Old Business

The number of amputees in Operation Desert Storm was?
Uniformity helps members of the interdisciplinary healthcare team
Uniformity

In Terminology –
below knee/transtibial
Amputation Level Terminology

• Below Knee – Transtibial
• Knee Disarticulation
• Above Knee – Transfemoral
• Hip Disarticulation
• Shoulder Disarticulation
• Above Elbow – Transhumeral
• Elbow Disarticulation
• Below Elbow – Transradial
• Wrist Disarticulation
Uniformity

In Assessing Functional Activity Levels—mobility predictor
Established by CMS to help determine the appropriate prosthetic prescription to meet functional goals and also to help avoid over prescribing prosthetic components.
• K - level 0 – Non Prosthetic Candidate
• K - level 1 - Has the ability or potential to use a prosthesis for transfers or ambulation on level surfaces at fixed cadence. *Typical of the limited and unlimited household ambulator.*
• K - level 2 - Has the ability or potential for ambulation with the ability to traverse low level environmental barriers such as curbs, stairs or uneven surfaces. *Typical of the limited community ambulator.*
• K - level 3 – Has the ability or potential for ambulation with variable cadence. *Typical of the community ambulator who has the ability to traverse most environmental barriers and may have vocational, therapeutic or exercise activity that demands prosthetic utilization beyond simple locomotion.*

• K – level 4 - Has the ability or potential for prosthetic ambulation that exceed basic ambulation skills, exhibiting high impact, stress or energy levels. *Typical of the prosthetic demands of the child, active adult or athlete.*
Prosthetic Component Terminology

• Foot
• Shin/pylon
• Knee
• Socket
• Inner face
• Suspension method
• Various additions
“Modern Era”
Prosthetic Materials

• Advanced Plastics
• Carbon Composite Materials
• Silicone and other hypoallergenic rubber materials
• Small motors and power sources
Carbon Composite Feet

High Tech Plastic

Rubber, Wood and Fabric

Wood and Leather
Wooden and Metal Single Axis Joint

Hydraulic Multiple Axis Titanium and Steel Knee Joints

Metal, Steel and/or Titanium modular weight activates locking knees

Micro processor controlled single axis knees
Current Outcomes Study
Putting The Best Foot Forward
So Many Feet!!
How do we begin to decide what’s best?
THE PRIMARY GOAL IN GAIT

Energy efficiency in forward progression
“Clinical gait assessment” contributes to the development of a comprehensive treatment plan with the ultimate goal of optimal energy efficiency and appropriate pathomechanical controls during walking, balancing, cosmesis and overall function.
Common Theme

Energy Efficiency
Today’s Technology Offers Full Toe Length...
The best single index of walking ability is **VELOCITY**.
<table>
<thead>
<tr>
<th>Gait Event</th>
<th>Expected Observation</th>
<th>Observed Deviation</th>
<th>Possible Causes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Step Length</td>
<td>80mm Males 65mm Females 30mm minimum</td>
<td>1. Sound limb step shorter 2. Prosthetic limb foot shorter</td>
<td>1a. Inability to balance over prosthesis 1b. Pain or discomfort 1c. Decreased confidence 2a. Too much time on sound limb 2b. Decreased confidence</td>
</tr>
<tr>
<td>3. Toe load</td>
<td>Forefoot break or rocker</td>
<td>1. Absence of toe break</td>
<td>1a. Inability to balance over prosthetic foot 1b. Decreased transverse pelvic rotation 1c. Category of foot too stiff</td>
</tr>
<tr>
<td>4. Knee flexion</td>
<td>30-40 ° @ Pre-Swing 60° at initial swing</td>
<td>1. Less than expected knee flexion</td>
<td>1a. Decreased pelvic rotation 1b. Inability to roll-over toe 1c. Prosthesis too short 1d. Too much flexion resistance 1e. Knee axis too posterior to weight-line</td>
</tr>
<tr>
<td>5. Pelvic Rotation</td>
<td>5” forward both sides</td>
<td>1. Prosthetic side pelvis posteriorly rotates</td>
<td>1a. Lack of pelvic transverse rotation 1b. Prosthesis too short</td>
</tr>
<tr>
<td>6. Trunk Rotation</td>
<td>5” in opposition to the pelvis</td>
<td>1. Decreased trunk rotation 2. Asymmetrical arm swing</td>
<td>1a. Poor balance 1b. Habit 1c. Use of assistive device</td>
</tr>
</tbody>
</table>
Suspension Methods

- Gel Suspension Sleeves
- Suction with Gel Liners
- Pin Locks