

**Reference**

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# Objectifying the Functional Advantages of Prosthetic Wrist Flexion

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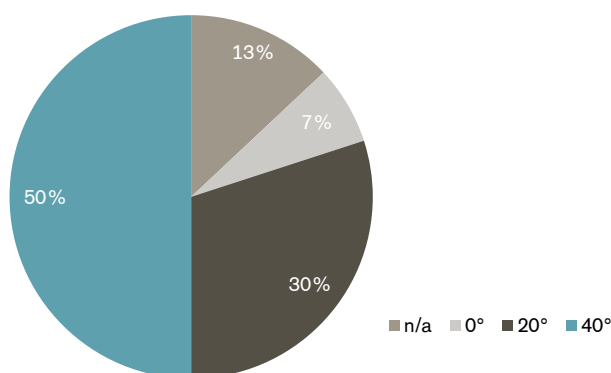
**Products**

**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."

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