

OUTCOMES OF THE CLINICAL APPLICATION OF PATTERN RECOGNITION IN UPPER LIMB PROSTHETICS: A TWO-YEAR RETROSPECTIVE

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ABSTRACT

Presented here is a series of case studies describing the successes and challenges that were experienced, as well as the innovative solutions that were developed, during the real-world clinical application of pattern recognition (PR) technology over the course of a two-year period.

Over the course of two years a total of 13 patients were fit by Handspring Prosthetic Rehabilitation Services with PR technology. Three females and ten males in total. Five patients had a transradial amputation level, seven patients had a transhumeral level amputation, and one patient had a shoulder disarticulation level amputation. One of the patients with a transhumeral level amputation also uses a body powered transradial prosthesis on his contralateral side. One of the patients with a transradial presentation had a congenital limb difference.

Two of the four patients in the transradial group discontinued use of PR. One discontinued use due to general non-compliance, the other discontinued use due to the extra bulk in the prosthesis created by the additional COAPT components.

All of the patients with transhumeral level amputations continue to utilize their PR systems with the exception of the patient with bilateral amputations. This patient was a long-time user of body-powered technology and decided to abandon any attempts at using external powered prostheses.

The one patient with the shoulder disarticulation was initially successful with utilization of the PR technology, but due to health complications secondary to a brachial plexus injury necessitated that the external powered prosthesis be abandoned in favour of a lighter weight custom silicone restoration.

Initially all patients were able to consistently control their prostheses with increased accuracy over the course of their post-delivery occupational therapy.

All patients initially subjectively reported being satisfied with the fit, function, and comfort of their prostheses.

All patients actively utilize the calibration feature of the COAPT system daily when they don the prosthesis for

optimal control. Everyone reported that this feature was very important to them.

These case studies demonstrate that the PR technology available from COAPT can be utilized successfully in externally powered prostheses for patients with all levels of upper limb differences. It was the experience of the patients and clinicians at Handspring that the clinical application of PR technology resulted in a 70% myoelectric prosthetic acceptance rate. It was our anecdotal experience that patients fit with the COAPT system were able to progress faster in their OT training than other patients.