The Evolution of Upper Extremity Prostheses for Sports and Recreation

By

Robert (Bob) Radocy
GOAL
Achieving Competitive Bimanual Performance in Sports and Recreation
The Concept of Activity Specific Prostheses

A prosthesis designed for optimum performance for a single purpose or limited multiple purposes.

A prosthesis that may vary radically in design from a traditional prosthesis in order to satisfy the “optimum performance” criteria.
BALANCE

PERFORMANCE

Physical Rehabilitation  Prosthetic Rehabilitation
21 Century Sockets and Interfaces

TRAC

“Open” Lattice Interface

ACCI

“Hi Fi” High Fidelity
Socket and Interface Designs

- Coyote Custom Silicone
- Modern Ossur
- 3S Variable Suspension
- Wide Brim
- Swimming Prosthesis
Consider a neutral or pre-extended socket to arm alignment and consider placement and angle of the prosthetic wrist to properly handle the forces involved.
Bio-mechanical Considerations

Why?

“To achieve performance with a prosthesis in a particular sport or recreation, the bio-mechanical elements and demands of the activity must be understood and duplicated.”

“Duplicating the bio-mechanics provides for the control and transfer of energy from the body through the limbs (anatomical & prosthetic), resulting in or facilitating some predetermined action.”
Bio-mechanical Considerations

- Basic Prehension
- Wrist Flexion/Extension
- Pronation/Supination
- Elbow Flexion
- Humeral Flexion/Extension
- Humeral Ab & Adduction
Ball Sports
Duplicating “Volar” or “Palmer” Function and Control

Ball Sports

Protective Neoprene Sleeve
Baseball & Softball Bat Swinging
Golf
Innovative Activity Specific Designs

Short, Trans-Humeral Golf/Sports Prosthesis
Bowling
Steering
Driving
Riding
Driving /Steering

Bike/Trike
Hand Brakes

Foot Brakes
Hydraulic Bike Brakes
&
Gear Shifting Controls
Canoeing/Kayaking
Windsurfing
Water Skiing
Mountaineering
Fishing
Hockey
Canoeing & Kayaking
Windsurfing
Water Skiing
Mountaineering

Unique Prehension Patterns and Gripping Force
Fishing
HOCKEY

Kids
Hockey Adults
POWER PLAY HOCKEY TD.
Archery
Weight Training
High Performance Weight Lifting Prosthetic Components

Black Iron Master and Trainer TD’s
Swimming
Fielding & Catching
Swimming
Catching & Fielding
Specialized Activities
Equestrian-Riding & Roping
FIREARMS

Lamprey Gun Turret
Skiing
Martial Arts
Wrestling & Boxing

DRAGON
The End

Thank You!