USE OF AN RGO WITH KNEE DISARTICULATION PROSTHESES FOR AN INDIVIDUAL PRESENTING WITH LUMBOSACRAL AGNESIS

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BACKGROUND
Lumbosacral agenesis (LSA) presents as an absence of a portion of the caudal spine where a part of the lumbar or thoracic spine may be missing, typically resulting in a lack of motor function/sensation inferior to the level of injury. LSA is characterized based on how the spine and pelvis articulate and the how much of the sacrum remains. The lower extremity typically presents as atrophied, the hips contracted in a flexed, abducted and externally rotated position. Surgery may be indicated to address joint contractures including amputation (Renshaw 1976).

Orthotic and prosthetic intervention, including either a hip disarticulation prosthesis or hip-knee-ankle-foot-orthosis (HKAFO)/ reciprocating gait orthosis (RGO) are needed for maintaining proper positioning, aiding in ambulation, and obtaining an upright posture which is imperative for proper systemic health (Karimi 2011).

The purpose of this case study was to trial an RGO attached to a prosthesis enabling the individual to become more independent while expending less energy.

PATIENT HISTORY
The 6 yo individual’s spine terminates at T10 with a complete absence of the lumbar spine and no articulation between the spine and sacrum. The individual has a history multiple surgeries, including bilateral knee disarticulation amputations. The individual presents with a hip abduction/flexion contracture of 30°/15° on the left leg and 35°/35° on the right leg, respectively.

Previous prosthetic orthotic use includes bilateral knee disarticulation sockets, clamshell design with lanyard suspension, attached to a low density polyethylene thoraco-lumbar-sacral-orthosis (TLSO) with aliplast lining, monolithic pylon attached to solid-ankle-cushion-heel (SACH) feet. The individual previously ambulated with a swing to gait pattern in a reverse walker.

Family goals were for the individual to become more independent and begin standing/ambulating more for better health.

METHODS
An impression was taken of the individual for an RGO (Fillauer) and bilateral knee disarticulation sockets. Once the durplex prosthetic sockets and TLSO test device was aligned as a complete unit, the finished prosthesis was fabricated.

An RGO with a horizontal cable pelvic section and push button release, knee disarticulation sockets, lanyard suspension, with monolithic knees and SACH feet was fabricated with the intention of decreasing energy expenditure with use of the reciprocating gait, maintaining an upright posture, and aiding the patient in becoming more independent as she ages. A benefit to the RGO is having the capability of reciprocal gait, which has been shown to decrease energy expenditure for patients with spinal cord injury (Leung 2009).

The individual was taught how to don/doff the device and liners so that she could become as independent as possible.

RESULTS
Initially the individual reverted back to a swing to gait pattern but showed the ability to perform reciprocal gait using the posterior lateral lean needed to progress the contralateral limb forward. The family was urged to practice and begin physical therapy so that she would become more efficient using the device.

The individual followed up with her physician approximately 1 month after delivery. She has been using the device in school and demonstrated the ability to take reciprocal steps with cueing. The family was urged to continue use at home with full weight-bearing.

CONCLUSION
A prosthesis incorporating a TLSO and RGO for an individual with LSA and bilateral knee disarticulation amputations is a valid orthotic/prosthetic device to encourage independence with a more efficient gait pattern. More follow up is needed to determine the individual’s progress and maximal benefits.

REFERENCES