When You Need an AFO Expert...

(Continued from page 1)

Materials

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In recent years, plastic laminates incorporating fiberglass and graphite resins have been employed to strengthen solid-ankle AFOs to achieve triplanar ankle immobilization. Previously, controlling ankle rotation with an AFO was difficult at best.

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To attempt a comprehensive discussion of all possible AFO types would necessitate a much larger newsletter. Several of these designs are discussed in the MS/ALS management article on page 2.

Tone-reducing AFOs comprise an interesting subset of AFO design based on considerable evidence that hyperactivity can be influenced by cutaneous stimulation and joint position. One version, the dynamic AFO (DAFO), is a thin, highly flexible orthosis featuring a custom-contoured soleplate that provides total contact support and stabilization of the dynamic arches of the foot. The DAFO is widely used in the pediatric population in conjunction with active postural control and balance-oriented therapy programs.

The AFO Expert

Rehabilitation professionals who prescribe AFOs to their patients do not need to try to keep up with the latest designs and fabrication techniques but rather to recognize that there is one type of practitioner who, generally speaking, knows more about AFOs than anyone else, including how to:

• perform a comprehensive patient orthotic evaluation...
• identify the most appropriate design for a given problem...
• accurately cast and modify a lower limb model...
• select the most advantageous materials...
• fabricate, then refine, the finished orthosis, and...
• measure outcome and modify the AFO as necessary to produce optimal results.

In the certified orthotist, rehabilitation decision-makers have at their disposal an AFO expert who can help them achieve optimal outcomes for their patients. Call us for details.

Off-the-Shelf or Custom?

The continuing rise of health care costs in America is exerting ever-increasing pressure on orthotic practitioners to forgo the well-established therapeutic and functional advantages of custom fabrication for the immediate cost savings of prefabricated alternatives.

Some applications do lend themselves to off-the-shelf AFOs, particularly those whose use will be short-term or a stepping stone to another orthosis. By far the greater number, however, should be custom-made from an anatomic model. Here’s why:

To carry our role optimally, most AFOs rely on a total-contact fit and proper pressure distribution across the entire covered area. Total contact, which also helps guard against skin breakdown, does not occur with prefabricated products. Moreover, even when prefab models come in several sizes, achieving a “proper” fit is difficult.

Prefabricated AFOs and other pre-fab orthoses may have their applications, but for the majority of users, “proper” fit is difficult. Other times, the goal may be to overcome drop foot and other biomechanical complications. Add the additional millions of children and adults challenged by cerebral palsy; multiple sclerosis; head trauma; polio; Charcot disease; ALS; fractures, injury and disease processes of the lower limb; and other central nervous system disorders, and you have a vast population of people whose quality of life can be improved by an appropriately prescribed, designed and fabricated AFO.

We now have a wealth of design and materials combinations at our disposal, each offering its own attributes for different rehabilitation objectives. With the technology and knowledge expanding at a rapid pace, it is the particular role of the board-certified orthotist to keep abreast of proven new developments.

That’s a critical point. In our current difficult economy, it is sometimes tempting to choose non-traditional alternative providers for certain health services, foregoing qualifications and experience for a lower price. However, as in most things, “You get what you pay for” generally rings true in our field as well.

Applications

AFOs are employed to control and correct biomechanical and/or neurological dysfunction, facilitate or restrict joint motion, maintain proper alignment of the lower limb, protect vulnerable structures, alleviate pain, and relieve weight-bearing. Overcoming drop foot is the most common and probably most familiar application. The orthosis supports the ankle at a 90 degree angle, and dorsiflexion assist may be incorporated to help the foot assume proper position for heel strike. Thus compensated, patients walk more efficiently, more safely and with less fatigue.

In some instances, the objective is to protect body structures from further insult or injury, such as a chronically inflamed Achilles tendon. Other times, the goal may be to immobilize the ankle, such as in the presence of degenerative joint disease. Whatever the goal, the weight-bearing stresses to the orthosis. Many variables enter into AFO construction: Materials, trims, and intimacy of fit are key design determinants.

Welcome, Duy Nguyen, LO, CO

Falk Prosthetics & Orthotics is pleased to introduce Duy Nguyen, who recently joined our staff. He will be working closely with Jeffrey Price, LPO, CPO in our Jupiter location. Duy is an American Board-certified and Florida-licensed orthotist and has almost completed his prosthetic residency as well. Duy earned his bachelor’s degree in orthotics & prosthetics at St. Petersburg College. He has a special interest in technical advances within the prosthetic industry and applying that knowledge to achieve the best possible outcomes for both upper- and lower-limb prosthetic patients. His knowledge and expertise will be a valuable asset to our staff as we continue to provide outstanding personalized care and prompt service to our patients both in and out of the hospital.

Falk Prosthetics & Orthotics is a full-service prosthetic and orthotic company serving Palm Beach County with offices in Delray Beach, Royal Palm Beach and Jupiter. We work closely with our patients, referring physicians and physical therapists to maximize the functional outcome of each patient.

We hope you find this publication informative and welcome your questions, comments and suggestions.

Duy Nguyen

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AFO – Orthosis for Many Reasons

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Multiple sclerosis (MS) and amyotrophic lateral sclerosis (ALS) are related neuromuscular diseases that affect patients with progressive muscle weakness in the lower extremities, accompanied by coordination and balance challenges. While the progression of the two disorders is distinctly different, both produce mobility challenges that can be ameliorated with focused orthotic support.

MS affects an estimated 2.5 million people worldwide. Diagnosis usually occurs between ages 20 and 50, more often in women. In MS, the body’s own immune cells attack the nervous system causing inflammation, which damages the myelin protective sheath surrounding nerve cells. This process disrupts brain communication to the body, resulting in muscle deterioration. Other MS symptoms include memory and cognitive problems, extreme fatigue, numbness and tremors.

ALS is a progressive disorder that attacks nerve cells in the brain and spinal cord controlling voluntary muscle movement. As these neurons waste away, they can no longer transmit signals to activate the muscles they normally control. ALS typically strikes between ages 40 and 60, more often in men. Besides weakness in the legs and arms, initial symptoms include twitches and cramps affecting the face and body. As the disease progresses, chest muscles atrophy as well, ultimately resulting in respiratory failure.

While MS and ALS have many common features, they differ in one important respect: Though multiple sclerosis is chronic and incurable, life expectancy can be normal or near-normal. With assistive devices, such as MS and ALS patients, orthotic support is generally best delivered by a custom-molded posterior leaf spring AFO, a single-L-shaped brace that provides necessary support primarily behind the ankle and under the foot and adds a degree of dorsiflexion assist. Width and thickness are customized to reflect the strength and weight of the patient. With its thin profile and lightweight, this AFO enjoys a high level of patient acceptance.

Articulated AFO—This design, featuring medial and lateral hinge joints closely aligned with the anatomical ankle joint and triradii encompassing the sides of the leg as well as the back, provides added support for patients demonstrating drop foot along with medial and/or lateral instability. The articulated AFO can also help control knee hyperextension resulting from quadriceps weakness.

The disadvantage of this design is that it is more bulky and difficult to conceal, an important consideration for some patients.

Solid-ankle AFO—This rigid construction promotes stability in all planes by preventing both dorsiflexion and plantar flexion. It is an appropriate choice when ankle motion must be controlled, as in the presence of ankle or knee instability or when ankle spasticity requires counter-resistance.

Addition of an anterior panel creates a floor reaction during weight-bearing to apply an effective knee extension moment, providing added support for patients with advanced muscle weakness. With its bulk and rigidity, the solid-ankle design is the least-tolerated AFO among this patient population.

Ongoing orthotic care includes comprehensive follow-up visits to ensure the selected orthosis remains effective. Orthotic modifications are commonly necessary as symptoms progress over time. A change in the orthosis design may be required to accommodate ongoing changes in the patient’s condition.

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**The Psychological Factor**

A significant and prevalent issue when prescribing an AFO for MS and ALS patients is the reality that many will fight wearing a brace because of what it represents, just as they refuse to accept any of the other “baggage” of their disability. Denial and disregard of obvious developing physical limitations are all too common among this patient population.

When symptoms accumulate gradually, as opposed to occurring suddenly, it is often more acceptable to them to endure until they meet the need for a form of orthotic support, or at best will acquiesce only to a device providing less control and support than they need...no matter how much the more appropriate brace may help them. Many say they do not want an assistive devise because it will make them appear disabled, or the orthosis indicates that their condition has reached a point of no return.

Beyond the denial factor, many patients believe their condition will worsen if their muscles aren’t constantly exercised. While there is some validity to this premise (which can be addressed by other means), the critical considerations of patient safety and the ability to stay mobile for as long as possible by wearing an appropriate AFO often become overlooked.

In the big picture, short-term cost is often well worth the long-term gain of being able to be safe and more active for a considerable length of time.

**Orthotic Solutions for MS, ALS Patients**

**KAFO**—When controlling drop foot becomes essential, a knee-ankle-foot orthosis can be applied. This long leg brace effectively prevents knee hyperextension by maintaining close contact both below and above the knee. A knee locking mechanism can be included as needed for added stability.

**FES Systems**—In recent years, a non-traditional approach to controlling drop foot and limited knee hyperextension has emerged, which can benefit early stage MS and ALS patients. Functional electrical stimulation devices such as the WallAide and the Bioness L300 direct electrical current to the peroneal nerve to trigger ankle dorsiflexion contraction timed to the gait cycle. FES devices are not widely approved for insurance reimbursement at this time.

Orthotic prescription for MS and ALS patients begins with an individualized initial assessment followed by careful measurements and/or casting for creating the most intimate, effective orthosis possible. While we realize both diseases are progressive in nature and likely will require heavier and more technically rigorous orthoses down the road, we also know that “bracing for the future” will only hasten the need for those more advanced devices. Therefore, we generally design AFOs to reflect existing and near-future conditions and anticipated needs.

Over time, MS and ALS patients tend to receive several braces of varying degrees of support and control, giving them a choice based on their planned activities and how they feel on a given day. MS patients in particular enjoy the flexibility that comes with choosing a maximally controlling posterior leaf spring AFO, a minimally controlling posterior leaf spring AFO, or at best will acquiesce only to a device providing less control and support than they need...no matter how much the more appropriate brace may help them. Many say they do not want an assistive devise because it will make them appear disabled, or the orthosis indicates that their condition has reached a point of no return.

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