

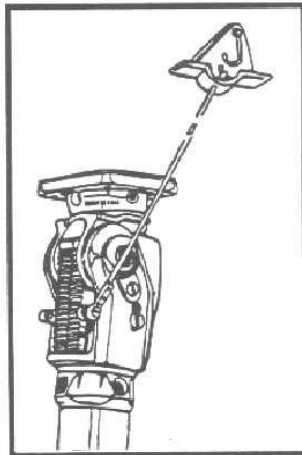
Prosthetic Knees

The type of knee used on an above knee prosthesis depends on the patient’s activity level, the patient’s weight, the patient’s strength and ability to control the knee, residual limb length, funding, and patient preference.

Friction is used in the knees in order to control the knee joint during walking. Friction controls how far and how fast the knee bends and straightens during gait. Some knees have mechanical friction while others have hydraulic resistance. Computerized knees are also available that control the knee speed based on the person’s gait. Mechanical knees provide constant friction where the hydraulic knees and computerized knees change the knee speed depending on how fast the person is walking.

Manual Locking Knee

The manual locking knee is the most stable knee used in prosthetics. The knee is locked during gait and the patient releases the lock mechanism in order to sit down. Manual locking knees are primarily used with patients who have very short residual limbs and/or poor hip strength and are unable to control the knee.

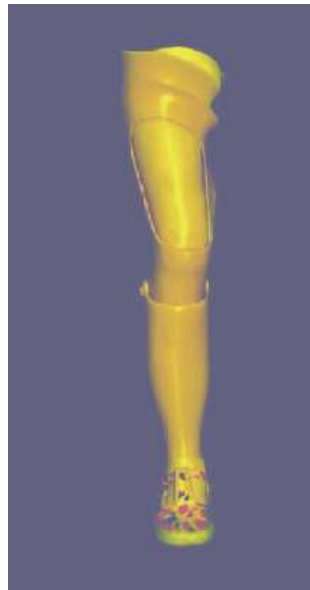


Manual lock

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Single Axis Constant Friction Knee

Single axis knees are basic knees that bend freely. The amputee must rely on his own muscle control for stability. The single axis constant friction knee is generally used by children who have a lower center of gravity or for patients with excellent musculature control that walk at a single speed. Friction in the knee can be adjusted by tightening a bolt. For exoskeletal knees, an extension strap made of elastic may be added to the front of the prosthesis to aid the knee in kicking forward. This knee is very durable and is easy to maintain and repair.



Exoskeletal Single Axis Knee

Single axis knees can be exoskeletal (hard plastic) or endoskeletal (metal components). Oftentimes, hydraulic or pneumatic controls are added to single axis knees to allow for variable speed walking. Stance control may also be added to improve stability.

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Weight Activated Stance Control Knee

The weight activated stance control knee is one of the most widely used knees in prosthetics. This knee is a single axis constant friction knee with a braking mechanism. When weight is put on the knee during gait, a braking mechanism is applied and the knee will not buckle. Using this knee, the patient must unload or take weight off of the prosthesis in order for the knee to bend. The wearer will need to unload the knee to sit or to initiate the swing phase of gait. This knee is sometimes referred to as the “safety” knee.



Otto Bock Weight Activated Stance Control Knee 3R49

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Polycentric Knees

The polycentric knee has a variable center of rotation allowing for stability at all phases of gait. The 4 bar linkage also allows the knee to collapse better during the swing phase of gait, essentially shortening the shin and allowing the foot to clear the ground easier. This collapsing feature also allows the knee to bend easier for sitting and is the ideal knee for knee disarticulation or long above knee amputees. The swing phase control can be either mechanical friction or hydraulic resistance. There are many manufacturers of polycentric knees.



Endolite Slim Profile 4-Bar Knee

Disarticulation



Medipro OP2



Otto Bock 3R46

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Hydraulic Knees

Hydraulic knees allow adjustment of walking speed by the use of hydraulics (either liquid or air) within the knee. As a person's walking speed increases or decreases, the hydraulics adjust to control the speed at which the shin of the prosthesis swings forward and bends backwards. This type of knee is often used for more active patients who vary their walking speeds and do not need assistive walking devices. Hydraulics can be used with single axis or polycentric knees. The following knees are just a few of the various hydraulic knees that are now available.

Mauch SNS Knee (Ossur)

The Mauch SNS (swing and stance) knee was the first hydraulic knee to offer swing and stance phase control. This allows "stumble recovery" or a braking mechanism to prevent buckling of the knee when weight is on the knee. This feature can be turned off at the flip of a switch so that hydraulics are used only for the swing phase. The knee also has the ability to be locked so that it will not bend. This may be used if someone is standing for long periods of time.



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Total Knee (Ossur)

The Total Knee incorporates a polycentric design, weight activated stance control, and hydraulics in one. While putting weight on the heel of the prosthetic foot, it is almost impossible for the knee to collapse. This knee is also available in a polymer friction version for both pediatric and adult use.



Medipro OP4 Knee

The OP4 is a single-axis pneumatic weight-activated locking knee. It provides pneumatic swing phase control in a single-axis design with the added attribute of weight activated stance control. The OP4 is a lightweight knee that can handle body weights up to 220#.



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Programmable / Computerized Knees

Intelligent Prosthesis Plus (Endolite)

The intelligent knee adjusts the swing of the knee to match the wearer's walking speeds. Using a remote handheld, the device can be programmed to adjust for the wearer's normal, fast, and slow walking speeds.



Adaptive Knee (Endolite)

Endolite's microprocessor controlled knee combines hydraulic and pneumatic knee controls with wireless programmability. Using a wireless remote, the knee can be programmed for stumble recovery, stairs, ramps and variable walking speeds.



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C-Leg (Otto Bock)

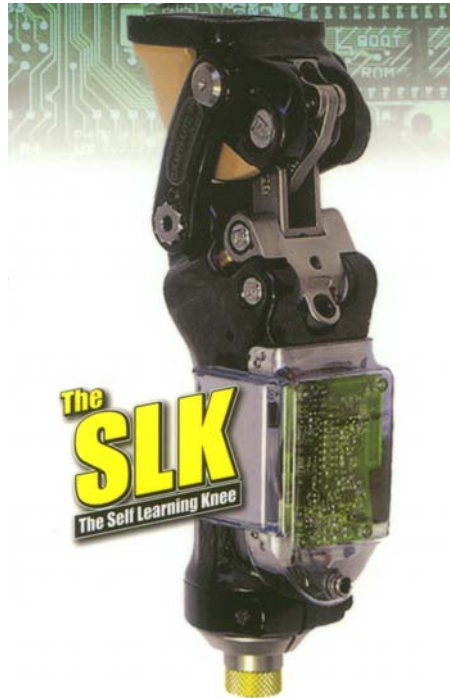
Otto Bock introduced the C-Leg in the United States in 1999. The microprocessor-controlled knee is programmed using PC-based software to achieve optimal gait. Customized settings control both swing and stance phase. The onboard microprocessor analyzes gait data 50 times per second to adjust the gait as needed. Also, a second set of settings can be created for use for a different activity, which the wearer can initiate when needed.



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The Self Learning Knee (DAW)

The SLK or Self Learning Knee by DAW works by measuring a magnet traveling in the kneecap of the knee. The computer learns the wearer's slowest and fastest gait speeds over a period of two weeks, effectively memorizing the pattern of the wearer's gait. The knee then self programs to the individual's gait pattern.



For further information on prosthetic knees, please visit the following websites:

www.ottobockus.com

www.ossur.com

www.daw-usa.com

www.endolite.com

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