

Fluid control



Description

Prosthetic knee joints can be classified by the way that the flexion and extension (bending and straightening) of the knee joint is regulated.

There are two types of fluid control systems: pneumatic (air) and hydraulic (fluid). In each case, pistons move through the control medium as the knee bends and extends. As the pistons move, control valves provide varying degrees of resistance depending on the angle of the knee. These systems allow a different stiffness during different phases of gait. The result allows the user to walk more comfortably at different speeds.

Advantages

- Progressive resistance as knee bends.
- Can be found in both monocentric (single axis) and polycentric (multi axial) knees.
- More natural gait.
- Can be adjusted to allow for a range of cadences.
- Accurately mimics anatomical knee function.
- Provides better swing control and stability than constant friction designs.

- Generally lighter and less expensive than microprocessor knees.

Disadvantages

- Piston seals are prone to wear.
- Can produce heat when actively worked for long periods.
- Small units can fail if overdriven.
- Heavier than mechanical friction knees.
- Complex.
- Require a high degree of accuracy and knowledge to be adjusted correctly.
- More expensive than mechanical friction systems.