Reference

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Differences in Two Multiarticulating Myoelectric Hands for Facilitating Activities of Daily Living in Individuals with Transradial Amputation: A Cross-Sectional Study

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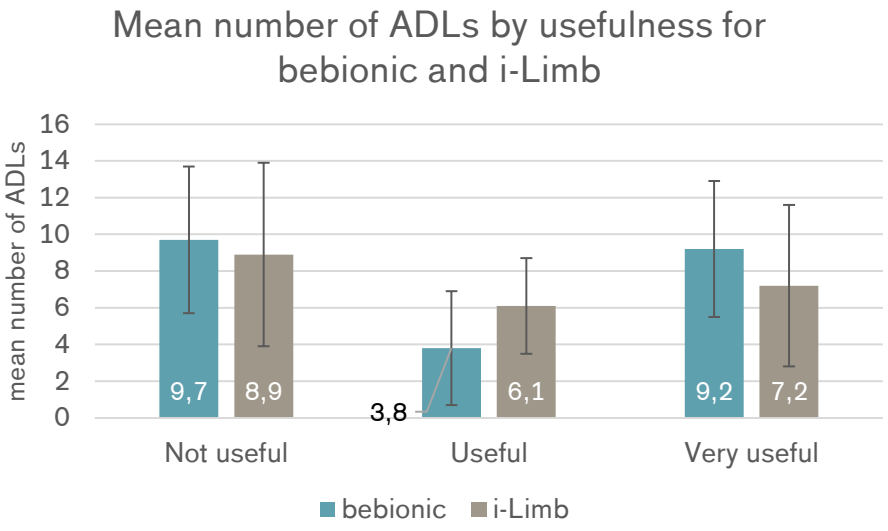
Products

Bebionic vs. i-Limb

Major Findings

With bebionic compared to i-Limb:

→ **No significant differences in ADL ease and usefulness between bebionic, i-Limb and historical data for Michelangelo**
→ **Higher ease and usefulness scores than previously reported for conventional myoelectric hands**



Population

Subjects:

<u>bebionic-group:</u>
10 transradial amputees (n = 5 male, n = 5 female)
<u>i-Limb group:</u>
10 transradial amputees (n = 9 male, n = 1 female)

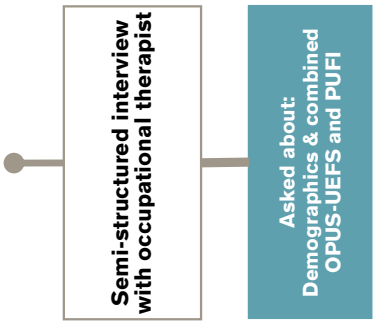
Previous prosthesis:

<u>bebionic group:</u>
i-Limb (n = 2), Greifer (n = 1), ETD-powered hook (n = 2), body-powered (n = 3), passive hand (n = 1), none (n = 1)
<u>i-Limb group:</u>

	i-Limb (n = 3), Sensor Hand (n = 1), Greifer (n =1), ETD-powered hook (n = 1), Body-powered (n = 2), none (n = 1), unknown (n =1)
Amputation causes:	bebionic group: Congenital deformity (n = 3), Trauma (n = 6), other (n = 1) i-Limb group: Congenital deformity (n = 3), Trauma (n = 4), Cancer (n = 2), Infection/Sepsis (n = 1)
Mean age (± SD) [years]:	bebionic group: 37.4 ± 14.2 i-Limb group: 50.4 ± 17.6
Mean time since Amputation (± SD) [years]:	bebionic group: 16.1 ± 19.6 i-Limb group: 16.1 ± 19.6
MFCL:	n.a.

Study Design

Observational study design:



Bebionic and i-Limb users were asked about demographics e.g.: age, sex, years of prosthetic use, amputation side and etiology of amputation. Following this, patients were asked to answer a hybrid outcome measure that combined the modified Orthotics and Prosthetics User Survey–Upper Extremity Functional Status (OPUS-UEFS) and the Prosthetic Upper Extremity Functional Index (PUFI).

Results

Body Function		Activity			Participation	Others	
Mechanics	Pain	Grip patterns / force	Manual dexterity	Activities of daily living (ADL)	Satisfaction and Quality of life (QoL)	Training	Technical aspect

Category	Outcomes	Results						Sig.*
		Bebionic			i-Limb			
Activity, Mobility, Activities of Daily Living (ADLs)	**OPUS-UEFS ease score**	**M[1]**	**IQR[1]**	**Mean ± SD[1]**	**M[1]**	**IQR[1]**	**Mean ± SD[1]**	
	All activities (23):	36	19.5-43.2	32.5 ± 13.5	30.5	23.75-44.5	34.9 ± 14.9	0
	Bimanual activities (14):	23	12.25-29.0	21.1 ± 9.5	21.5	18-28	23.6 ± 8.2	0
	Monomanual activities (9):	12	7-17.25	11.4 ± 6.0	10	5-16.5	11.3 ± 7.4	0

Category	Outcomes	Results		Sig.*
		Bebionic	i-Limb	
Activity, Mobility, Activities of Daily Living (ADLs)	**Mean number of ADLs per usefulness of the prosthesis rating category per prosthetic hand**	**Mean ± SD**	**Mean ± SD**	
	Not useful:	9.7 ± 4.0	8.9 ± 5.0	0
	Useful:	3.8 ± 3.1	6.1 ± 2.6	0
	Very useful:	9.2 ± 3.7	7.2 ± 4.4	0
	Mean number of ADLs per way-of-prosthesis-use rating category per prosthetic hand	**Mean ± SD**	**Mean ± SD**	
	Both hands, prosthesis used actively to grasp	10.7 ± 2.9	9.8 ± 3.0	0
	Bot hands, prosthesis used passively to stabilize	2.1 ± 2.5	2.2 ± 1.8	0
	With assistance of residual limb	1.8 ± 2.3	1.3 ± 1.4	0
	Second hand alone	6.8 ± 2.7	8.2 ± 2.4	0

* no difference (0), positive trend (+), negative trend (–), significant (++/––), not applicable (n.a.)
[1] M: Median, IQR: Interquartile-range, Mean: mean value, SD: Standard deviation

Author's Conclusion

"The differences in overall ADL [activity of daily living] ease and usefulness of the prosthesis between the i-Limb and bebionic hands were clinically negligible. Ease and usefulness scores were higher than previously reported for conventional myoelectric hands. Interestingly, the availability of more grip types in bebionic and i-Limb did not result in greater ease or usefulness than previously reported for the Michelangelo hand with fewer grip types. However, the multiarticulating hands showed different activity ease profiles that they facilitate. Thus, clinicians should have access to all advanced prosthetic hands to be able to match their patients´ functional needs with the differential functional ease profiles of these hands. Future research that compares all available multiarticulating hands using performance-based and patient-reported outcomes is warranted to further guide clinicians´ and payers´ decision making." (Kannenberg et al. 2022)

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