COMPLEX CASE PRESENTATION PROSTHETIC MANAGEMENT OF A HIGH LEVEL BI-LATERAL UPPER EXTREMITY AMPUTEE WITH ASSOCIATED BURN INJURIES

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PATIENT PROFILE

The patient to be presented exhibits high bi-lateral limb loss. In addition, there are complications due to the extensive electrical burn injuries. This patient presents a very short, left trans-humeral residual limb with associated soft tissue trauma in the area of the axilla which limits range of motion and presents several fitting difficulties. The right extremity exhibits a true shoulder disarticulation amputation with reasonably good range of motion and good vertical loading capabilities.
PROSTHETIC MANAGEMENT

At the time of writing, the patient has been fitted with an externally powered upper extremity prosthesis, which includes the following features:

**Prosthetic Interface** - a laminated hemi-thoracic frame type socket

**Shoulder Unit** - a manual-locking flexion/extension, abduction/adduction joint (MICA) - this locking joint is a chin-nudge switch to cycle the lock/unlock function.

**Elbow** - a Boston Elbow II - this elbow is equipped with extensive control flexibility and enhanced mechanical performance

**Wrist Unit** - a powered wrist rotator (Otto Bock)

**Terminal Devices** - electromechanical rotator (Otto Bock)

- electromechanical hook (Griefer Otto Bock)

Anterior view: Fitted shoulder disarticulation prosthesis with electromechanical hook

Lateral view: MICA shoulder joint locked in a pre-fixed position ideal for reaching for objects

CONTROL

In this case, four force resistors (touchpads) were mounted to the hemi-thoracic frame to capture the relative motion of the remnant shoulder joint. The force sensitive resistors were arranged in two pairs, the first pair which controls the powered elbow function capture the motions of elevation retraction of the shoulder. The terminal device is controlled by two force sensitive resi-
tors mounted anteriorly using a combination of protraction and depression. When function of the powered wrist is needed, a momentary contact mode selection switch is depressed with the chin. This switch transfers control of the two terminal device force sensitive resistors to the powered wrist rotator. In the future, when new circuitry permits the mode selection to be done with a quick/slow selection scheme, the momentary contact chin switch will be eliminated. At present the patient derives substantial functional benefits of the Boston Elbow II and the highly versatile control system options which are integrated within the elbow. The provision of the MICA locking shoulder joint is also viewed as a considerable asset in several ADL activities. The system as it stands today is very functional for this patient.

FUTURE PROSTHETIC MANAGEMENT

Presently, we are seeking solutions with regards to the short left trans-humeral amputation and directions for future management of this patient. The condition of this patient's skin and short humerus preclude the fitting of a body-powered prosthesis at this time. The team anticipates fitting a powered prosthesis and selection of components will be critical to the successful rehabilitation of this patient. The purpose of this case study is to solicit the expertise of the symposium attendees with regard to future prosthetic management of this patient.