

# The Efficacy of Orthoses Wear in a Patient with Sacral Level Myelomeningocele: A Case Report and Evidence-Based Analysis

Krista Riebli sDPT<sup>1</sup>

1. UNM Department of Orthopaedics & Rehabilitation

## INTRODUCTION

The purpose of this case report was to evaluate the effectiveness during gait of supra-malleolar orthoses (SMO) on a child with sacral level myelomeningocele who lacks normal strength in her lower extremities. A secondary purpose of this case report was to thoroughly review the current available literature regarding commonly used orthoses in children with sacral level myelomeningocele in order to adequately make further recommendations for a new pair of orthoses.

## METHODS

The subject was a 6 year old female with a diagnosis of S1 myelomeningocele which was present at birth. Evaluation and examination was performed by 1 examiner who was a physical therapy student. A clinical instructor observed all sessions with the patient and student. The patient's lower extremity range of motion, muscle strength, and sensation were all tested. The patient was also administered the Bruininks-Oseretsky Test of Motor Proficiency (BOT-II), while she was wearing her SMOs and tennis shoes and in just tennis shoes. A gait analysis was performed at the University of New Mexico Gait Lab using a Vicon Gait Analysis system. The patient was analyzed in the barefoot condition, as well as with her SMOs and tennis shoes. Sagittal parameters of the knee and ankle as well as spatial and temporal parameters were measured during the gait analysis. A literature search was conducted using the Academic Search Complete, PubMed, and Web of Knowledge databases. A total of 8 articles were reviewed, analyzed, and compared with the clinical question presented in the case.

## FINDINGS

The SMOs were not found to greatly increase the patients' scores on the BOT-II examination. During the gait analysis, the patient showed an increase in knee extension and dorsiflexion during the stance phase when the SMOs were worn. However, the values were still not enough to provide the patient with normal or near normal ranges. Benefits of the SMOs found during the gait analysis included more symmetrical values during double limb support, step length, and cadence; increased stride length; and increased walking speed. The literature search revealed that many children with sacral level myelomeningocele wear an ankle-foot orthosis (AFO) as opposed to any other type of orthotic. The literature also provided a sound argument that an AFO is much more beneficial to a

child of this population when compared to the barefoot condition. Various types of AFOs were compared in the literature, including carbon fiber spring AFO, hinged AFO, ground reaction AFO, and solid AFO. The literature lacked quality randomized controlled trials and systematic reviews.

## CONCLUSION

The SMOs were not providing the patient with the maximal amount of benefit she requires. A different orthotic, such as an AFO, would be of much more benefit to this patient and provide her with the support and alignment which she so desperately needs to prevent further impairments and complications. Further higher quality research is needed in the topic of bracing children with sacral level myelomeningocele.