compression respond poorly to treatment and are associated with a high morbidity, confining patients to hospital for most, if not all, of their remaining lives. If those patients most likely to develop a major neurological complication can be identified it seems important to prevent it. Thus to irradiate painful areas of increased ^{99}Tc uptake in the spine as determined by radioisotope bone scanning will do little harm and may prevent paraplegia in many patients.

- 1 Felletti R, Souhami RL, Spiro SG, *et al.* Social consequences of brain or liver relapse in small cell carcinoma of the bronchus. *Radiother Oncol* 1985;4:335-9.
- 2 Goldman JM, Ash CM, Souhami RL, *et al.* Spinal cord compression in small cell lung cancer. A retrospective study of 610 patients. *Br J Cancer* 1989;59:591-3.
- 3 Ushio Y, Posner JB, Kim JH, *et al.* Treatment of experimental spinal cord compression caused by extradural neoplasms. *J Neurosurg* 1977;47:380-90.
- 4 Findlay GF. Adverse effects of the management of malignant spinal cord compression. *J Neurol Neurosurg Psychiatry* 1984;47:761-8.
- 5 Gilbert RW, Kim JH, Posner JB. Epidural spinal cord compression from metastatic tumour: diagnosis and treatment. *Ann Neurol* 1978;3:40-51.

Everyday Aids and Appliances

Mobility aids and appliances for disabled children

Kenneth S Holt

Aids and appliances should be provided to help immobile children whenever it would help the children and their parents and teachers. The needs of children cannot be met by scaled down versions of adult equipment. The design of equipment for children requires an understanding of their distinctive requirements. Most disabled children are afflicted early in life before the acquisition of abilities such as sitting, walking, and talking. So any equipment has to be appropriate for their stage of development and should help and not hinder their developmental progress. For example, an adult recovering from an accident can be given crutches to help walking because he or she was able to walk before the accident but a child with cerebral palsy or spina bifida can be given crutches only when he or she is developmentally ready to learn to walk. Allowances have to be made for growth and changes in body proportions. Equipment should be made according to the child's measurements; it should be supplied promptly because otherwise it may not fit when finally delivered; and it must be adjusted as growth occurs. Children like to be free and may not accept equipment that is too restrictive. Parents need to understand the purpose of any item and also how and when it should be used.

Buggies and wheelchairs

The "buggies" (lightweight folding frame with canvas hammock seat) that are used for most young children are suitable for disabled children. As disabled children get older larger versions are available from the disablement service centres (fig 1) that are suitable for

FIG 1—A major buggy

Prescribing a wheelchair: questions to consider

- Who will operate it? The child (with hands on large wheels or other means), or attendant (so the handles have to be of suitable height)?
- Will the chair be used outdoors? If so are the wheels suitable and the construction sturdy?
- Is the child restless and needing restraint (for example in athetoid cerebral palsy)?
- Does the child need postural support (such as a child at risk of scoliosis)?
- Should the chair fold (to go into a car boot or be taken on a bus)?

FIG 2—Measurements for wheelchair

moving the child from one place to another. Older children and those who spend considerable time in their chairs require something more substantial than a buggy and a wide range of pushchairs and wheelchairs is available from the disablement service centres and commercial sources. Prescribing a suitable chair is not easy. A number of questions have to be answered; measurements have to be made (fig 2); and consideration given to possible adjustments and modifications. Helpful advice can be obtained from occupational therapists and the disablement service centres.

Currently, the needs of most children can be met from the range of chairs supplied by the Department

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FIG 3—Attendant operated wheelchair with restraints and side supports

Modifications and adjustments to wheelchairs (fig 3)

- Angulation of back
- Position of head rest
- Method of foot support and restraint
- Need for pommel and restraints
- Type of side supports
- Number, type, and position of cushions
- Colour

Requesting many alterations may seriously delay delivery

sanctions their provision. Parents have to consider the maintenance of the chairs.

Footwear

The footwear needs of disabled children can usually be met satisfactorily from the wide range of shoes available for all children, and unless there are particular reasons to the contrary this avenue should be explored before considering special boots and shoes. Not only is it more convenient and cheaper but preferable because the disabled child's shoes are then just like any other child's. Parents sometimes ask for special shoes in the hope that they will enable their child to walk or correct the appearance of deformed feet. Unfortunately these high expectations cannot be achieved by footwear alone. Special footwear is now available in more attractive forms and colours than previously.

Indications for special boots or shoes

- Misshapen feet that cannot be fitted by ordinary footwear
- Unstable feet requiring additional support
- Need to inhibit progression of deformity
- Need to fit or accommodate other appliances such as a short leg caliper or ankle foot orthosis
- Need to alter pattern of gait.

A Piedro boot is often prescribed. It provides good support for the ankle, can be fitted with an ankle restraining strap, and can be laced up quickly. It is supplied in two or three different colours. The Wolfson boot (fig 5), which is a close fitting, fine leather boot fashioned on a plaster cast of the foot and worn inside another shoe or boot, provides firm yet comfortable support. Some children, especially those with hemiplegia, have feet of different sizes. Buying shoes of different sizes from an understanding shoe salesperson or by arrangement with the shoemakers may be possible. Otherwise the larger foot can be fitted and then toe inserts and heelgrips placed in the other shoe to obtain a fit on the smaller foot. Unequal leg length can be dealt with by building up the shoe on the shorter side, but this should be done only if it is recommended by doctor and therapist and is acceptable to the child and parents. Shoes can be modified in various ways, but it is better not to make any changes without the advice of a physiotherapist.

Aids for standing

Early experience of standing is desirable to provide experience of being upright; to get good angulation of the femoral necks; and to give the child opportunity to use his or her hands. Standing frames, of which there are several types and sizes, are preferred to the standing boxes used in the past because they provide better control of the limbs, which also can be seen and

FIG 4—Powered chair for small child

FIG 5—Wolfson boot

of Health. Sometimes parents prefer to buy a chair from a commercial source, perhaps because it fulfils a distinctive need that is not covered by the other chairs or they may be the fortunate beneficiaries of charitable support. Parents buying chairs privately also have to pay for maintenance and repairs. Children who can propel their own chair require an appropriate large wheeled model, and if they participate in races and games they may want a sports model, which is strong yet lightweight. Sports models are not usually supplied by the Department of Health unless there is a strong medical indication. A powered (battery operated) wheelchair should be considered for any disabled child who can operate the control switch and lever. The mobility that they achieve and control themselves in this way is of immense benefit to their development and confidence. We have supplied such chairs to children as young as 3 years (fig 4). There are many places they can go without being on public roads. Many powered chairs are bought privately and may cost £1000 or more. A child who is so disabled as to need such a chair is usually a suitable focus for a local fund raising venture. The needs of many disabled children cannot be met by one chair, they may need two or three different ones. Consider their needs at home, at school and when travelling outdoors, and also whether their chair can be transported between home and school. When the reasons for more than one chair are set out clearly the Department of Health usually

Maintenance of wheelchairs

- Provide space for storage
- Each week clean, check screws and fittings, oil, and check inflation of tyres (have available spanners, screwdrivers, oil can, and pump with correct end to fit the tyres)
- With a powered chair, each night recharge battery and each week top up water and check the wires (room should be well ventilated)
- Have readily available name, address, and telephone number of technical officer or private engineer.

FIG 6—Standing frame

checked easily (fig 6). The feet are fixed, and flexion of the knees (and in some cases also rotation) and the hips is controlled by broad bands in front of the chest, behind the buttocks, and in front of the knees. When knee flexion is especially troublesome gaiters may be used. Once a child is familiar with a standing frame he or she will stay in it for an hour or so—the duration of a classroom lesson. Children afflicted with cerebral palsy, spina bifida, and muscular dystrophy are likely to benefit from standing frames.

Avoid

- Baby bouncers in which the child sits in a suspended seat with his or her legs touching the floor because they encourage unsuitable movement patterns
- Baby walkers in which the child sits in a canvas seat attached to a frame with wheels because they may run away out of control.

Walking aids

Training disabled children to walk is a specialised task that is best carried out by a paediatric physiotherapist. The simplest walking aid is a small pram or cart or animal on wheels that the child pushes. The aid can be weighted to give stability. The rollator (a walking frame with wheels) follows the same principle (fig 7). Whenever these types of walking aids are used attention must be given to the child's posture, which may become too flexed at the hips and knees. To overcome this tendency to crouch posterior walkers, which the child pulls behind him or her, are used and they promote a more upright posture.

Some form of hand held walking aid may be considered for children with useful arms. These may be walking sticks, brooksticks (again to encourage an upright posture), tripods, quadropods, and crutches. The child's condition is one of the major factors influencing the type of aid to use. For example, a child with spina bifida usually learns to use crutches quite early but one with cerebral palsy may not be able to use them until much later because of difficulties of manipulation and control. Calipers are used less often nowadays. Aversion to their heavy, cumbersome nature played some part in this but earlier therapy and better orthopaedic surgery also contributed. Short leg calipers are used to control the posture of the foot and the position of the tibia in stance when ankle foot orthoses are not sufficient. They are used to control foot deformity and footdrop and increase stability at the ankle. Children with flail legs such as those with spina bifida, poliomyelitis, and the late stages of muscular dystrophy may need long leg calipers. In recent years attention has been given to reciprocal calipers, which have a functional role and are not just supportive and restrictive. As one leg moves forwards and begins to take weight the opposite leg of the calipers is stimulated to move forwards. Another device for a paraplegic child is the swivel walker, which depends on trunk sway to initiate the reciprocal action.

Other equipment that is useful in particular instances includes the knee cage, which controls movements at the knee, especially hyperextension, and is useful in any disorder with an unstable knee. Children with cerebral palsy sometimes have strong spasm of their hip adductor muscles that causes their legs to cross and so impedes walking. The problem can be controlled by a thigh abduction splint, which inhibits adduction without restricting walking. An inflatable orthosis has improved the management of children with osteogenesis imperfecta (brittle bones). In the past children afflicted with this rare condition laid in bed to avoid recurrent fractures. When wrapped from

mid-chest to feet in a suit composed of tubes that can be inflated with air they are given gentle, firm support and can be got to an upright position from which they can learn to walk (fig 8).

Acceptance of equipment

However much care is taken in the prescription of aids and appliances they are useful only if they are accepted and used by the disabled. Adults usually understand the purpose of anything provided and cooperate to get the full benefit from their equipment. Children, especially if young or retarded, do not have this ready understanding and motivation to cooperate so ways have to be found to ensure acceptance of the equipment. Concerned adults have to be informed, and thought has to be given to the design of the equipment. There are many simple and cheap ways by which equipment can be made attractive and appealing to children. Fortunately, manufacturers are realising the importance of design, colour, and even camouflage. The attitudes of parents, teachers, and therapists greatly influence children and may be the determining factor in children's acceptance or rejection of equipment. Offhand detached attitudes and overforceful persuasion are often counterproductive.

At all stages in managing disabled children attention has to be given to all the family, and this is especially so when introducing equipment. Parents may resent that their child has to wear unsightly equipment that proclaims that he or she is crippled or they may themselves not understand its purpose. All this comes when they are still deeply distressed to have a disabled child. Introducing any item of equipment requires sensitive and sometimes prolonged discussion with the parents until they fully understand its purpose, support its use, and work with you to achieve acceptance by the child.

Appendix

FURTHER INFORMATION

Disabled Living Foundation, 380-384 Harrow Road, London W9 2HU
 Spastics Society, 12 Park Crescent, London W1N 4EQ
 Association for Spina Bifida and Hydrocephalus, 22 Upper Woburn Place, London WC1H 0EP
 Muscular Dystrophy Group, Natrass House, 35 Macauley Road, London SW4 0QP
 Brittle Bone Society, 112 City Road, Dundee DD2 2PW

FIG 7—Rollator

FIG 8—Inflatable orthosis, showing inflated tubes up front of leg

What is the likely aetiology, treatment, and prognosis of progressive combined shoulder girdle and hip girdle dystrophy in a 75 year old man first noticed four years ago?

This is an unusual case. The term dystrophy implies a genetic basis. Although myopathies of late onset with limb girdle weakness have been reported, there is now considerable doubt whether cases of this type form an entity. They are better regarded as a clinical group with several causes. It is not stated whether there is a family history, and the late onset indicates that it is unlikely to be dystrophy, but the condition may have been present for much longer than the patient describes.

Investigations that should be done include measurement of the serum creatine kinase activity, electromyography and nerve conduction studies, and muscle biopsy. Systemic endocrine disorders, particularly of the thyroid, and infiltration such as sarcoidosis should be considered. In the absence of identifiable disease the prognosis may be judged only on the basis of the recent course. —BRYAN ASHWORTH, consultant neurologist, Edinburgh

Walton JN, Gardner-Medwin D. The muscular dystrophies. In: Walton JN, ed. *Disorders of voluntary muscle*. 5th ed. Edinburgh: Churchill Livingstone, 1988:543.