

A New Look at the RGO Protocol

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INTRODUCTION

The L.S.U. Reciprocal Gait Orthosis (RGO) is an orthotic device that gives structural stability to the patient with lower trunk and lower limb paralysis while allowing, through a cable coupling system, reciprocal hip joint motion for ambulation. The device has been used at the Shriners Hospital in Springfield, Massachusetts since December, 1980. Our experience with the Reciprocal Gait Orthosis has led us to a simplified approach in the selection, fitting, and training of patients suitable for fitting with this device.

PATIENT DISTRIBUTION

Sixteen fittings with the Reciprocal Gait Orthosis have been reviewed for this article. Seven of these children were under the age of four years at the time of their first fitting, with a total of 12 children under the age of eight at the time of first fitting. All 12 children were discharged from the hospital using the orthosis effectively. One child in this group later rejected the orthosis because he was able to ambulate with bilateral knee-ankle-foot orthoses and felt the Reciprocal Gait Orthosis was too much bracing. Out of this group, the remaining 11 children are currently community ambulators and wear the orthosis for most of the day.

In addition to these 12 children, we have four young adults who are fit with the Reciprocal Gait Orthosis. Three of them were 13 years old at the initial fitting. Two of these children were discharged from the hospital using the orthosis effectively and are currently household ambulators. The last of the 13 year olds rejected the brace due to an extreme fear of the upright position. Our last fitting was done on a 21 year old male with severe hip and knee

flexion contractures. This patient had a tremendous desire to ambulate and so the fitting was attempted. However, after numerous fittings and adjustments, the attempt was abandoned as a result of the severity of his contractures.

PROTOCOL

Our first patient was fit with a reciprocator in December, 1980. Subsequently, 12 children were fit following the general guidelines established by Louisiana State University. In November, 1985, we developed our own written protocol. The protocol was extremely specific, outlining prerequisites before fitting with the Reciprocal Gait Orthosis. The protocol included such criteria as, 1) hip and knees free of flexion contractures greater than 20 degrees, 2) patient required to demonstrate independent mobility in a parapodium, and 3) parents required to admit children for training.

After a review of our series up to that point, we realized that few of the patients actually met 100 percent of the criteria in our existing protocol, and yet our success rate was quite high. After a further review of the fittings was done, a revised protocol was written and instituted in June, 1986. Our new protocol for fitting with the Reciprocal Gait Orthosis is outlined below:

- 1) Parents and child will watch a video prepared by the hospital showing the fitting and training process for the Reciprocal Gait Orthosis.
- 2) A team meeting will be held prior to admission with parents and child, physical therapist, orthotist, nurse, social service representative, and physician. At this meeting, goals are set for admission and parents are given the opportunity to ask



Figure 1. Front view of patient showing extensive pre-existing contractures and shoe wedging to accommodate the contractures.

any member of the team questions that they might have. The child's abilities will be discussed, including a) ability to stand and move in the parapodium, b) emotional and cognitive ability to tolerate training, c) upper extremity strength, and d) any existing joint contractures and their influence on fitting and training.

- 3) Goals will be set, regarding a) cooperation for training, b) balance and confidence with movement, c) quality of mobility, d) independency in transfers, and e) donning and doffing of the orthosis.

Following fitting and dynamic alignment of the Reciprocal Gait Orthosis, gait training begins. It includes 1) momentary standing balance, 2) training on the parallel bars (patient



Figure 2. Lateral view.

instructed to "shift weight" and "push back"), 3) progression to a rollator walker when consistent orthotic control, good balance, and even stride length are demonstrated in parallel bars, and 4) progression to Loftstrand crutches when improved independence in balance is achieved and the patient is cognitively able to use them.

Three weeks into training, a second team meeting is held. Each goal is addressed and the team determines the best way to continue training based on the reassessed goals.

At discharge, the patient will 1) ambulate with the walker, 2) exhibit consistent control in step length, balance and stability, 3) exhibit good standing balance, and 4) be able to negotiate a ramp.

FITTING PROBLEMS

Without a doubt, the most consistent problem we've seen in fitting the Reciprocal Gait Orthosis is existing hip, knee, and ankle contractures. We have fit patients with significant contractures of these joints and have accommodated for the contractures in alignment by wedging the shoes (Figures 1 and 2). Our intention is to enable the child to exhibit effec-

tive ambulation and then to consider joint releases when possible.

We have seen, in a few cases, where it is difficult for the patient to comprehend that pushing back will advance the leg. To make this concept more easily understood in the early stages of training, the hip joints are flexed slightly more than usual to allow the patient to grasp this concept easily. This usually makes standing balance impossible. However, after a day or two, the orthosis can be extended and standing balance can be addressed. We found this to be an extremely useful tool in expediting the initial stages of training.

EARLY INTERVENTION

Taking into consideration the importance of upper limb strength, preservation of range of motion, and weight control before fitting a patient with the reciprocating orthosis, it is easy to see the importance of early intervention in cases of congenital deficiency. Through our myelodysplasia clinic, we are able to follow the patients on an ongoing basis from birth to insure continuing follow up in these areas. It is also possible to insure the delivery of an infant stander at the appropriate time. The clinic also gives us the opportunity to observe the child in the stander or parapodium. Mobility in these devices is a good indication of motivation, balance, and the child's awareness of his body moving through space. The myelodysplasia clinic gives us an invaluable opportunity to insure that all of the prerequisites are being nurtured and that we can initiate a fitting with the Reciprocating Gait Orthosis at the appropriate time.

RESULTS

Included in our series of 16 patients are 12 children who are community ambulators. In

addition, two children are ambulatory in their household or for short distances, and two rejected the Reciprocal Gait Orthosis as their means of mobility. The age of initial fitting for these children spanned two years to 21 years, with children under the age of eight all being community ambulators.

CONCLUSION

Clearly, the results demonstrate the importance of both early intervention and early fitting with the Reciprocal Gait Orthosis. We hope that children with congenital paraplegia who initiate ambulation with a Reciprocal Gait Orthosis at an early age will continue to be ambulatory further into adult life than those who have used knee-ankle-foot orthoses in the past. In conclusion, we would like to propose the idea that, based on experience with our protocol, the fitting and training of a child using the Reciprocal Gait Orthosis is no more difficult than other bracing modalities and can be approached with the same ease.

AUTHORS

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