

THE VERTICAL WHEELER

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SUMMARY

The vertical wheeler provides the means for independent mobility in the standing position, thus contributing towards the physical and psychological requirements of the paraplegic child.

INTRODUCTION

Independent mobility and upright posture are major requirements in the management of the paraplegic child during his growing years. The quality of life for the physically disabled child is enhanced by providing the means for the freedom of movement he longs for and needs in order to experience and explore his environment. The psychological benefits derived from the upright posture include an improved self-image, potential for normal eye-level communication and interaction with his peers and the community. The physiological advantages of weightbearing in the standing position comprise the prevention of lower limb contractures and spinal deformity, decreased osteoporosis, stimulation of bone growth, reduction of spasticity and improved urinary drainage.

In the treatment of the paraplegic child, a great deal of emphasis is placed on achieving the maximal degree of ambulation and minimal use of the wheelchair. However, unless the level of the neurological lesion is sufficiently low, ambulation with the aid of calipers and crutches is frustratingly slow, requires a high level of energy expenditure and the hands are not free for functional and play activities. These limitations have led to the development of the swivel walker but this appliance does not provide for speed of movement and crutches are required for outdoor use. The vertical walker has been developed in order to meet both the physical and psychological requirements of the paraplegic child. This appliance provides fast, precise, independent mobility in the standing position.

The development of the vertical wheeler at the Spinal Cord Injuries Centre, Conradie Hospital, was undertaken as a joint project by the Physiotherapy Department of the Conradie Hospital and the Department of Bio-Medical Engineering, U.C.T. and Groote Schuur Hospital, in 1979.

DESCRIPTION OF APPLIANCE

The vertical wheeler consists of a frame which holds the child erect by means of foot, knee, pelvis and trunk supports. These supports, which are well padded to prevent pressure sores, are fully adjustable to allow for initial fitting as well as for subsequent growth.

The frame is mounted on rear wheels and front castors and is propelled manually by pushing rims and a chain drive, which are also adjustable to the height of the user. Alternatively, power-drive wheels and joystick control may be fitted to the frame for the more severely disabled child who is unable to propel the appliance with his hands.

Parking brakes are provided to ensure that the appliance remains stationary during transfer activities. The provision

OPSOMMING

Die vertikale wielstoel voorsien onafhanklike mobiliteit in die staande posisie, wat bydra tot die fisiese en psigiese behoeftes van die paraplegiese kind.

of a tipping bar and hand-hold ensure easy handling for the attendant, especially of the very young child.

The appearance of the vertical wheeler is attractive to the child by virtue of its design and bright, cheerful colour



Fig. 1. Independent mobility — Shaun age 9 years, T4 complete paraplegia.

DISCUSSION

The vertical wheeler has been found to be of considerable value in the rehabilitation of paraplegic children. It is clear that the appliance provides a degree of independent freedom of movement which these children are otherwise unable to attain, whilst, simultaneously, gaining the benefits of standing.

It is striking to observe the pleasure and fun the children derive from using the vertical wheeler. Home and school reports indicate that the children are more active, more alert and that social functioning is greatly improved.

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Fig. 2. Hands-free standing.

The wheeler is proving to be especially effective in the prevention of joint contractures and abnormal, incorrect postures as well as inhibiting spasticity. Functional ability is enhanced by secure hands-free standing, and upper limb strength as well as cardiopulmonary fitness is increased. The children are able to tolerate use of the appliance for the full period of a normal day and no evidence of lower limb oedema has been encountered. The wheeler is inherently stable and is safe to use up and down slopes. Apart from a few sessions learning how to get in and out of the appliance, user training has been found to be unnecessary. The appliance is braked and tipped backwards to the horizontal position for the child to transfer in and out of it. The supports are then fastened in sequence commencing with the feet, and by means of a monkey chain, or similar device, the child can pull himself up to the vertical position. The ease and simplicity with which adjustment for growth is accomplished, obviates any interruptions in the use of the wheeler and is a saving in cost. The wheeler initially issued will see a child through his growing years until he reaches adulthood, at which stage the paraplegic usually becomes a "sitter" in a wheelchair. Provision has been made in the design, for the frame to be extended if need be, and, in fact, the appliance has been successfully tested by a few adult paraplegics.

Finally, although initially developed for the traumatic paraplegic, the vertical wheeler has been found useful in the management of the physically handicapped child of various other disabilities.



Fig. 3. Social functioning. Early model of the Vertical Wheeler. Annie, age 3 years, T1 complete paraplegia.

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AMENDMENT TO ETHICAL RULE 21 (1)

The South African Medical and Dental Council has accepted the amendment of Ethical Rule 21 (1) to that of "Patients will be treated on referral from a Registered Medical or Dental practitioner or in close co-operation with such registered practitioners" The amendment of this rule still has to be passed by the Minister of Health and then gazetted before it will apply in practice.