

Case Study: A Modification for Reciprocating Gait Orthosis Use with Bowel and Bladder Involvement

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INTRODUCTION

The increasing acceptance and use of the Reciprocating Gait Orthosis (RGO) has been well documented in articles and lectures.^{1, 2, 3, 4} In the Spina Bifida clinic at The Orthopaedic Hospital of Los Angeles, the RGO has become an integral part of the comprehensive program of orthotics, physical therapy, and surgery.

DISCUSSION

While the advantages of RGO use over more conventional types of orthoses are significant, there are times when these advantages come into conflict with the practicality of a person's lifestyle. A case in point involved an eight year old male spina bifida child with an L-3 lesion level and bowel and bladder involvement. He had been ambulating the past three years in bilateral single upright knee-ankle-foot orthoses (KAFOs) with no pelvic or thoracic extensions. Though the knee joints could be locked, the patient had developed a preference to use the orthoses unlocked. This made ambulation easier for him, though he was significantly flexed at the hips and knees. Locking the joints eliminated the knee flexion, but did nothing to keep the hips extended. The physician was

concerned about the possibility of hip flexion contractures developing with his increasing size and age. Placing him in conventional thoraco-lumbo-sacral-hip-knee-ankle-foot orthoses (TLHKAFOs) would eliminate this problem, but would also result in a swing through gait pattern, meaning a possible increase in energy expenditure and a cosmetically unsatisfactory gait.

The clinic team decided that this child was ideally suited to use the RGO, yet one extenuating circumstance had to be dealt with. The child always had been placed in special schools because his spina bifida caused difficulty with personal hygiene. He was now in the process of being taught to change his own diapers and his success at doing this would make him a candidate to progress into a regular school environment. While his KAFOs did not provide an ideal ambulation pattern, they did permit relatively good access to the gluteal and perineal areas for diaper care. The application of an RGO system, with the pelvic band and thoracic extensions, would significantly improve his gait, but could also be a limiting factor in his ability to change his diapers and proceed with other hygienic measures. The child's chances to progress to a normal school setting could be severely diminished should he be un-



Figure 1. Reciprocating Gait Orthosis utilizing single lateral uprights and polypropylene pretibial shells.

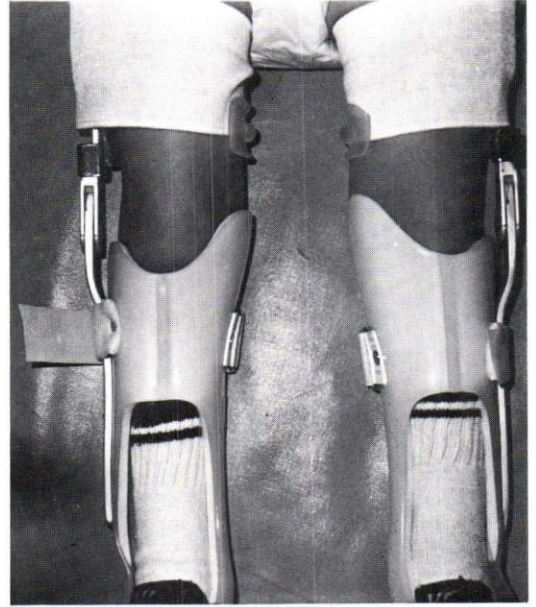


Figure 2. Elastic straps at the thigh help to control tissue dispersion.

able to accomplish these tasks while using the new orthoses. Thus, modification of certain aspects of the RGO system became necessary.

The basic design of the RGO, which the patient uses, is relatively unchanged with single lateral drop lock knee joints and polypropylene pretibial sections (Figure 1). The thigh shells are also polypropylene, but only 1½" wide. Attached laterally and wrapping medially is a 4" wide elastic thigh strap. The plastic acts in conjunction with the high medial walls of the ankle-foot orthoses (AFOs) to provide medial stability, while the elastic straps help to control tissue dispersion (Figure 2). The straps are coated with Scotchgard[™] to reduce the problem of soiling. The importance of this design is that it allows easier access to the perineal area by simply disengaging the strap (Figure 3).

The most significant modification to the system relates to the posterior aspect of the pelvic section. In most conventional orthotics, as well as the RGO, the pelvic band, whether standard or butterfly, is placed in such a position that access to the

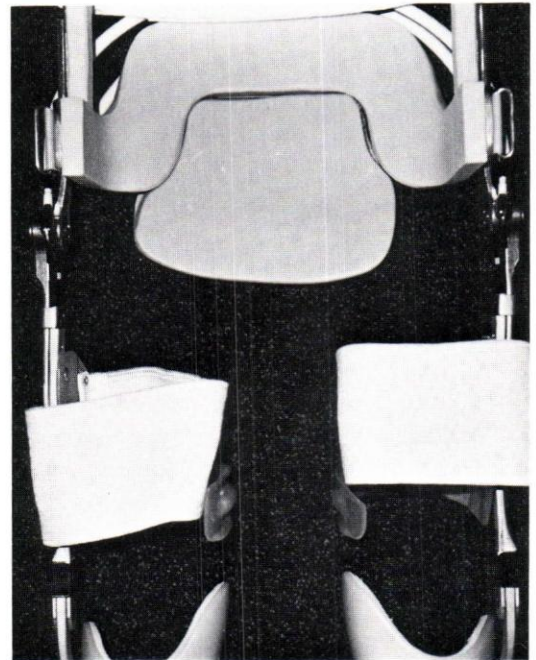


Figure 3. Easy access is gained to the peroneal area by disengaging the "Scotchgard[®]" thigh straps.

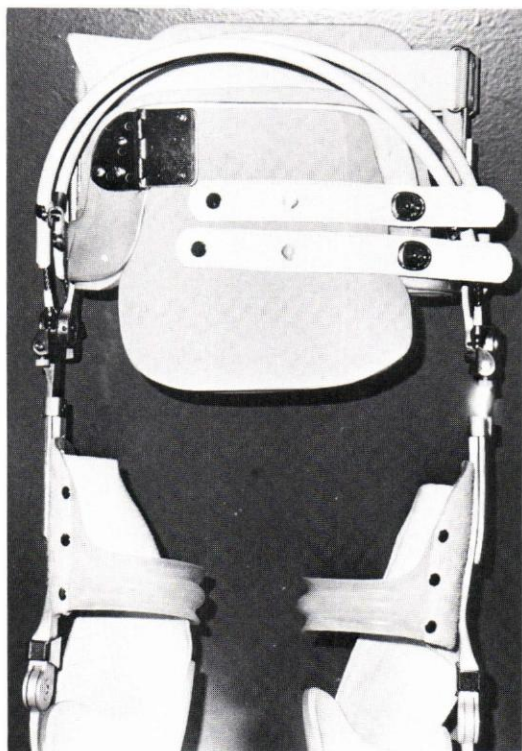


Figure 4. "Lift-a-dot" closures connect the hinged posterior portion to the other extension.

gluteal or distal spinal areas is difficult at best. What we have done is to almost reverse the normal butterfly band design and extend it proximally, forming it into a modified thoracic band. In order to maintain gluteal control, an extension of $\frac{1}{8}$ " Kydex with one-half Plastazote™ padding is attached to one side of the band through means of a metal hinge joint. Two leather straps riveted onto the extension connect the extension on the other side by "lift-a-dot" closures (Figure 4). Adhesive hook and pile are added as shown to make opening and closing the "door" easier. When opened, the areas are much more accessible to the patient (Figure 5). Another advantage of the Kydex extension is that length and shape can be easily modified by trimming the plastic and not needing to worry about the exact placement of the metal pelvic band (Figure 6).

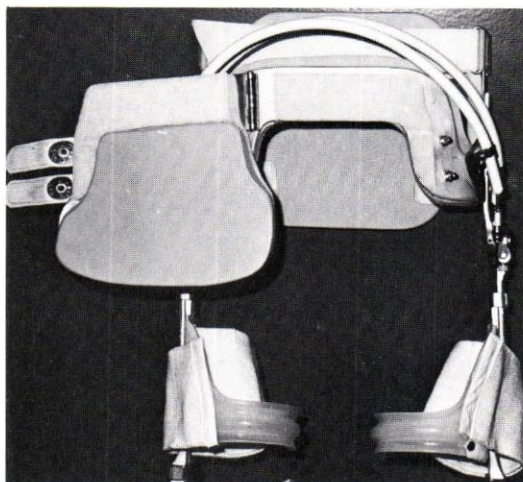


Figure 5. Posterior portion of pelvic band showing hinged portion in the open position.

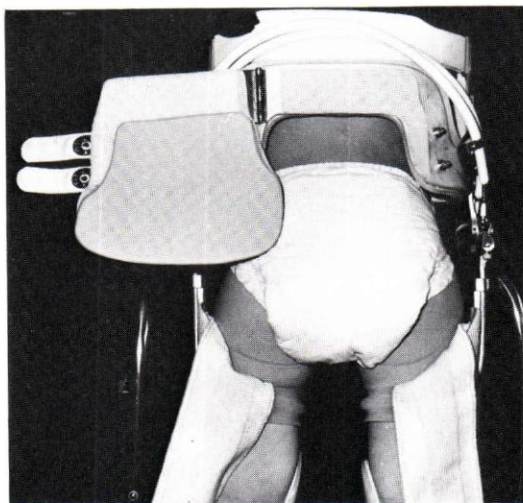


Figure 6. Posterior portion of pelvic band demonstrating access to patient for hygiene.

CONCLUSION

Upon follow-up, the patient has been able to make excellent use of the modifications and has not experienced any difficulty in using the orthoses. Plans are proceeding for him to be mainstreamed into regular school in the near future.

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REFERENCES

- ¹Douglas, R., and Parson, P., "The LSU Reciprocating Gait Orthosis," *Orthopaedics*, 1983, 6, pp. 834-9.
- ²McCall, R., and Douglas, R., "Surgical Treatment in Patients with Myelodysplasia Before Using the LSU Reciprocating Gait System," *Orthopaedics*, 1983, 6, pp. 843-8.
- ³McCall, R., and Schmidt, W., "Clinical Experience with the Reciprocal Gait Orthosis in Myelodysplasia," *Journal of Pediatric Orthopaedics*, 1986, 6, pp. 157-61.
- ⁴Yngue, D., et al., "The Reciprocating Gait Orthosis in Myelomeningocele," *Journal of Pediatric Orthopaedics*, 1984, 4, pp. 304-10.