INTRODUCTION

Idiopathic toe walking (ITW) is a diagnosis commonly seen in the pediatric orthotic setting with a classic presentation of a neurologically healthy child with normal muscle strength and control who chooses to walk on their toes. (Westberry, et al., 2008) Idiopathic toe walking can lead to future orthopedic problems including contracted Achilles tendon, hyperlordosis of the lumbar spine and deformities of the bones and soft tissues in the feet. (Hemo, et al., 2006) ITW can have negative impacts on gait parameters including decreased walking velocity secondary to decreased stride length and cadence as well as put a child at increased risk for falling. Idiopathic toe walking can persist and lead to an abnormal gait pattern in adulthood; thus, prevention of toe walking in the early stages of growth is essential for the future development of a normal gait pattern.

METHOD

Six children with a diagnosis of ITW were seen in this study, aged 2-6 years old. Following informed consent, subjects were randomized to either an articulated ankle foot orthosis (AAFO) with a plantarflexion stop or a carbon fiber footplate with an attached custom foot orthosis (FO). An AAFO blocks plantarflexion at the ankle joint and dorsiflexion at the metatarsal phalangeal joint, while an FO resists only the latter motion. Impressions, measurements and/or castings of all subjects were performed by the same orthotist and device fabrication was completed using the same materials for each device. Two clinical outcomes measures were performed and compared before and one month after treatment: 1) the L-test of functional mobility and 2) a parental satisfaction survey of the child’s gait.

RESULTS

Parents of patients treated with an AAFO reported significantly less incidence of toe walking than parents of patients treated with an FO (p<0.05), but parents of children treated with the FO did report a reduction in time spent toe walking. Parents of children who were treated with an AAFO reported higher levels of satisfaction with their child’s gait after treatment than parents of children who were treated with the FO, although no statistical differences were seen between the groups for satisfaction levels. Both the FO and AAFO groups showed a significant (p<0.05) increase in speed in the L-test of functional mobility after treatment with both the AAFO and the FO.

DISCUSSION

Parental report of time spent toe walking is a necessary and important measure of idiopathic toe walking since children with this pathology are able to walk normally if asked. A parental report of a significant reduction in time spent toe walking is an excellent indicator of the effectiveness of the AAFO. However, parents of children who were treated the FO did report slight reductions in time spent toe walking, indicating that treatment with an FO may be an effective means to inhibit toe walking if used for a longer period of time. The FO is a less visible and restrictive form of orthotic treatment than the AAFO in that it cannot be seen when the patient is wearing it and it does not restrict plantarflexion.

CONCLUSION

These results indicate that both treatments of idiopathic toe walking increase patient speed, while an AAFO may lead to greater parent satisfaction and quicker reductions in time spent toe walking than treatment with an FO. More research is warranted given the small sample size of this study. The outcomes of this study will allow us to direct future care for patients diagnosed with ITW in a more scientifically based manner.

REFERENCES