

Dynamicnews

Winter 2008

a publication for patients and clients of
DYNAMIC ORTHOTICS and PROSTHETICS

Children are not 'Small Adults'



Courtesy of Sky Medical

This newsletter focuses on the unique aspects of providing orthotic devices for children. From a biomechanical and design perspective, working with young patients draws largely on the same orthotic principles and materials as those encountered when working with adults; indeed the spectrum of orthotic appliances includes relatively few systems designed specifically for pediatric applications.

Nevertheless, the caveat, Children are not small adults! clearly applies to orthotic management—kids present unique opportunities and challenges. The overall goals are familiar: prevention and/or correction of deformities and improvement of daily function. While desired outcomes can sometimes be achieved with scaled-down versions of adult appliances, providing pediatric orthoses requires certain skills and considerations that add complexity to the process but offer commensurate professional rewards.

Here are some special considerations we encounter in managing children:

CUSTOM VS. OFF-SHELF. While some popular devices such as the Pavlik Harness, orthopedic shoes and night splints are primarily prefabricated components, pediatric orthoses tend to be custom-made because of the reduced tolerance for error corresponding to the child's stature and smaller area on which correctional forces can be focused.

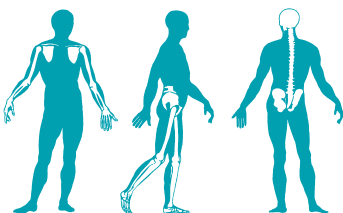
GROWTH. Unlike adult populations, where it is common to see an orthotic device used effectively for years, children universally outgrow their devices. The amount of growth-adjustability depends largely on the material and design properties of orthoses, but is rarely

sufficient in the minds of parents, HMOs, and others who write the checks. One of the unique challenges associated the treatment of children is prolonging the useful life of our interventions for as long as possible.

DEVELOPMENTAL AGE. Each child presents with his/her unique combination of motor development, cognitive function, adaptive abilities, and learning skills. The amount and quality of assistance available to each child will also vary greatly. This set of variables challenges orthotists to provide solutions suited to the capacity of each patient and their caregivers.

COMMUNICATION. Both very young children and adolescents with development impairments are often unable to verbalize pain or describe problems with the way an orthosis fits or feels. To a large extent, it is incumbent upon our clinical skills and experience to recognize and address these issues. Further, because young patients cannot be expected to understand or remember details of device application, wearing schedules, and skin care, the orthotist is called upon to accurately relay this information to parents and caregivers. Guardians who understand why they are being asked to do certain things are much

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L.P.



(713) 747-4171

www.dynamicoandp.com

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If your organization would be interested in an in-service on prosthetics and/or orthotic care, please contact company President, Tom DiBello at (713) 747-4171.

From Tip to Toe, Specialized Orthoses Support and Direct Childhood Development

The following selection presents a cross-section of orthotic componentry employed in contemporary management of pediatric patients. While some also have adult applications, the majority of these designs are primarily prescribed for children.

If you have an interest or questions regarding a particular orthosis presented, or excluded, here, please call our office.

Ankle Foot Orthosis (AFO)

Application: Varus and valgus deformities

Description: Custom-fabricated thermoplastic, metal or composite device designed and trimmed for patient's unique needs

Function: Provide proper alignment, limit or encourage foot, ankle and knee motion



Courtesy: Dynamic Orthotics and Prosthetics, LP

Anti-Adduction Orthosis

Application: Tight hip adduction secondary to spastic diplegic cerebral palsy

Description: Custom-molded thigh cuffs connected to adjustable aluminum joint

Function: Control adductor tightness, leg scissoring



Courtesy: Fillauer LLC

B-Hip Abduction Orthosis

Application: Children age 3-12 months with hip dysplasia or a hip subluxation

Description: Lightweight plastic orthosis consisting of an abdominal strap and thigh cuffs connected to a posterior plate by straddle bars

Function: Maintains hip in relative flexion and abduction to promote proper femoral head and hip development



Courtesy: Fillauer LLC

Cranial Remolding Orthosis

Application: Positional or deformational plagiocephaly, brachycephaly, scaphocephaly

Description: Custom-molded plastic and foam helmet

Function: Redirect cranial growth to correct facial and skull asymmetry and disproportion

Courtesy: Orthomerica Products Inc.



SMAFO Supra Malleolar AFO

Application: Cerebral palsy, hemiplegia, spastic diplegia

Description: Thin, flexible molded thermoplastic orthosis covering the entire foot; custom-contoured footplate; designed to distribute weight-bearing forces over large area

Function: Reduce ankle hypertonicity, increase ankle stability and provide proper alignment



Courtesy: Dynamic Orthotics and Prosthetics, LP

Floor Reaction Orthosis

Application: Cerebral Palsy and Spina Bifida "crouch gait," knee instability

Description: Rigid thermoplastic or laminate AFO with neutral ankle position and a broad anterior panel just below the knee

Function: Apply knee extension moment during stance phase to prevent knee buckling and excessive flexion associated with crouch gait



Courtesy: Dynamic Orthotics and Prosthetics, LP

Knee-Ankle Foot Orthosis (KAFO)

Application: Hemiplegia, diplegia, lower-limb instability and deformities

Description: Primarily thermoplastic brace extending from thigh to footplate, typically incorporating a knee and/or ankle joint

Function: Control motion and alignment of the foot/ankle, knee and hip



Courtesy: Dynamic Orthotics and Prosthetics, LP

What's New

Two New Options for Treating Cerebral Palsy Spasticity

For nearly two decades, Ultraflex custom orthoses have provided the rehabilitation community with conservative management options for severe neuromuscular and/or orthopedic dysfunction. Recently, the company introduced two new joint mobilization systems for managing cerebral palsy-induced spasticity.

The **HOPe1 (Hip Orthosis, Pediatric)** is a variation of the traditional A-Frame brace incorporating an Ultraflex joint mounted to solid knee orthoses or knee-ankle-foot orthoses at mid-calf with swivel brackets. It can be used for pediatric patients needing night bracing post-multilevel Botox for spastic cerebral palsy or where abduction of the hip is needed.

The joint unit provides:

- a 7.5 degree-increment abduction or adduction stop,
- 7.5 degree-increment don/doff locks,
- adjustable dynamic tension for abduction assist, and
- adjustable internal/external rotation position.

The solid KO or KAFO sections minimize point pressure, and patellar counter force strapping keeps knees in full extension (as cast).

Components gently abduct to stable full maximum abduction, and bar length adjusts to achieve maximum abduction and allow for growth. The HOPe1 is easier to don and provides better compliance than traditional A-frames. Quick release components add to this brace's flexibility of use.

FirstFlex™ is a conservative treatment protocol combining custom bracing and neuromuscular electrical stimulation for select children with upper-extremity C.P.-induced spastic hemiplegia.

Patients, age 3-20, with mild-to-moderate spasticity in the scapula, shoulder and elbow and moderate-to-severe spasticity in the wrist and fingers who have been treated with

FirstFlex have achieved significant gains in posture, strength and control of global arm-hand function without pharmacological injections or surgery.



FirstFlex™ System Courtesy: Ultraflex Systems

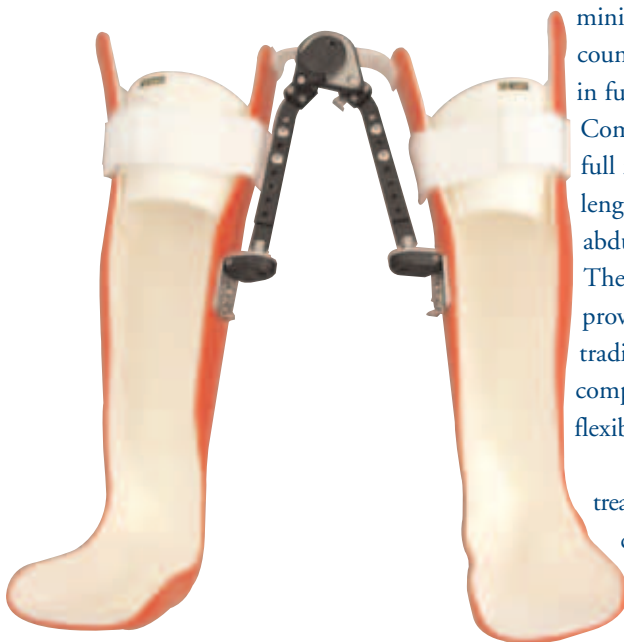
The FirstFlex custom orthosis provides precise dynamic input to the complete spastic elbow-wrist-hand musculature, including pronator isolation. The dynamic extension MCP finger pan postures, lengthens and strengthens the intrinsic hand musculature needed for grasp and pinch functions.

Patients treated with FirstFlex demonstrate improved reach, grasp and pinch with carryover improvement in daily activities: hair combing, dressing, and play. A retrospective study covering seven years and a prospective study conducted over two years revealed marked improvement in appropriate patients. The research points to patient cognition, motivation and parental support as crucial ingredients in the treatment's success. Research details are available through the Ultraflex internet site, www.ultraflexsystems.com.

FirstFlex is not recommended for children with fixed capsular elbow or wrist contractures; extremely poor sensation; or prior wrist fusions, tendon transfers, or selective neurectomies.

To be effective, FirstFlex™ program requires an extensive daily time commitment on the part of both patient and caregivers. Considerations also include psychosocial family issues as well as the daily logistics of scheduling two 30-minute treatment sessions and of donning the brace at bedtime.

For further information on these and other orthotic options for C.P. management, contact our office.



HOPe1 Orthosis
Courtesy: Ultraflex Systems

Children (Continued)



Courtesy: Dynamic Orthotics and Prosthetics, LP

more likely to comply with your instructions. Thus, we often find ourselves monitoring the physical well being of the child and the understanding and acceptance of care providers.

FINISHING ENHANCEMENTS. Creative finishing, such as with playful patterns or a given patient's favorite color of strapping material, can make regular daily use of an orthosis significantly more acceptable to a younger child. Other techniques—designing braces to be worn under clothing or to fit into normal-appearing shoes—enhance body image and therefore

acceptance among older, appearance-conscious, pre-teens and adolescents.

FAMILY SUPPORT. Though a child's abilities, viewpoint and responses will vary significantly from infancy to adolescence, active parental and family participation in the orthotic intervention remains critical throughout. Few pediatric patients can be expected to carry out the at-home portion of the orthotic plan independently.

Our orthotic staff is well-trained and experienced in working with pediatric patients. We invite your inquiries and referrals.



Low res
samples

Maple Leaf Hip Abduction Orthosis

Application: Post operative management of cerebral palsy, ages 4-12

Description:

Anatomically contoured thermoplastic lumbar-pelvic section connected to thigh cuffs by adjustable locking joints

Function: Maintains length of involved musculature and control or prevent recurrence of deformity after soft tissue release or related hip surgeries



Courtesy: Becker Orthopedic

Non-Invasive Halo Vest

Application: Positioning of structurally stable spine after complications of standard halo immobilization, C1-C2 rotary instability, torticollis

Description:

Pinless, MRI-compatible HALO headpiece and vest with rigid or semi-rigid back post component

Function: Cervical spine immobilization and control



Courtesy: Becker Orthopedic

Parapodium

Application: Paraplegic patients 3 years and older, myelomeningocele, spinal muscle atrophy

Description: Aluminum frame incorporating thermoplastic footplate, foam knee block, hip and knee locks, and chest and back panels. Three-point system keeps patient upright.

Function: Enable paraplegic children to stand without crutches; prevent or reduce flexion contractures. Those with good torso control can achieve pivot gait and independent mobility.



Courtesy: Fillauer LLC

Pavlik Harness

Application: Hip dysplasia, including congenital hip dislocation in infants of pre-walking age

Description: Shoulder harness with anterior and posterior straps extending from chest strap to foot/ankle stirrups



Function: Hold hip in flexion-abduction attitude while allowing for movement within acceptable limits

Courtesy: Fillauer LLC

Reciprocating Gait Orthosis

Application: Lower-body neurologic impairment: Indicated in L1 to L3 lesions in children with functioning iliopsoas and hip adductors

Description: HKAFO incorporating cable system or similar method of mechanically translating hip extension on one side into hip flexion on the contralateral side

Function: Provide standing and ambulation ability, thereby raising physical and psychological horizons



Courtesy: Becker Orthopedic

Scoliosis Jacket

Application: Idiopathic scoliosis

Description: Thermoplastic TLSO
Function: Utilized at night and during sleep, these devices are designed to correct or reduce the progression of muscle contractures around the knee and ankle



Courtesy: Dynamic Orthotics and Prosthetics, LP

AFO – Nighttime Stretching Orthosis

Application: Application of a low load prolonged stretch to contracted muscles around a joint

Description: Custom fabricated thermoplastic, lined with soft foam designed and trimmed to address each patients unique needs. The Low Load Prolonged Stretch is provided by an Ultraflex® Joint at the knee or ankle which utilizes a clock spring to provide the corrective forces

Function: Utilized at night and during sleep, these devices are designed to correct or reduce the progression of muscle contractures around the knee and ankle



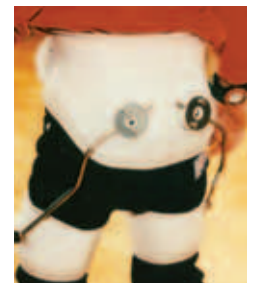
Courtesy: Fillauer LLC

SWASH - Standing, Walking and Sitting Hip Orthosis

Application: Cerebral palsy; any child whose adduction and/or internal rotation at hip joint interferes with function or induces lateral migration of the femoral head

Description: Plastic padded waist band and two joint assemblies connected by shaped leg bars to adjustable plastic thigh bands

Function: Stabilize hip and oppose excessive adduction and internal rotation; reduce scissor gait while walking and improve balance while standing



See Orthoses Page 6

Orthoses (Continued)

Torticollis Orthosis

Application: Congenital muscular torticollis

Description: Custom-molded helmet and shoulder sections connected by multi-planar adjustable joint

Function: Maintains head in any desired position, including rotational and longitudinal adjustments, post-sternocleidomastoid release surgery



Courtesy: Fillauer LLC

Wheaton Brace - KAFO (Tibial Torsion Orthosis)

Application: Metatarsus adductus, club tibial torsion; used in place of serial cast or corrective shoes

Description: Molded thermoplastic and Velcro knee ankle foot orthosis

Function: Applies direct corrective rotational force on the tibia without any torque on the femur or hip



Note to Our Readers

Mention of specific products in our newsletter neither constitutes endorsement nor implies that we will recommend selection of those particular products for use with any particular patient or application. We offer this information to enhance professional and individual understanding of the orthotic and prosthetic disciplines and the experience and capabilities of our practice.

We gratefully acknowledge the assistance of the following resources used in compiling this issue: Becker Orthopedic • Bio-Mechanical Composites Inc. • Custom Composite Mfg. Inc. • Fillauer LLC Hope Orthopedic • Össur • Orthomerica Products Inc. • Otto Bock Health Care • Sky Medical • UltraFlex Systems

Houston (713) 747-4171 • Stafford – (281) 980-5300 • The Woodlands – (281) 419-6638 • www.dynamicoandp.com

7015 Alameda Road
Houston, Texas 77054
4915 South Main, Suite 115
Southwest Professional Bldg.
Stafford, Texas 77477
Southwood Tower
19221 I-45 North, Suite 480
The Woodlands, Texas 77385

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