INTRODUCTION

Epidemiological data estimates that 90% of the 20,000 new cases of upper limb loss or deficiency each year occur at, or distal to, the wrist joint (Dillingham, Pezzin, & MacKenzie, 2002). This is mirrored in the military population where 87% of upper limb amputations occurring in all active and reserve service members from 2000-2011 were distal to the wrist joint (Armed Forces, 2012). Similarly, in the workplace 94% of all non-fatal amputations involve the fingers (Brown, 2003). While the shoulder, elbow and wrist are critical to putting the upper limb in the proper position to engage with an object, it is the hand that typically completes complex and multidimensional tasks. This research explores how using an externally-powered partial hand prosthesis contributes to the completion of functional tasks.

METHOD

Subjects: Fifteen individuals (12 male, 3 female) being fit with either a 4-digit or 5-digit i-limb digit partial hand prosthesis were asked to participate in the study. Participants ranged in age from 26-58 with an average age of 42.

Apparatus: The Patient-Specific Functional Scale was used to identify individualized goals and have the users rank their current level of performance. The Southampton Hand Assessment Procedure was used to objectively evaluate function with and without the prosthesis.

Procedures: During one-week condensed fittings, participants and their local prosthetists consented to engage in the study. Therapists at the fitting facility conducted all outcome measures prior to fitting and post-fitting. Individuals received 10-15 hours of therapy with their prosthesis prior to post-fitting testing.

Data Analysis: Data was analyzed and compared to baseline according to clinically significant findings as defined by the outcome measure.

RESULTS

While all goals identified on the PSFS were individualized to the user, similarities were found among subjects. PSFS scores range 0-10 with 0 being unable to perform and 10 being able to perform at same level as pre-amputation. Results are significant for the minimum detectable change score required for the PSFS.

SHAP scores demonstrated significant improvement for all users. Not surprisingly, a more significant change was shown for those fit with a 5-digit system in comparison to those being fit with a 4-digit system.

DISCUSSION

Results demonstrate the significant functional improvements that can be obtained for individuals with partial hand limb loss and deficiency.

CONCLUSION

These findings should encourage clinicians and payers on the benefit of partial hand prostheses.

CLINICAL APPLICATIONS

Individuals with partial hand limb loss or deficiency should be evaluated and appropriate prosthetic intervention recommended based on individual goals and current level of function.

REFERENCES


American Academy of Orthotists & Prosthetists
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