rehabilitation, social medicine, psychiatry and dietetics.

It cannot be expected that a single person be expert in all of these fields, but he must have a basic understanding of all of them in order to decide, in a given situation, which of these fields shall have momentary preference over the other. Because the final decision, as to the course of treatment to be undertaken with a specific patient, rests with the director of the unit, this person must be well qualified and a specialist in his own right. He could be a specialist neurologist, neurosurgeon, surgeon, orthopaedist or physician, but must be in complete and *full-time* control of the unit. Not only must this official be in full control of all the medical treatment of the patient, but he will have to coordinate all the work done in the unit. The final industrial rehabilitation of the patient, and this applies especially to South Africa, is extremely difficult and the head of the unit will have to spend much of his time and ingenuity in personal contact with industry, to arrange for the final placement of the patient.

The smooth operation of a multidisciplinary unit of this type is facilitated by weekly and monthly conferences. During these discussions the case of each patient is reviewed with respect to diagnostic and therapeutic procedures. The conferences and the preparation for them are time-consuming and throw an extra load on the medical officer. Owing to the nature of their illness, full clinical examinations must be done more frequently on these patients than are required of the general ward patients. Neurological and urological investigations on these patients, which must be done regularly, are very time-consuming. Progress notes of each case must be kept in great detail and written up frequently. Each doctor in charge of a group of patients must also keep in continual touch with the physiotherapists, occupational therapists, social workers and other sections dealing with the patient. Because of the above it has been found that a patient-doctor ratio of 1:20 is the maximum that a doctor can handle efficiently.

2. *Nursing*

Owing to the nature of the work in a paraplegic centre, the nursing establishment should be on a higher ratio than in general hospital wards. In this respect it must be remembered that the patient to be nursed can at the beginning do very little for himself. It has been postulated by Bors that a ratio of personnel to patient in a paraplegic centre should be 1:1—this refers only to medical and nursing staff. This seems a very fair ratio but I feel that 1·5 nursing personnel to every 2 patients is quite satisfactory. The ratio should, however, not be higher than this figure. As far as the nursing care of the male paraplegics is concerned, it is felt that male orderlies are the best equipped to nurse these patients. The organization and supervision of the nursing duties in the ward is, of course, undertaken by trained nurses. All nursing personnel should work on the shift system—each working an 8-hour shift and having at least one half-day and 1 full day per week off duty. This will give them a 44-hour working week and they are then allowed the usual time off for tea and meals.

In a 32-bed ward unit the following nursing staff establishment is suggested:

Sisters	2
Staff nurses	4
Student nurses	3
Ward orderlies	15

The above is considered to be the minimum staff on which a ward unit of 32 beds can function efficiently. The postgraduate training of trained nurses in a paraplegic unit is considered highly desirable and if this is undertaken in the unit these nurses should be supernumary to the above establishment.

3. *Physiotherapy*

One of the greatest contributing factors to the final rehabilitation of the paraplegic patient is physiotherapy treatment. Where the centre is attached to a general hospital, physiotherapists should be allowed to treat a certain number of general ward patients as well as paraplegics. In a paraplegic unit there must always be at least one physiotherapist on call for night and weekend duty.

It is generally felt that one physiotherapist can treat up to at the most 12 paraplegics per day of 8 hours plus an additional 3 - 5 general ward patients. The most satisfactory ratio of staff to patients here is 1:10 paraplegics and 5 general ward patients, i.e. a total of 1:15. A physiotherapist cannot give adequate treatment to her patient if she has to work on a higher ratio.

It is felt that the physiotherapists should also take a very active part in the training of paraplegics in sporting activities. Where funds are available, however, sports instructors should be appointed to the unit, as this part of the rehabilitation of the patient is most essential.

Porter staff in the department is essential, as they are required to fetch patients from the wards, help lift patients and heavy equipment, etc., and the requirement is one porter attached to every 4 physiotherapists.

4. *Occupational Therapy*

The main duties of the occupational therapist are to teach patients the activities of daily living, to test patients' work tolerance, to build up their work tolerance and to assess their capabilities for later work placement.

The staff-patient ratio here should be approximately 1:20. Here again the occupational therapist should, where possible, be allocated at the most 15 paraplegics and at least 5 general ward patients. The ratio of these patients can of course be changed as the demands of the hospital dictate.

Porter staff must also be provided in this department, and here too the ratio of 1 porter to every 4 occupational therapists applies.

5. *Social Workers*

In the treatment of the paraplegic the provision of a social welfare service is of the greatest importance. The paraplegic, on admission to the unit, is usually a person with very many social problems. He has usually been cut off from his source of income, he has family problems to be solved, housing and accommodation problems, future work problems and many others. Right from the day of admission a trained social worker should be available to help him solve these problems as soon as possible. A ratio of social workers to patients of 1:50 appears to be the most satisfactory.

6. *General Staff*

The usual ward domestic staff, viz. cleaners, ward kitchen staff, linen room staff, is of course required in the unit and the allocation of these members of the staff can follow the same pattern as in general hospital wards.

The provision of clerical staff to the unit is considered most essential.

GENERAL ADMINISTRATION

The general administration of the paraplegic centre will in South Africa fall directly under the medical superintendent of the hospital. Owing, however, to the special nature of the centre and the specific problems involved in the treatment of the paraplegic the director of the paraplegic centre, as proposed by me, will be very much involved in the general administration of the unit. All matters of general administration of the unit will in the first place fall on him and he will deal with the day to day administrative problems of the unit under delegated authority from the medical superintendent. The final decision administratively will, however, always rest with the medical superintendent.

Administrative problems include planning for the future and coordination of adequate supplies and equipment; evaluation of suggestions by any member of the personnel; providing adequate staff for the efficient functioning of the unit; systematic review of programmes and operations; coordinated schedules of diagnostic, operative and teaching activities. One administrative activity is of the foremost importance, i.e. the maintenance of good relations with the patients as a group.

In South Africa one of the greatest administrative problems which face the medical superintendent and the director of

the unit is the industrial rehabilitation of the paraplegic patient. There are numerous other problems which they have to face, e.g. housing and transport of the paraplegic patient, but at present the industrial rehabilitation is the most serious problem to be solved. Ways and means whereby this problem can be tackled are discussed below.

RESETTLEMENT AND INDUSTRIAL REHABILITATION

A patient suffering from paraplegia cannot be considered as medically 'cured' until such time as he has been suitably resettled with his family and finally been rehabilitated in industry. Only when he has started earning his own living again can it be said that the treatment of the case has been successful. The resettlement and industrial rehabilitation of the paraplegic is one of the most serious problems to be faced in South Africa.

As soon as the patient's medical rehabilitation has proceeded sufficiently, he should be encouraged to spend weekends at home. These home visits are invaluable both for the morale of the patient, his mental re-adjustment and the re-adjustment required by his family. Since some alterations to the home of the paraplegic are usually necessary, the patient on these weekend visits can find out what difficulties are being encountered and can report back, and the necessary steps can be taken to make the required alterations. In England provision is made through legislation to have the necessary alterations made to the homes of all disabled persons. The resettlement problem in South Africa is not so great among the White patients affected with paraplegia. In many instances the patients or their relatives can afford to make the necessary adjustments and in any case the greatest incidences of paraplegia in South Africa is among the non-Whites. The resettlement of this race is one to which there appears to be no solution. Where they live in Bantu housing areas they can still use their wheelchairs to get around in the township, but where the native comes from the reserves it is quite impossible for him to use his wheelchair to get around. All the Bantu houses are usually overcrowded (this also applies to the Coloured race) and I cannot see these patients suitably housed with their families. The best solution for the non-White paraplegic patients appears to house them in suitably planned or adapted hostels. This is not considered the ideal housing for them, since it does away with the family life. If funds were made available by the National Housing Scheme to build suitable houses for paraplegics in a native township this would be ideal. These patients could be resettled in one area in a township so that they are together and this will then make the transport of the paraplegic to his work much easier since they will all be living in the same area. However, until this can be achieved, accommodation in suitable hostels is the best solution. Near Stoke Mandeville in England they have such a hostel, Gloucester House, which is serving a most useful purpose.

In England and on the Continent it was found that transport for the paraplegic patient is of such vital importance that legislation exists to provide each paraplegic, on discharge from hospital, with a motorcar of his own. All these cars have hand controls and are inexpensive, small and so planned as to allow the patient to get his folded wheelchair into the car.

The question of the industrial rehabilitation of the paraplegic patient was solved in England by the passing of 'The Disabled Persons (Employment) Act of 1944'. This act provides for:

(*i*) Courses of industrial rehabilitation for those who are not fit enough to return to work after illness or injury and possibly are also in need of vocational guidance to enable them to do so;

(*ii*) Courses of vocational training for those in need of training to enable them to undertake employment or work on own account of a kind suited to their age, experience and general qualifications;

(*iii*) Assistance towards ordinary employment through a requirement on employers to engage a proportion of disabled persons; and

(*iv*) Employment under special conditions for those registered disabled persons who are so severely disabled that they cannot enter ordinary competitive employment.

Soon after admission of the paraplegic patient to the Spinal Injury Centre the Disablement Resettlement Officer (DRO) visits the patient and right from the beginning his future is being discussed with him and he is given expert advice on what types of work he will be suitable for and for which there is a demand. So the patient has time to think things over, and between himself and the DRO a decision on what form of work he will do on discharge is reached.

Training for the disabled person is provided under the Government vocational training scheme in the Ministry's own Government Training Centres, at technical colleges and other similar establishments. Courses are available in a variety of trades among which are agriculture, building and civil engineering, clerical work, engineering, furniture manufacture, leather trades, tailoring, typewriter repair, watch and clock repairing, etc.

From the above it will be obvious that in England the Spinal Injury Centre really has no problem. Once the patient has achieved physical fitness the patient is discharged to a training centre, where he is trained and placed in a suitable job. He is provided with a suitably adapted house, a car is provided, and he can face life as a fully rehabilitated citizen. All he now needs to do is look after himself and report back at intervals for check-up.

On the continent of Europe it appears that little attention is paid to the industrial rehabilitation of the paraplegic. These patients are paid a fairly high disability pension by the state and it is then not necessary for them to work for their living.

Since it is felt that a paraplegic should be kept occupied as much as possible during the day, the system of his living off his pension only is not considered the ideal for which we must strive in South Africa. Financially, however, it would pay the authorities to pay the paraplegic patient a satisfactory pension rather than to keep him in hospital. With the treatment available to the paraplegic in our hospitals today the life expectancy of these patients is approximately 20 years. The cost to the State to keep this patient in hospital is ±R5.00 per day and at that rate for 20 years the cost will be R36,500. If the patient was given a pension of R50 per month for a non-White the cost to the state would be R12,000 for 20 years. Add to this at the most R8,000 for routine medical care during the 20 years and the cost of the patient to the state would be R20,000; thus there would still be a saving of R16,500.

The greater percentage of paraplegics are young married men. They therefore have a family to keep and before these patients can be discharged from hospital, provision must be made for them to provide for their families. If the home conditions are not satisfactory the patient will soon be back in hospital again and all the good work done in his physical rehabilitation over many months will have been wasted.

Industrial rehabilitation of the paraplegic patient can be achieved in 2 ways. First the Government should pass the necessary legislation based on existing legislation in England to provide for the retraining and re-employment of the patient. In a modern state this type of legislation is essential and the Government of the country owes this to her citizens. It is recommended that strong representations in this respect should be made to the Government.

Until such time as the needs of these disabled citizens have been taken care of by the Government, it is suggested that commerce and industry should be approached by the administrator of the paraplegic unit and their help and co-operation enlisted in the retraining and re-employment of the paraplegic patient. There are many avenues of work in which the paraplegic can be suitably employed and I feel sure that commerce and industry would be willing to give these disabled persons a chance to earn their own living again. The help of organizations such as the Cripple Care Association should be called in to help with the retraining of the patient. At the paraplegic centre a retraining centre can be created. To finance this project it is suggested that the local organization should collect the necessary funds by appealing to the general public and to financial and commercial institutions. An assessment can be made so as to establish in which spheres the patient can be placed in work and they can then be trained for these specific jobs. I feel sure that if the problem is presented to

the various bodies and institutions their cooperation and help will be forthcoming.

SUMMARY

The conclusions of my tour to study the organization of a spinal injuries unit are set out. The requirements with regard to accommodation, equipment and staff are given. The general administration of a paraplegic centre is discussed and the problem of resettlement and industrial rehabilitation, as well as the possible solution to this problem, is discussed.

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