Monocentric (single axis) knees

Description

This type of knee works as a simple hinge: one part of the knee rotates about the other using a shared single pivot.

Advantages

- May feature mechanical, pneumatic or hydraulic control.
- Lightweight – generally lighter than comparable polycentric knees.
- Can be made smaller than similar polycentric knees.
- Durable & robust – mechanical versions have fewer moving parts due to their simplicity.
- Mechanical versions are relatively inexpensive.
- May offer stance control, which assists the user to maintain stability when standing.
- Sometimes features a manual lock to compensate for lack of stance control.
- Mechanical units use constant friction to regulate the swing speed of the shin section.

Disadvantages

- Constant friction design does not adapt to different walking speeds.
- Distance from centre of rotation to toe is fixed during swing phase; this increases the risk of stumbling.
- Bending action does not match the anatomical knee.
- No geometric lock.
- May lack stance control, which means that the user must use muscle power to remain stable when standing.
- Mechanical stance control may be unreliable.
- May become noisy when wearing.
- May result in thigh length inequality when used with a very long residual limb.
- Become less stable as they wear.
- Amount of flexion is not as great as polycentric knees.
- Higher wear coefficient for full length cosmetic covers.