Ok, I have read the text.
A Welcome Alternative to Traditional KAFOS

Providing effective and patient-acceptable orthotic intervention for individuals with low-back pain or paraplegia has been a longstanding challenge in our specialty.

Patients lacking full voluntary knee control secondary to polio, weak quadriceps, spinal-cord injury, multiple sclerosis, stroke and other neuromuscular and/or musculoskeletal disorders have traditionally been fitted with a knee-ankle-foot orthosis (KAFO) incorporating manual locking knee joints to provide stability during stance and thereby prevent knee collapse and resulting gait abnormalities as addressing the presenting diagnosis.

But knee motion is an essential ingredient of a normal, efficient gait. Ambulating in a traditionally allowed-knee KAFO produces an awkward, highly inefficient walking pattern in which the wearer must circumduct and/or hike up the braced leg, or vault on the opposite leg, to provide foot clearance and advance the involved limb. This gait is awkward, fatiguing and habitual and thus unacceptable to many patients, who frequently choose to leave their brace in the closet as a result.

Another common outcome of abnormal compensating biomechanics associated with long-term use of a locked-knee KAFO is pain and loss of motion stemming from soft tissue and joint dysfunction, especially in the hips and lower back.

Fortunately, a relatively new class of componentry called stance control orthoses (SCOs) now provides us with a viable alternative. The concept behind these devices—locking the knee during weight-bearing for stability and allowing it to flex more or less normally during leg swing—wasn’t hard to figure out; but coming up with a reliable design acceptable to users proved elusive for decades. And while no one product among the various options currently available to us will apply generically, we now do have sufficient choices to address different patient needs, even as new and improved designs continue under active development.

Determining whether an SCO will be beneficial and if so which design will be most appropriate for a given individual is as much a function of correctly assessing the patient’s physical and cognitive capabilities as addressing the presenting diagnosis. Only some individuals with post-polio symptoms, for example, have the facility and motivation to succeed with a stance control brace.

The same is true with all other relevant diagnoses for this category. The majority of currently available SCOs are mechanical devices, which emulates some feature of the user’s gait such as ankle range of motion to lock the knee just before commencement of stance phase (heel strike) and unlock it at transition to leg swing. More recent microprocessor-controlled systems extend stance control benefits to individuals with minimal heel malalignment that preclude use using mechanical hip bracing.

Though SCOs have not been around long enough for conclusive long-term outcomes studies, initial research involving some of the early designs suggests significant benefits can be achieved for appropriate patients notably substantially improved gait biomechanics coupled with less effort and energy expenditure and more normal gait pattern in which the wearer produces an awkward, albeit more efficient gait. This gait is awkward, fatiguing and habitual and thus unacceptable to many patients, who frequently choose to leave their brace in the closet.

On the other hand, stance control KAFOS present certain drawbacks. The current generation of SCO joints tends to be somewhat bulky as compared to their standard cousins, and the newer microprocessor-controlled SCOs tend to be heavy by comparison; some are noisy as well. For the patient, the question becomes, Are these compensations worth the added performance the orthosis provides? In many cases, the answer is a definite Yes!

As with most new and technological advancements, stance control orthoses, particularly those with electronic function, are considerably more expensive than conventional KAFOS for this population.

Moreover, obtaining reimbursement has been problematic; in fact, Medicare’s initial reluctance to provide funding for SCOs symptomatic product development for several years. Now, however, a reason-able code has been issued, and insurance funding for these orthoses can often be obtained with the necessary justification and documentation.

In evaluating patients for possible SCO application, we have learned that those who have worn a conventional KAFO typically have more difficulty adapting to and taking full advantage of the stance control features than individuals receiving their first orthosis.

From the increasing number of stance control KAFO products now commercially available in the U.S., knowledgeable orthotists can select the one offering the most appropriate mix of attributes for any given patient’s unique needs, body measurements, capabilities and activity expectations.

General contraindications to using a stance control KAFO include significant knee stiffness, substantial impairment of patient cognition and/or motivation, knee flexion contractures exceeding 10 degrees and uncertain prospects for pain and muscle spasticity. To discuss stance control prospects for a specific patient or to learn more about this class of componentry, we invite you to call our office.

Helping Hands in Haiti

The Jan. 12 earthquake that devastated Haiti is a human tragedy of epic proportions. Beyond the estimated 170,000 killed in the 7.0 magnitude quake, at least 200,000 more are beleived to have suffered major injuries. Among these, 2000–4000 are predicted ultimately to undergo limb amputation surgery, many of them children.

From a rehabilitation standpoint, few countries could have been more ill-prepared to cope with this disaster than Haiti. The facility of the primary provider of prosthetic and orthotic care in the capital of Haiti was destroyed; Healing Hands for International, was 80 per-cent destroyed the need for its services was exploding.

But help is on the way, amid an outpouring of concern from around the world. That is encouraging, but it is vital that this support be organized and focused in a way that Healing Hands International, a global network focused on improving the living conditions of people living in disabling situations in post-conflict and low-income areas of the world, is leading the coordination of the rehabilitation effort. Healing Hands for Haiti is involved as a primary provider of services along with similar organizations based in various countries.

At the appropriate time, volunteer prosthetists and orthotists from many nations will travel to Haiti in temporary stints to provide the needed skills and experience largely lacking in the small country’s inherent resources. It is important to note, however, that the need for device adjustments and follow-up care will remain long after the volunteers have gone home; thus, the infrastructure to provide that ongoing care must be created essentially from scratch.

Meanwhile, collections of used O&P components and supplies and various patient aids have been organized in many locations for ultimate shipment to Haiti. Many of these items will be helpful, but it is likewise important to note that Haitian amputees are going to need basic, non-complicated replacement limbs or braces as compared with many of the devices provided to their counterparts in the U.S. Often, the simpler basic lower-limb prosthetic components, such as a toe-wearing shoe, are unexpectedly valuable as replacement parts, but used prosthetic socket, liners and hard-end components are generally not appropriate.


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 practitioners.

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*CAAEHP—Commission on Accreditation of Allied Health Education Programs
I n the laboratories of rehabilitation technology, new doesn’t remain new for long. No sooner does an innovative design or product hit the market than efforts are already under way to improve on it, either through an entirely new approach or improved engineering of the original concept.

Such is the case with stance control orthoses, or SCOs, for which the initial, largely mechanical joint designs have now been taken to a new level of microprocessor control to address the specific needs of a wider range of patients. Two recently introduced products exemplify this new generation of “intelligent” SCO technology.

The E-MAG Active system extends the benefits of a stance control knee-ankle-foot orthosis and provides an added level of safety to patients with no ankle function. In lieu of an ankle sensor or weight-sensing footplate, an on-board gyroscope monitors the affected limb’s position within the gait cycle at all times and controls an electro-mechanical knee unlocking mechanism accordingly to enable flexion during swing phase and ensure that by contrast, the Sensor Walk, can withstand users of up to 300 pounds, most of any stance control KAFO currently available. Such is the case with stance control orthoses, or SCOs, for which the initial, largely mechanical joint designs have now been taken to a new level of microprocessor control to address the specific needs of a wider range of patients. Two recently introduced products exemplify this new generation of “intelligent” SCO technology.

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The E-MAG Knee joint is completely enclosed, preventing clothes from becoming snagged and protecting against external impact and contaminants entering the joint. This system can be used for appropriate patients weighing up to 187 pounds.

By contrast, the Sensor Walk, can withstand users of up to 300 pounds, most of any stance control KAFO currently available. This heavy-duty orthosis, developed in conjunction with the Mayo Clinic, offers several unique features that provide the benefits of sophisticated stance control to individuals who cannot operate other SCOs.

Sensors in the knee and footplate feed data to the Sensor Walk microprocessor and unlock the knee in late-stance phase when weight has been transferred to the contralateral side and is ready for single limb support. Gait is frequently more natural than with other SCOs, because a knee extension moment is not required to unlock the joint. After mid-stance but prior to initial contact, the Sensor Walk knee joint will lock at any degree of knee flexion, facilitating stumble recovery.

Unlike other stance control systems, which can take up six months to master, gait training for the Sensor Walk is fast and can be as simple as walking for a time between parallel bars. Many users quickly gain sufficient confidence to climb stairs, change cadence during ambulation, and walk on uneven terrain.

The Sensor Walk can be set to function as a fully locked or free-swinging knee to accommodate changes in the patient’s ability and special circumstances. Like the E-MAG Active, the Sensor Walk uses a rechargeable lithium ion battery that gives active wearers a full day of service. This next generation of SCOs illustrates the exciting future of orthotic limb rehabilitation. Call our office for more information.