



Adaptive snow sports

BY ZACH HARVEY, CPO

About me

*Certified Prosthetist Orthotist

In Denver, CO

*Our job typically involves
getting people walking

*I volunteer several times/year

with various adaptive ski programs

because I see the rehabilitation value and don't want the
prosthesis or equipment setup to get in the way



CREATIVE
TECHNOLOGY
ORTHOTIC & PROSTHETIC SOLUTIONS

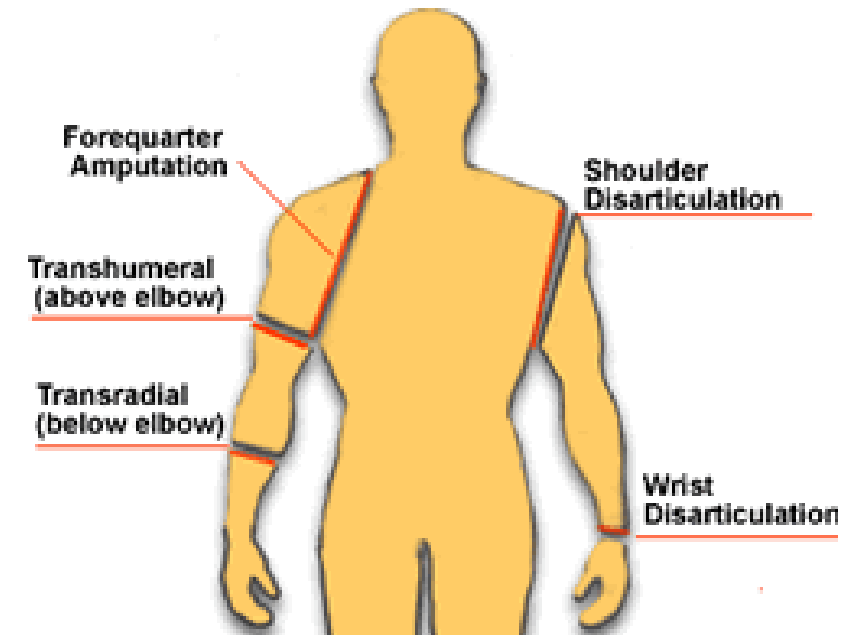
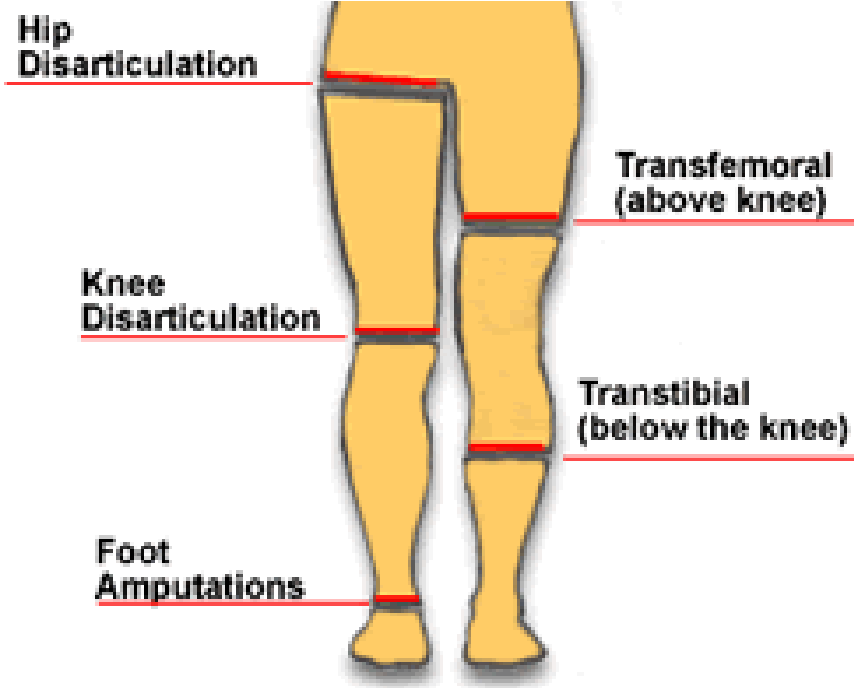


What we'll cover

- ▶ Amputation levels
- ▶ Suspension types
- ▶ Alignment/equipment setup
- ▶ Specialized prosthetic devices
- ▶ Little tricks



Amp levels



Suspension types for transtibial (BK)

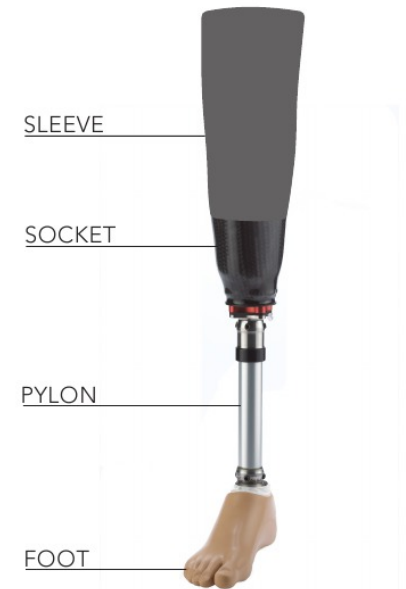
Pin lock



Suction seal in



Suction sleeve



Suspension types for transfemoral (AK)

Pin/lanyard



Suction



Auxiliary suspension



Alignment/equipment considerations

- ▶ If given choice to adapt prosthesis vs. adapt equipment, choose to adapt equipment. That way, the walking alignment is not affected
- ▶ Exceptions:
 - ▶ person has a dedicated prosthesis for sport, separate from walking
 - ▶ or were given proper instruction by prosthetist how to change alignment or components

Upright skiing with BK prosthesis

- ▶ Alignment considerations:
 - ▶ Toe in/toe out
 - ▶ Forward lean
 - ▶ Inside/outside ski
- ▶ Change alignment with:
 - ▶ Placement of foam
 - ▶ Heel wedges
 - ▶ Allen wrench



Specialized feet

- ▶ Versa foot- boot, ski or snowboard
- ▶ Freedom ski foot- no boot, ski only



Equipment considerations

- ▶ Custom knee brace
 - ▶ Protects knee
 - ▶ Increases torsional control
 - ▶ Aids in suspension



Snowboarding alignment AK and BK

- ▶ Alignment in athletic stance with knee slightly bent
- ▶ Goal: Center of mass through center of board

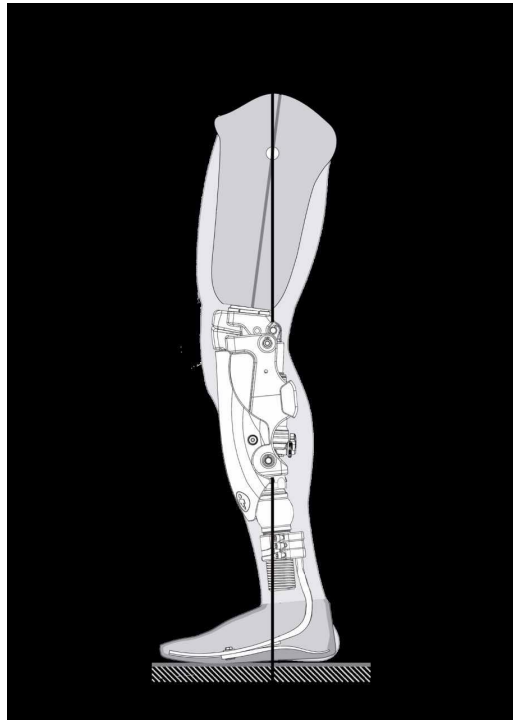


equipment setup

- ▶ Heel wedge
 - ▶ Inside boot up to ½"
 - ▶ Between boot and binding
 - ▶ Temporary- duct tape wedge
 - ▶ Permanent- PVC pipe up to ¾"
- ▶ Foam wedge (more on lateral)
- ▶ Adjust high back



Upright skiing/snowboarding with transfemoral prosthesis



Knee type

- ▶ Mechanical (lock or no lock?)
- ▶ Microprocessor (second mode?)
- ▶ Specialized (air pressure?)
 - ▶ Bartlett tendon knee/crossover
 - ▶ Moto knee
 - ▶ XT9
 - ▶ Procarve



Adjusting shocks

- ▶ Air pressure 15-165
- ▶ Rebound
- ▶ Lock/pedal/unlock



Snowboarding- Bilateral transfemoral

- ▶ Keep short for balance
- ▶ No knees easier than with knees
- ▶ Align with center of mass in center of board
- ▶ Shorter board and narrower stance



Sit skiing considerations- outriggers

- ▶ Grip mits/duct tape
- ▶ Locking elbow?
- ▶ Adjustable wrist?
- ▶ Terminal device
 - ▶ Hook
 - ▶ Hand (waterproof?)
 - ▶ Specialized TD



Specialized terminal device



Snowboarding considerations- upper limb

- ▶ Wear vs. not wear- falling could hurt shoulder (above elbow) vs. easier to push up from ground (below elbow)
- ▶ Reverse straps on bindings
- ▶ Boa closure on boots
- ▶ Specialized TD vs. hook
- ▶ Waterproofing myo's



Tricks and tips

- ▶ Grocery bag to help boot slide on
- ▶ Tape hand warmers on sockets if really cold
- ▶ Snowboarding- prosthetic side stays in at lift
- ▶ Residual limb volume decreases throughout week
- ▶ See prosthetist before small fit issues get bigger



Good prosthetic fit/design + good instruction = successful outcome



Contact info

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