Reference

Bertels T, Schmalz T, Ludwigs E

Otto Bock HealthCare GmbH, Goettingen

Objectifying the Functional Advantages of Prosthetic Wrist Flexion

Journal of Prosthetics & Orthotics 2009; Vol 21, Num 2

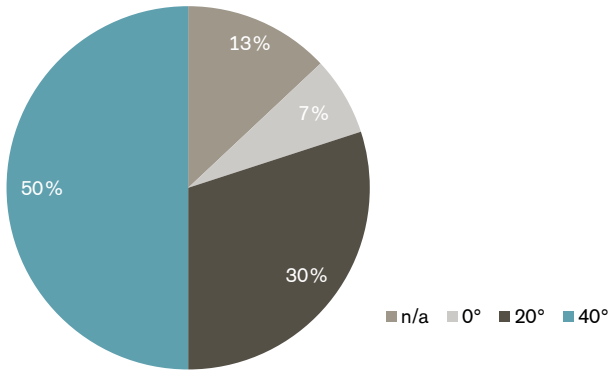
Products

Transcarpal-Hand with and without Transcarpal Myowrist

Major Findings

→ Wrist flexion of 40° is preferred by 50% of the patients.
→ Active wrist reduces compensatory movements of shoulder

Users´ flexion angle preference



Population

Subjects:	6 transradial amputees
Previous:	not specified
Amputation causes:	3 traumas and 3 congenital deficiencies
Mean age:	39 ± 21 years
Mean time since amputation:	23 ± 15 years

Study Design

Pilot study

Study was designed to compare benefits of wrist motion at 20° and 40° in flexion and extension with the locked wrist (0° in flexion and extension).

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 Transcarpal-Hand with and without Transcarpal Myowrist	Sig.*
Mechanics	Motion analyses of wrist, elbow and shoulder	The compensatory movements with wrist flexion were drastically reduced while performing ADL.	+
		With wrist flexion, anteversion (being tilted further forward than normal) of a shoulder was decreased for 35°.	+

Category	Outcomes	Results for Transcarpal-Hand with and without Transcarpal Myowrist	Sig.*
		With wrist flexion, shoulder tilting is reduced by 7°.	+
		Wrist flexion of 40° is preferred by 50% of the patients.	+

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

Author's Conclusion

"In the present pilot study, motion patterns typically performed in the patients' daily life were selected. The results of motion analysis show that compensatory movements may be reduced by wrist flexion in most of the cases. This is noted considerably by kinematic characteristics of the shoulder joint on the prosthetic side. Even if only slight differences of few degrees were measured, the patients perceived an optimization of the motion pattern. Reduced compensatory movements support more physiological loading of the unaffected joints of the locomotor system. The more natural subjective impression is an important psychological aspect for the prosthetic user."