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Technical Note

Whangarei Spina Bifida Orthosis

As a reader of *Orthotics and Prosthetics* for many years, I have appreciated its contents and the help it has given me as an orthotist. I would like therefore, to offer a contribution as a small return for all the information the American Orthotic and Prosthetics Association members have so generously given me.

The number of children in our Spina Bifida Center at the Northland Base Hospital, Whangarei, New Zealand is small enough so that the Orthotics Department is able to provide special devices and modifications to accepted ambulatory orthoses when such modifications seem indicated. Publication of the details of the ORLAU[1] Swivel Walker (4), no doubt reminded orthotists of their own experience in modifying earlier designs of ordinary calipers, the dynamic orthotic system of Glancy (1), the swivel walker of Motloch (2), the Shrewsbury Splint (3), or the Standing Brace Mark II (5).

The development of the English "ORLAU[1] ORTHOSIS" has prompted me to outline the construction details of our successful method of marrying two concepts, the Parapodium and the Shrewsbury Swivel Walker, to produce a rigid body support frame with no hip or knee joints but one that allows some degree of locomotion.

Anterior and lateral views of the Whangarei Spina Bifida Orthosis are

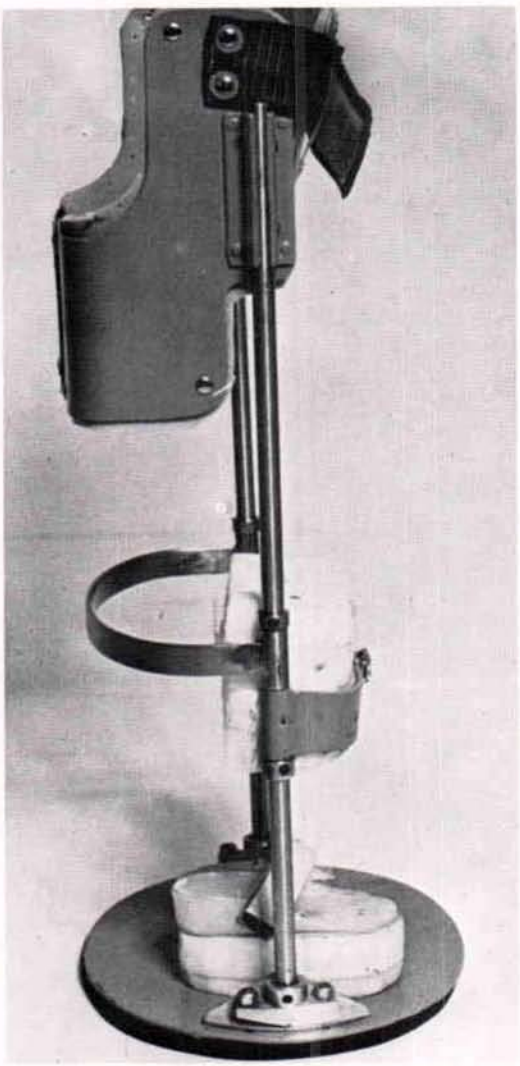

Fig. 1. Lateral view of the Whangarei Spina Bifida Orthosis.

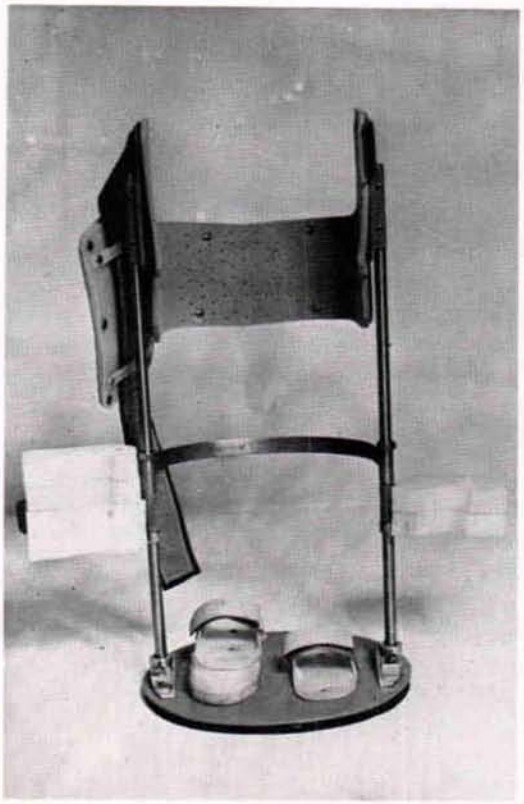

Fig. 2. Anterior view of the Whangarei Spina Bifida Orthosis.

Fig. 3. Patient in his Whangarei Spina Bifida Orthosis with swivel "feet" attached. This particular patient has cerebral palsy.

shown in Figures 1 and 2 respectively, and an anterior view of the device and patient is shown in Figure 3. Note that the swivel "feet" are not shown in Figures 1 and 2.

Construction Details

Swivel foot plates made of aluminum 3mm x 330mm are mounted on double-row ball bearing races. A 6-degree dihedral angle between the plates is used. Aluminum base plates, 3.5mm thick are made in a range of sizes to suit the development of the child. Moulded plastic shoe supports with Velcro straps hold the feet in position. A Plastazote block is placed under a shoe support when required to compensate for leg length discrepancies. Lateral base support blocks are made of aluminum and drilled to accommodate a stainless steel tube 13mm in diameter which is held in place by a 3mm Allen-head screw.

The knee clamp assembly is made of aluminum, 40mm x 340mm x 3mm. Plastazote blocks are bonded to these and carved to fit the child's knees. The two hinged sections are joined by a toggle clamp. Stainless steel collars 19mm I.D. are used distally and proximally to hold the knee clamps in the correct position along the side bars. Allen-head set screws, 6mm in diameter, are used to hold the collars in place.

The pelvic support is made of aluminum sheet and is fixed to side members by means of a casting that is riveted to the lateral walls (Figs. 1 and 2). The pelvic support is dipped in nylon and lined with Plastazote.

The thoracic pad is made from polythene, 2mm thick, lined with 6mm thick Plastazote, and held by a 5mm-wide nylon belt and Velcro fastening.

The concept of crutchless mobility has been achieved with our present orthosis. The modular construction makes assembly and adjustment quick and easy. The swivel foot plate is used on very young children with hand impairments and in early confidence training for independent mobility. Children with cerebral palsy have also benefited from using this orthosis (Fig. 3). When the upper limb has developed sufficiently for the child to use a parallel pusher frame the swivel plates are removed.

The child is able to apply and remove the orthosis with little assistance. The confidence of independent mobility of our children using this orthosis to stand erect and move with a lift-up and swing-through action with the frame has proved this to be a successful development. Low cost of construction and maintenance and ease of adjustment over the years has been appreciated by the parents and children concerned.

References

(1) Glancy, John, "Dynamic orthotic system to assist pelvic extension", *Orthotics and Prosthetics*, 29:1, March 1974.

(2) Motloch, W., "An orthotic device for neuromuscle disorders", *Artificial Limbs*, 15:2, Autumn 1971.

(3) Rose, G.D., J.T. Henshaw, "Swivel walkers for paraplegics—considerations and problems in their design and application", *Bulletin of Prosthetics Research*, BPR 10-20, Fall 1973.

(4) Stallard, J., G.K. Rose, and I.R. Farmer, "The Orlau swivel walker", *Prosthetics and Orthotics International, 2:2, August 1978*.

(5) Variety Village Electro Limb Production Centre, 731 Danforth Avenue, Scarborough, Toronto, Ontario, Canada.

Acknowledgement

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Maurice Arthur, Orthotist
Northland Base Hospital
Whangarei
New Zealand

Footnote

[1]Orthotic Research and Locomotor Assessment Unit (The Robert Jones and Agnes Hunt Orthopaedic Hospital, Oswestry, England)