INTRODUCTION
Charcot-Marie-Tooth (CMT) is one of the most common inherited neurological disorders, affecting approximately 1 in 2,500 people in the United States. The neuropathy of CMT is a slowly degenerative process with symptoms often starting in adolescence or early adulthood and typically results in weakness of dorsiflexors, plantarflexors and the intrinsics of the feet. CMT is not considered a fatal disease and people with most forms of CMT have a normal life expectancy however they typically require physical therapy, orthotic intervention and assistive devices to maintain mobility during their lifetime. Identifying maximal functional outcomes is often limited to visual gait analysis and subjective patient commentary and it can be difficult to know if an adjustment or change of design has made a difference to function. Utilizing a portable computerized gait analysis system, we are able to quantify measures of gait modify our components, designs and gait training to maximize functional outcomes of orthotic intervention.

METHODS
A single female patient with a 15 year history of CMT affecting bilateral lower extremities was tested in 3 different bilateral conditions. The custom fit dynamic carbon composite AFO designs included 1) without adjustment; 2) with increased rigidity without adjustment; 3) same rigidity as condition 2 with an adjustment to customize the orthosis for the heel height of the shoe. Temporal-spatial and pelvic motion was collected utilizing a BTS G-Walk Portable Gait Analysis System placed at the L5 vertebral level. Speed, percent of double limb support, and pelvic kinematics were compared across the conditions and to normal values for women.

RESULTS
Speed and percent double limb support were closest to normal values when the patient ambulated with the orthoses that were more rigid, custom fit, customized for heel height and manufactured fully of carbon composite. Pelvic range of motion in 3 planes shows that orthotic interventions with more rigid profiles reduce pelvic motion primarily in the transverse plane.

DISCUSSION
Comparing objective measured values provides guidance for providing the orthotic design with maximal functionality for the patient. Utilizing the G-Walk system functional outcomes due to changes in orthotic design and customization can be measured and documented. The orthotic intervention that provides the maximum function for this patient allowed for increased speed and decreased pelvic motion, which happened to be the more rigid design customized for heel height. By utilizing a portable computerized gait analysis system changes in gait function can be monitored over time and with changes to orthotic intervention as well as physical therapy treatments.

REFERENCES

DISCLOSURE
Vincent DeCataldo, BOCPO, NJ LPO is employed by Allard USA manufacturer of dynamic carbon composite AFOs.

ACKNOWLEDGMENTS
Thank you to Virginia Mamone and Orthopedic Motion, Inc.