INTRODUCTION
Ankle foot orthoses are often prescribed for individuals with Incomplete Spinal Cord Injury to provide support for weakened musculature, specifically to address excess plantar flexion during initial contact, stabilize the joint for effective push-off during late stance, and prevent toe-drag during swing. (LER Article 14, 16). Traditional AFOs that encompass the calcaneus prevent this “normal” biomechanical process. The purpose of this case study was to investigate the effect on gait wearing bilateral custom solid ankle plastic rigid AFO (SAAFO) versus bilateral rigid Dynamic carbon composite AFO (Allard ToeOFF® AFO) with open calcaneus (RDCC AFO).

METHODS
Subject: 27 year old female who sustained an Incomplete T12 Spinal Cord Injury due to a horse riding accident at the age of 15.
Procedures: Subject was tested in 2 different conditions: 1) Bilateral Custom Solid Ankle AFO and 2) Bilateral rigid dynamic carbon composite AFO with an anterior tibial shell and open calcaneus.
Research Tools: BTS G-WALK Portable Gait Analysis System placed at the L5 vertebral level3.
Data Analysis: Averaged temporal-spatial data from 3 walk trials in each condition and then compared averaged data between two conditions.

RESULTS
Overall, the subject performed better in all temporal spatial measures using the RDCC AFO with her performance trending toward normal values for women. Subject’s speed increased by 2.4% and cadence increased by 6.38% while utilizing the RDCC AFO.

DISCUSSION
Comparing objective measured values provides guidance for providing the orthotic design with maximum functionality for the patient. The DRCC orthotic intervention provides the maximum function for this patient with an increase in speed and cadence, a decrease in stance phase duration and double limb support while increasing swing phase duration and single limb support. These temporal spatial values tend to indicate more stability and comfort in walking. The RDCC AFO design incorporates a relatively stiff forefoot, restricting dorsiflexion and includes an anterior tibial shell that provides a mechanism whereby forces caused by loading the toe lever can be comfortably distributed to the leg which appears to normalize gait parameters in this patient model. This study has the obvious limits of a case study and gait parameters measured but can give guidance to practitioners in recommending AFO interventions for patients with SCI.

REFERENCES
1. LER et al. Lower Extremity Review, April 2012
2. Groner C, Lower Extremity Review, October 2010

DISCLOSURE
Thank you Allard USA for use of ToeOFF AFO’s (RDCC AFO).
Thank you to my patient for her participation.