



## Prosthetic Knees for Children

For many years infants and toddlers with above knee amputations were fitted initially without a knee joint. However, more often prosthetists are turning towards fitting children with a bending knee joint right at the time of the very first fitting. The idea being that children quickly and naturally adapt to a bending knee joint when it is provided right from the start.

It is important to discuss with the prosthetist the types and level of activities your child takes part in, to ensure that the right kind of knee is chosen. Learn more about the types of knees and their features by reading on...

There are three main types of knees: single axis, polycentric and hydraulic.

### Single Axis

The most basic design is the *single axis* knee. It functions like a hinge joint, but with an internal spring mechanism to help it swing the lower part of the leg forward when the child takes a step. When young amputees become increasingly active a more durable knee is usually necessary.



3R38 by Ottobock (also comes in a version with a manual lock)

### Polycentric (often referred to as "four-bar")

A popular design for knees is the *polycentric* or four-bar knee. Polycentric means the knee design has multiple points of movement, making the knee function more like a natural knee. The "four-bar" name comes from the fact that if you envision lines between the four main axes of the knee, you end up with four bars.

When a polycentric knee bends, it actually raises up the lower part of the leg, including the foot, slightly. This slight raise helps keep the toes of the artificial foot from stubbing on the floor, which is a common cause of stumbling and falling for leg amputees. Also, the knees are designed to assist in swinging the lower part of the leg forward with ease.



Child's 4-bar by DAW

Euro modular monocentric (single axis) knee with lock



As seen here, numerous manufacturers of prosthetic components have child versions of polycentric knees. A quick comment on the features of a couple of these – the **Total Knee Junior** by Össur has a locking system that provides stability at full stance when the amputee’s weight is on the knee, and the **Ottobock 3R66** includes a rotation feature that enables the lower part of the prosthesis to be rotated so the child can sit on the floor more comfortably while playing. Prosthetists can provide more information on the different knees and their experiences with them.

## Hydraulic

The **Ottobock 3R65** is the only *hydraulic* child’s knee available. The body of the knee is a single axis design as opposed to a polycentric design, but the unique feature of this knee is that the ability to swing it forward is provided by a hydraulic cylinder (where fluid moves through an internal cylinder using valves). The hydraulic unit makes the knee swing forward more naturally. Many adult knees have hydraulic swing control, but this is the only child’s knee with hydraulic control.



**Ottobock 3R65 hydraulic child's knee**



**3R66 Children's Four-Bar Knee Joint with Rotation by Ottobock**



**Euro modular polycentric knee**



**Total Knee Junior by Össur**

**MightyMite® Knee by Fillauer**



**Endolite Children's Knee**



**Child's Play® Knee by Seattle Systems**

