Upper Extremity Prosthetic Solutions

Kinsey Herrin, MSPO, CPO/LPO
Ortho Pro Associates, Inc.
Unique Patients = Unique device every time

• Niche population
• Every patient is completely unique
• Prosthesis is a “tool”
• 6 options:
  • None
  • Body powered
  • Externally powered
  • Passive functional
  • Activity specific
  • Hybrid
The prosthetic process
• The million dollar question?!
Team for outcomes

• Collaboration is key
• Team: Surgeon, PM&R, Therapist, Psychologist, Prosthetist, Patient!
• Therapy and training critical after device is received
• Managing expectations
Therapy is key!

- Control strategy must be perfected
- Avoid compensation strategies
  - What is their shoulder doing?
  - What is their neck doing?
Very short TR
Complexity-3 devices to control
Transhumeral... sorta

- Activities at midline
  - Zippers
- Hook and hand
Congenital transradial/transhumeral

• No “prosthesis” on left side
• Harnessing challenges
When to fit?

• “Fit with sit”

• Prosthetic tolerance as early as 5 months (MacDonnell, 1958)
  • Purposeful grasp and release hard to develop under 2 years (MacDonnell, 1958)
    • Anecdotal success fitting children with prehensile devices as early as 1 year

• My personal clinical experience: Case by case; Prehension when start showing signs of bringing to mouth

• Equal arm length!
Pediatric considerations: Growth liners
Body powered bilateral transhumeral

- Harness is translating motions of the scapula and shoulders to the elbow and terminal device
- Must lock elbow before TD will open
Sports specific-weight lifting

• Easy to switch different terminal devices with quick disconnect option
Externally powered
Hybrid

• Combination of different types of prostheses:
  • External powered TD/wrist, body powered elbow, aesthetic glove
How do we myotest?

• Always seeking two sites
• With biofeedback, sites often strengthen over time
External power options

• Electrodes - dual vs single site
• Touch pads (FSRs)
• Linear transducers
• Switches
Myoelectric digits

• Fine motor control
what options are there for Partial hands?

• How do aesthetics impact function?
Sports Specific - football
Sports specific-Basketball
What’s on the horizon

• Pattern recognition
  • Muscle signals are more than just “loudness” (amplitude)
  • Array of sites sense EMG patterns
  • Algorithms create “memory” of patterns
Fur friends!
Thank you!

• Questions?
  
  Kinsey@orthoproassociates.com
  305-598-9688 (office)
  706-424-9255 (cell)

www.orthoproassociates.com