SPECIAL NEEDS: REALIZING POTENTIAL

A Guide for Using Ankle-Foot Orthotics

There are a variety of reasons to use ankle-foot orthotics in children with special needs, and a growing number of options from which to choose. The main reasons for orthotics use are: to provide support, to limit unwanted motion, to improve function during walking, to delay or prevent secondary deformities, and to provide protection for the foot.

The use of ankle-foot orthotics (AFOs) should be integrated into a treatment program with specific developmental, positioning, or mobility goals. Intervention with an AFO before a child is walking may be necessary if there is a potential for developing foot or ankle deformity from spastic or weak muscles.

This scenario most often occurs in children with cerebral palsy; this article will focus on the use of AFOs in this population.

When deciding to start using AFOs to promote the development of walking in less severely affected children with cerebral palsy, it is complicated. The need to provide support during weight bearing in stance must be balanced against the need to allow the child to use sensory feedback to promote the postural reactions that are integral to ambulation development. Placing a plastic brace between the foot and the floor takes away intrinsic compensatory feedback useful for learning balance and stability. Therefore, it is reasonable to phase in the use of AFOs for children who are learning to walk, but who also require external support for weak muscles or to correct the effects of overactive muscles that push that foot into unstable positions.

When it is decided that a child will benefit from AFO use, consistent daily use will improve walking performance. Input from a team that may include a physical therapist, rehabilitation physician, orthopedist, and orthotist is important for determining the type of AFO, the timing, and the duration of use.

The introduction of moldable plastics in the 1990s allowed orthotic manufacturers to easily fabricate custom-contoured orthoses in a variety of designs best-suited to a child’s specific needs. Foot orthoses became available in different shapes, sizes, and styles.

There are nighttime stretching orthoses to provide a static stretch while asleep; ankle-high supramalleolar orthoses designed to provide mediolateral ankle stability; “leaf spring” AFOs with a slightly flexible upright; solid one-piece AFOs; and insulated AFOs with a built-in joint. There are even shoes designed for use with AFOs. A popular brand is the Hatches Elites, featuring a rear-entry hinge system that allows the back of the shoe to drop down for easy access.

The term DAFO stands for “dynamic ankle foot orthosis” and was first introduced at the 1990s by Cascade Dafo Inc. They used moldable plastics that could be shaped to the contours of the foot and brought the walls of the foot plate up and over the sides of the foot to more securely control the position of the ankle within the brace. These AFOs are made by Cascade at their facility based on specification sheets sent to them. Cascade-like orthotics, incorporating features of the DAFO, can also be made by orthotists located in the patient’s area.

Prevention of progressive deformity is an important function of AFOs. Spasticity can lead to sustained muscle pull at joints and bones in the foot that may lead to fixed deformities at the ankle and collapse of the medial arch in the midfoot. Providing external support to the ankle and the foot through a custom-molded foot plate with built-in arch support is critical to optimizing eventual ability to walk and to decreasing the extent of surgical correction that may be needed.

A solid AFO conforms to the shape of the calf and foot as one continuous plastic brace. It is used to prevent plantar flexion of the foot and to provide mediolateral ankle stability. AFOs of this type may be used to provide support in children with cerebral palsy who are beginning to learn how to walk. They provide a base of support by countering the tendency to walk on the forefront or toes. A hinged AFO constructed from two plastic parts joined by an articulation at the ankle is used as an assist to gait in children with cerebral palsy who have mastered the basics of walking. They are used when the child has passive range of motion at the ankles past the neutral position but none of dorsiflexion. This promotes slight flexion at the ankles and knees that contribute to a more fluid and normal gait. The articulated AFOs also provide a passive stretch of tight Achilles tendons during gait.

Solid or hinged AFOs also may be used to provide a sustained static stretch at the ankle to prevent loss of range of motion due to spasticity-related contractions. Usually at least 6 hours of stretching per day, preferably while asleep, are needed to prevent progressive loss of range of motion.

When less support is required, supramalleolar orthotics (SMOs) that look like a high-top sneaker with an open front can be used. SMOs also provide mediolateral stability to the hind foot and allow controlled dorsiflexion at the ankle during gait.

Signing off on a prescription for an AFO without knowing about the goals of the therapist carries the risk of obtaining the wrong orthotic. Also some knowledge of who is making the AFO is important since pediatric brace-making is technically difficult and requires an experienced hand. Using a company that mainly provides AFOs for adults can result in unsatisfactory results.

It is important to determine if the child’s AFO fits correctly and if it is being used consistently. If other interventions are being planned, such as medication, botulinum toxin injections to ameliorate the effects of spasticity, the requirements for a specific type of AFO may change. The overall therapeutic plan should be taken into account when ordering new AFOs. A discussion with the parents or therapists regarding progress and upcoming goals for physical therapy is useful.

It is good practice to evaluate the tolerance and fit of new orthotics within 2-4 weeks to determine whether there are skin problems, increased falls, or pain associated with the new AFOs. In addition, it is useful to ask whether the child’s walking looks better, worse, or no different while wearing the orthotics.

Reinforcing compliance with AFOs for ambulatory children with cerebral palsy is important throughout the growth years. Consistent use tends to be high after initiation when the child is learning to walk, but decreases by the time they are in school, often for social reasons. Loss of flexibility at the ankles due to contractures from spastic muscles that cannot grow in length in accord with bone growth may result in stumbling, increased falls, or foot pain. If these problems occur, restarting an AFO stretching program may be necessary.

In conclusion, the selection of an AFO to use in a child is based on examination of active and passive range of motion and assessment of the functional goals.