



## THIS ISSUE

Selecting the Right Mechanical Knee

Therapeutic Shoes Keep Feet Healthy and Can Prevent Amputations

Don't Forget the Preauthorization

ACA offers Spanish Language Site

## Selecting the Right Mechanical Knee

It's important for amputees to select the correct mechanical knee that fits their needs, but the one with the latest technology and features may not always be the right choice.

Within the mechanical, prosthetic knee category, there are several from which to choose, but they all have distinct features that correlate with a wearer's age, health, activity level, and lifestyle. No matter which knee you opt for, it must provide reliable support when standing, allow smooth, controlled motion when walking, and permit unrestricted movement for sitting, bending, and kneeling.

### *Single-Axis and Polycentric*



Mechanical knees are separated into two categories: single-axis and polycentric, or multiaxis. Single-axis knees are essentially comprised of a hinge, and they are considered to be the simplest, most economical, and most durable of all single-axis knees.



The drawback of single-axis knees is they do not have stance control, which means amputees must use their own power to keep them stable while standing. To compensate for this, single-axis knees typically have a constant-

friction control and a manual lock to prevent the leg from swinging forward too quickly.



Polycentric knees, or four-bar knees, are more popular since they have multiple axes of rotation, which allow for a very stable stance phase, yet an easy-to-bend swing phase. Another advantage and popular option of polycentric knees is the leg's overall length shortens in stride, reducing the risk of stumbling. Polycentric knees are suitable for



many amputees, including those who cannot walk securely with other knees and those who have knee disarticulation or bilateral leg amputations, or have long residual limbs. Several polycentric knees have fluid (pneumatic or hydraulic) swing control, which permit variable walking speeds.

A couple drawbacks of polycentric knees are they are heavier and they have parts that may need to be serviced more often than other types of prosthetic knees.

### *Manual and Weight-Activated Locking Systems*

To provide stability, all mechanical knee units require manual or weight-activated

*Continued on next page*



locking systems, which lock the knee joint when extended and prevent buckling. The manual locking system is the most stable locking system since it can be locked and unlocked voluntarily; walking can be done with the system locked or unlocked, but more energy is required when the system is locked and it may result in an awkward gait. The

manual locking knee is appropriate for unstable patients, or those who frequently walk on unstable terrain.

The weight-activated stance-control knee is often prescribed for a first prosthesis; when weight is placed on the prosthesis, the knee will not bend until the weight is displaced. This knee is commonly prescribed for older or less active amputees.

### *Constant-friction and Variable Friction*

Every knee must have some type of swing control to maintain a consistent gait, in which the friction at the axis of rotation adjusts to the cadence of the opposite leg. Constant-friction knee units are simple, lightweight, and dependable, but the knee must adjust for a single walking speed at any given time.



Variable friction offers increased resistance as the knee bends from full extension, providing variable walking speeds. A disadvantage of variable friction is this system requires frequent adjustments and repair to moving parts and is considered less advanced than fluid control knee systems.

### *Fluid Control Systems: Pneumatic and Hydraulic*

In order to walk comfortably at different speeds, prosthetic knees use fluid dynamics to provide variable resistance, which allow amputees to walk at different speeds.



Pneumatic control systems involve the technology of pistons inside cylinders containing air. These cylinders are compressed as the knee is flexed, then it stores the energy, then returns the energy to the knee as it is extended. A spring coil may be added for additional gait control. Pneumatic systems are considered to provide better swing control to friction knees, but to be less effective than hydraulic systems.



Hydraulic control systems are considered to function very closely to a normal knee. Hydraulic systems use a liquid, usually silicone oil, to respond to a range of walking speeds. Although they provide a smoother gait, they are heavier and require more maintenance and are more expensive, initially.



**The Ossur Total Knee® 1900** is manufactured for low-level activity and for single speed walking on level ground around the home and local areas. The Total Knee 1900 closely resembles a true knee motion and its geometric lock makes it nearly impossible to collapse when fully extended during heel load. The Total Knee requires less effort to begin bending and provides shock absorption for added comfort.

For a moderately active lifestyle, Ossur's Total Knee 2000 is suitable for light duty work, walking on level and uneven terrain and ramps. Its hydraulic swing control accommodates changes in walking speed. It has a natural and fluid movement so it mimics a true knee motion, and, like the Total Knee 1900, it has a geometric shape to resist collapsing. Its low-built height means the knee will not protrude when sitting.



The **Total Knee 2100** is for wearers who have a highly active lifestyle who need a knee that can handle multiple speeds while walking on level and uneven terrain. It is able to detect the knee is extended prior to loading weight onto the prosthesis.



The **GeoFlex™ Knee** from Ohio Willow Wood is for wearers who are just learning to walk or less active.

It is a friction-controlled polycentric knee for people who need stability but don't want a locking knee. Its wearer can walk on almost any terrain with little effort, energy, and training. A built-in stance flexion allows for a natural bending motion at the knee. It can be retrofitted to almost any leg. The new roller bearing design allows more durability and longevity and is much easier to use.



Contact your prosthetist, or rehabilitation specialist to learn which mechanical knee is right for you, and how to properly use your knee for maximum comfort and to avoid stumbling and discomfort.

The staff at Calumet Orthopedic makes every effort to match our patients with the most suitable prosthesis. For more information, contact us at (219) 942-2148.

*Source: Military in-Step, Sept. 11, 2006  
Photos courtesy of Ohio Willow Wood, Hosmer/Fillauer Companies, Otto Bock HealthCare, and Ossur*



## Therapeutic Shoes Keep Feet Healthy and Can Prevent Amputations

According to the American Diabetes Association (ADA) there are approximately 17 million Americans with diabetes and 25 percent of those people will develop foot complications as a result of the disease. People with diabetes are far more likely to have a foot or leg amputated than other people because many people with diabetes also have artery disease, which reduces blood flow to the feet, and/or nerve disease, which reduces sensation. Together, these problems make it easy to get ulcers and infections that may lead to amputation.

That's why it's so important for diabetics to carefully follow diet and exercise programs and check their feet everyday. In fact, most amputations are preventable with regular care and proper footwear -- diabetic or therapeutic shoes and special socks. Diabetic shoes are made to provide protection, enhance comfort, and reduce injury. Studies show that well-fitted diabetic shoes with moldable insoles reduce the development of ulcers and sores that lead to serious foot problems. Studies have indicated that patients who wear therapeutic shoes had an ulcer recurrence rate of only 17 percent while those who returned to wearing regular shoes had an 83 percent recurrence rate.



Because shoes play such a vital role in the management of these patients, Congress passed the Therapeutic Shoe Bill in 1993, which made it possible to provide depth shoes and custom inserts through Medicare coverage.

Joe Garza, CO, is skilled in creating custom foot orthoses and fitting orthopedic shoes that protect injured, sensitive, or at-risk feet. Based on the physician's prescription, Joe can evaluate the condition and design a custom foot orthosis or shoe insert, or custom-fit shoes to the patient's needs.

"Anytime pressure is placed on the diabetic foot, there is potential for injury and infection," said Joe. "To avoid the potential complications such as loss of sensation, reduced circulation, and delayed wound healing, it's important diabetics wear their prescribed shoes all the time – even on the beach."

"Styles in diabetic shoes have come a long way as well," Joe added. "There are many attractive shoes for men and women that still provide the width and depth needed for pedorthic insoles. A good shoe design includes breathable construction for proper air circulation, no interior seams or covered seams to prevent running injuries, and a roomy toe box to prevent pinching or squeezing of the toes."

Diabetic shoes should not be purchased off-the-shelf. It's very important to be fitted by a trained professional because a diabetic may not be able to feel an improper fit due to peripheral neuropathy. And, also important to the patient's insurance coverage, the Medicare Shoe Bill requires the footwear to be fitted and furnished by a qualified professional (orthotist, prosthetist, pedorthist, or podiatrist).

Your Calumet practitioner can help you choose the brand and style best suited for your needs.

American Diabetes Association  
[www.diabetes.org](http://www.diabetes.org)

Centers for Disease Control and Prevention  
[www.cdc.gov/diabetes](http://www.cdc.gov/diabetes)

Department of Veterans Affairs  
[www.va.gov/health/diabetes](http://www.va.gov/health/diabetes)

Juvenile Diabetes Foundation International  
[www.jdfcure.org](http://www.jdfcure.org)

American Association of Diabetes Educators  
[www.aadenet.org](http://www.aadenet.org)

American Orthotic and Prosthetic Association  
[www.aopanet.org](http://www.aopanet.org)

Information about Diabetes  
[www.informationaboutdiabetes.com](http://www.informationaboutdiabetes.com)



## Don't Forget the Preauthorization

Understanding your insurance plan is very important to maximizing your benefits. However, one element that is easily overlooked before a visit to us is preauthorization. Preauthorization is the approval by your insurance company for us to treat you.

The staff is here to help you in any way we can. We will make every effort to answer your questions and to help you fill out forms, but because there are so many different types of coverage and variances in regulations between companies, we may not be familiar with the particulars of your individual plan.

To make sure you are fully aware of what you need to do prior to visiting us, call the number on the back of your insurance identification card, and ask if you need

preauthorization for any orthotic/prosthetic product or service.

It's easy to assume that because you have current coverage, you don't need to worry about paying 100 percent of the cost. But many carriers require that before we can provide you a product or a service that is covered by your insurance, you need to get preauthorization from them. And, any billing prior to this authorization becomes the responsibility of the insured.

It's important to keep in mind that even with a preauthorization, you still may be required to pay a part or full cost of the product/service.

At Calumet, we want to make sure our patients get all the benefits to which they are entitled. We are always happy to be of assistance, and we look forward to serving you.

## Amputee Information Available to Spanish-Speakers *ACA Online Offers Sections in Spanish*

The Amputee Coalition of America (ACA) and its National Limb Loss Information Center (NLLIC) recently established a Spanish language portion of its Web site at [www.Amputee-Coalition.org/Spanish](http://www.Amputee-Coalition.org/Spanish).

Statistics show that Hispanic/Latino Americans are 1.5 times more likely to have diabetes than non-Hispanic/Latino white persons of similar age. Approximately 60 percent of nontraumatic lower-limb amputations occur in people with diabetes, so the need for limb-loss-related materials in Spanish has never been greater.

Spanish-speakers have easy access to comprehensible translations of all of the ACA's amputee information, including:

*First Step: A Guide for Adapting to Limb Loss*, NLLIC Fact Sheets, and magazine and newsletter articles from *First Step: inMotion, Connections, Expectations, and Senior Step*.

Founded in 1986, the Amputee Coalition of America (ACA) is a national 501 (c)(3) nonprofit organization, that's mission is to reach out to people with limb loss and to empower them through education, support, and advocacy. Through a cooperative agreement with the Centers for Disease Control and Prevention (CDC), the ACA maintains the National Limb Loss Information Center (NLLIC), the nation's most comprehensive source of information for people living with limb differences.

For more information – in English or Spanish – call ACA at (888) 267-5669 or visit online at [www.amputee-coalition.org](http://www.amputee-coalition.org).