Examples of Lower Extremity Prosthetic Components for K3 to K4 Patients

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K3 Prosthetic Knee Units
Mauch S&S

• Passive hydraulic fluid knee unit

Pros
• Provides variable cadence for community ambulation
• Provides some resistance to falling
• More durable, able to withstand most weather conditions
• Does not need an electrical source for power

Considerations
• Does not respond as quickly as a microprocessor to changes in gait speed
Does not provide powered knee flexion for ascending step over step
• Maximum weight 300lbs (136kg)
Rheo

• Microprocessor knee

Pros
• Immediately senses change in cadence
• Can be programmed for varying resistance

Considerations
• Maximum weight 275lbs (125kg)
• Weather considerations - cannot get wet
• Battery lasts 24-48 hours, requires recharging
Ottobock C-Leg

• Microprocessor knee

Pros
• Immediately senses change in cadence
• Can be programmed for varying resistance
• Activity mode allows for adjustable resistance by the user (such as for bicycle riding or running)
• Stumble recovery

Considerations
• Weight maximum 300lb (136kg)
• Battery life 40-45 hours
• Weather limits- cannot get wet
**Ottobock Genium**  
• Microprocessor Knee

**Pros**
- Step up capability - using hip extension
- Locked position when not sensing motion gives added stability
- Switches to free swing when the femur is horizontal - allows leg to fall to 90 degrees when user is sitting down
- User can walk backwards

**Considerations**
- Maximum weight 330lbs (150kg)
- Weather considerations: splash resistant, not submergable
- Battery life 5 days
- Increased cost
Ottobock 3R80

• Rotary hydraulic knee

Pros
• Adjustable resistance during flexion and extension
• Gradually adjusts to variable cadence
• Durable in all weather conditions

Considerations
• Weight maximum 330lbs (150kg)
Ossur Total Knee

• Polycentric hydraulic knee

Pros
• Durable
• No battery charging required
• Polycentric design allows knee to fold under socket for long transfemoral amputees.
• Gradually adjusts to variable cadence

Considerations
• Weight maximum 275lb (125kg)
K 3-4 Level Ankle and Foot Units
**Endolite Echelon**

**Pros**
- can change resistance for matched dorsiflexion and plantarflexion
- Manual adjustment allows prosthetist to change resistance against dorsi and plantarflexion separately
- Also pictured is Echelon VT which provides added vertical shock absorption and ankle rotation (pictured with split keel foot unit)

**Considerations**
- Maximum weight 100kg
- More ankle movement sacrifices stability
- Cannot run or jump with this unit

*Passive hydraulic ankle*
Ossur Talux • Single Keel Dynamic Response foot

Pros
• Carbon fiber material provides energy storing response
• Multiaxial
• Single keel provides more stability.
• Polyurethane bumper allows for some eversion and inversion.
• Foam middle compresses during stance phase to improve rollover (yellow arrow)
• Plantar strap limits dorsiflexion (blue arrow)

Considerations
• Weight maximum 325lbs, (147 kg)
Freedom Highlander

• Split Keel Dynamic Response Foot

Pros
• Carbon fiber material provides energy storing response
• Split Keel provides increased inversion and eversion flexibility, but increases instability
• Available units can accommodate users of up to 500lbs

Considerations:
• Weight maximum 365 lbs (166kg)
Freedom Highlander
Example of split keel inversion and eversion flexibility

Please click to activate video
Ossur Vari-flex with EVO

• Split Keel Dynamic Response Foot

Pros
• Carbon fiber material provides energy storing response
• Split Keel provides increased inversion and eversion flexibility, but increases instability
• Low profile option available for patients with longer residual limbs

Considerations:
• Weight maximum 365 lbs (166kg)
Freedom Renegade

Single keel dynamic response foot

Pros
• Carbon fiber provides energy storing components
• Extra folds provides shock absorption and increased reactivity for running

Considerations
• Weight maximum 365 lbs (166kg)
Ossur Ceterus ankle • Air pressurized rotating ankle unit

Pros
• Allows for rotational motion at the ankle
• Adjustable rotational resistance
• Available in low profile style for long residual limbs or to accommodate for a knee unit
• Can be used with different foot styles
• Vertical shock pylon for shock absorption

Low profile style
Ossur Cetarus ankle

Rotating ankle

Click to activate
Ottobock C-walk

• dynamic response foot

Pros
• Shaped to allow for smoother rollover
• Springs to cushion at end range

Considerations
• Weight maximum 220lbs (100kg)
Endolite Elite 2

• Dynamic response foot

Pros
• Split keel for inversion/eversion flexibility
• Independent carbon foot pieces for vertical shock absorption and loading

Considerations
• Weight maximum 365lbs (166kg)
Disclaimer

This list is not meant to be all inclusive, but rather to provide examples of the types of components that can be used in a prosthesis.

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