Reference

Salminger S, Vujaklija I, Sturma A, Hasenoehrl T, Roche A D, Mayer J A, Hruby L A, Aszmann O C.

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Functional Outcome Scores With Standard Myoelectric Prostheses In Below-Elbow Amputees

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Products

Myoelectric prosthetic hands (SensorHand Speed, Michelangelo Hand, Transcarpal Hand DMC Plus, Bebionic hand)

Major Findings

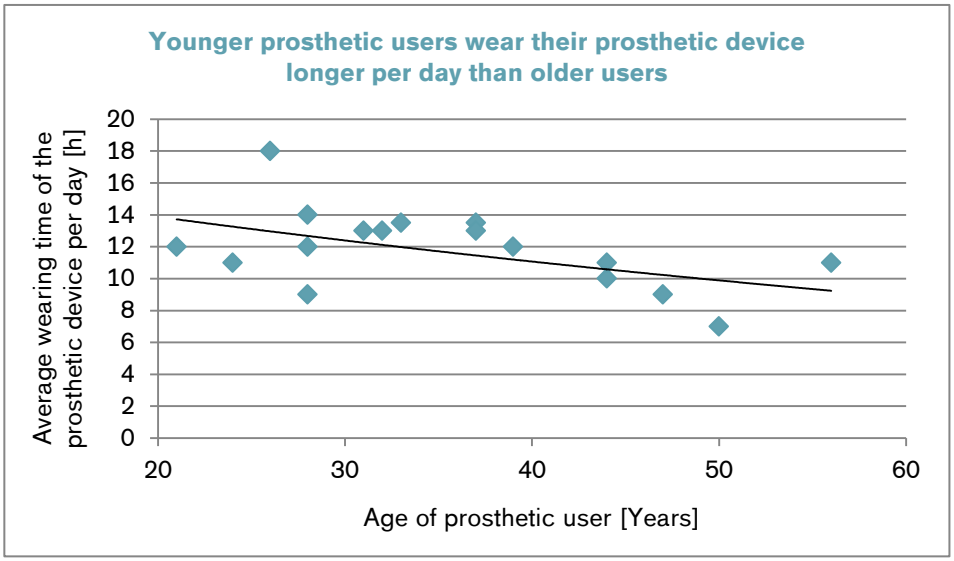
→ Younger prosthetic users wear their prosthetic device longer per day than older users

→Significant correlation between the average wearing time of the prosthetic device per day and the age of the patient

→ High validity of Southampton Hand Assessment Procedure (SHAP) and Box and Blocks Test (BBT)

→Significant correlation to all other assessed outcome measures

→The normative outcome data collected in this study with below-elbow amputees using standard myoelectric devices can help clinical teams better assess success of patient's prosthetic care/fitting

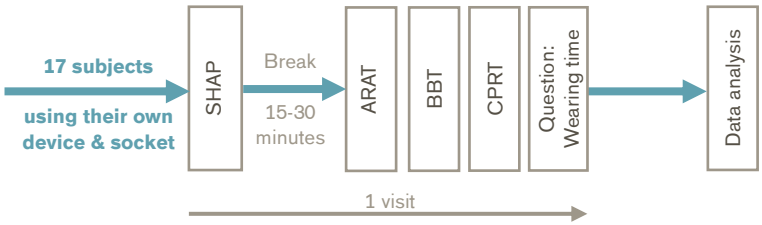


Population

Subjects:	17 unilateral, below-elbow amputees (16 males)
Myoelectric hand:	SensorHand Speed (8), Michelangelo Hand (5), Transcarpal Hand DMC Plus (3), Bebionic hand (1)
Amputation causes:	Trauma (15), Tumor (1), Congenital deficiencies (1)
Mean age:	35.59 ± 9.89 yrs
Mean time since amputation:	9.47 ± 9.03 yrs
Prosthetic experience:	6.76 ± 6.62 yrs

Study Design

Observational study:



During 1 visit, 4 different objective and timed outcome measures were performed once with each subject:

- Southampton Hand Assessment Procedure (SHAP)
- Action Research Arm Test (ARAT)
- Box and Blocks Test (BBT)
- Clothespin-Relocation Test (CPRT)

Additional to the mandatory break after the SHAP, the subjects had the opportunity to take a break at any time during the entire assessments in case of fatigue. Furthermore, the subjects were asked about their average wearing time of the prosthetic device per day.

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 for all prosthetic devices	Sig.*
Manual dexterity	Southampton Hand Assessment Procedure (SHAP)	65.12 ± 13.95 pts (out of 100 pts) Dominant vs non-dominant hand loss: No difference in SHAP results SensorHand Speed (n=8) vs Michelangelo Hand (n=5): No difference in SHAP results	n.a. 0 0
	Action Research Arm Test (ARAT)	35.06 ± 4.42 pts (out of 57 pts) Dominant vs non-dominant hand loss: No difference in ARAT results SensorHand Speed (n=8) vs Michelangelo Hand (n=5): No difference in ARAT results	n.a. 0 0
	Box and Blocks Test (BBT)	20.9 ± 5.74 sec Dominant vs non-dominant hand loss: No difference in BBT results SensorHand Speed (n=8) vs Michelangelo Hand (n=5): No difference in BBT results	n.a. 0 0
	Clothespin-Relocation Test (CPRT)	22.57 ± 7.5 sec Dominant vs non-dominant hand loss: No difference in CPRT results SensorHand Speed (n=8) vs Michelangelo Hand (n=5): No difference in CPRT results	n.a. 0 0
	Correlation between the different outcome measures (SHAP, ARAT, BBT, CPRT)	• **SHAP: Confirmed validity due to significant correlation with ARAT, BBT and CPRT.** • **BBT: High predictability due to significant correlation with SHAP, ARAT and CPRT.** • Correlation between ARAT and CPRT trending.	++ ++ +

Category	Outcomes	Results for all prosthetic devices	Sig.*
Satisfaction and Quality of life (QoL)	Question: Average wearing time of the prosthetic device per day	11.88 ± 2.47 hours/day	n.a.
		Correlations between average wearing time of the prosthetic device per day and the	
		• **Age of the patient: Significant correlation showing that younger subjects are wearing their prosthesis longer than.**	++
		• Prosthetic experience: No significant correlation	0
		• All outcome measures: No significant correlation	0

* no difference (0), positive trend (+), negative trend (–), significant (++/––), not applicable (n.a.)

Author's Conclusion

"In the current economical situation of health care systems, demonstrating the effectiveness and necessity of rehabilitation interventions is of major importance. Here we report normative outcome data of below-elbow amputees with standard myoelectric devices using validated standardized objective measurement tools. This data set should help therapeutic teams as well as the prosthetic service providers to gauge rehabilitative success or failure of their prosthetic car." (Salminger et al, 2018)