CASE STUDY

# On Firm Footing

DAFO™ orthoses help treat flat-foot dysfunction in children.

**BY CHARMAYNE ROSS, DPTSC, PT, AND FERNANDO VILLAR, PHD, PT**

The feet make up a body's foundation. They affect the ability to stand upright, balance and ambulate. It's not uncommon for patients with foot dysfunctions to also have biomechanical impairments.

Children with neuromotor difficulties, such as Down syndrome, developmental delays, Prader Willi syndrome, ADD, ADHD or autism, are more susceptible to problems with motor pattern development. These children are prone to hypotonia, gross muscle weakness, ligament laxity, poor joint stability, a reduced medial longitudinal arch (MLA) or flat-foot dysfunction.[1,2] Research reveals that flat-foot dysfunction (pes planus) contributes to gait and balance deficits.[1-7]

Many physical therapists believe that stabilizing a child's feet can improve gross motor function. Descriptive and observational reports suggest that this intervention works, but experts question if treatment to correct flat-foot dysfunction is a better option than normal maturation and development.[1,3,8-10]

However, new studies demonstrate that orthotic intervention and lower limb muscle strengthening improve neuromotor skills in children with atypical development. One study examined the effectiveness of DAFO™ orthoses, by Cascade DAFO™ in Ferndale, Wash. The study looked at three groups of children: a control group, a group that received orthoses, and a group that received orthoses and performed heel lift exercises (two sets of 10 repetitions) biweekly. The two latter groups received soft orthoses with arch support and heel correction, which children wore inside their shoes daily.

After six months, both intervention groups improved arch development and gait parameters, compared with the control group. Researchers theorized that DAFO orthoses provided MLA elevation and foot supination, which enhanced foot stability and improved muscle control during gait. In addition, long-term orthotic wear and repeated loading during standing and walking promoted soft tissue adaptability. In turn, this resulted in structural changes that elevated foot arches.[11]

The orthoses also protected foot joints from excessive stress and strain, which improved gait efficiency.[1-7,12] The control group didn't display any of these changes, which left them at risk for foot injury, structural deformities and inadequate gait patterns.

All study participants showed progress in velocity, step length, single limb support time and cadence. However, those in the intervention groups displayed greater improvements. As a result, these children created more efficient gait patterns and progressed in appropriate muscle activation and joint stability.

Emerging research, such as the DAFO case study, can help clinicians intervene appropriately with patients who have neuromotor impairments. Based on these outcomes, children with flat-foot dysfunction may benefit from a preventive approach that includes exercise and wearing an orthotic device.

**Debbie Donaldson, CPO, fits a patient with the Cascade Dafo® HotDog™. The orthoses is designed for patients who need mild biomechanical support and sensory feedback.**
Courtesy/Cascade DAFO™

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