Reference

Samitier BC, Guirao L, Costea M, Camós JM, Pleguezuelos E.

Hospital de Mataró, Barcelona, Spain.

The benefits of using a vacuum-assisted socket system to improve balance and gait in elderly transtibial amputees

Journal of Prosthetics and Orthotics. Epub.

Products

Vacuum-assisted socket system* (VASS) vs other socket system

* Harmony P2 & HD

Major Findings

With VASS compared to previous socket:

MFCL K2 subjects

→ Improvement of prosthesis use by 7.4%

→ Balance increased by 15%

→ Trend towards decreased risk of falling

Trend towards improvements in timed up and go test (TUG) by 15%

MFCL K3 subjects

→ Decreased risk of falling

Timed up and go test (TUG) improved by 22%

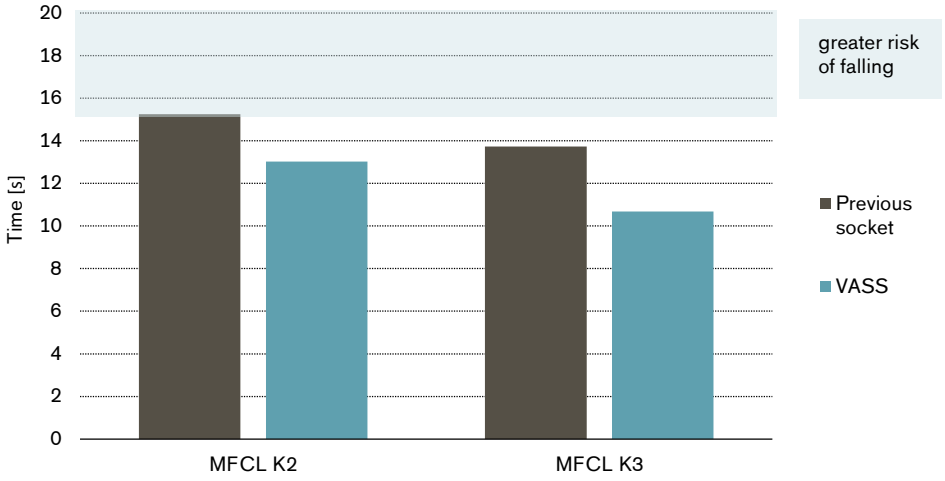
→ Walking velocity increased by 15% and mobility by 19%

→ Increased balance by 19%

→ Subjects tend to more satisfied

→ Time of prosthesis use tends to be increased

Decreased time to complete TUG with VASS



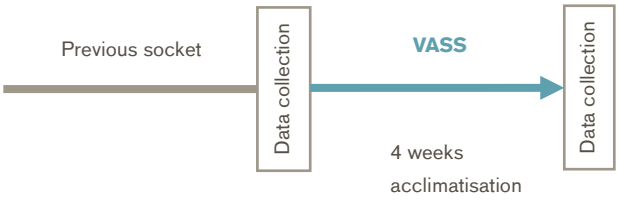
The timed up and go test (TUG) includes standing up from a chair, walking 3 meters, turning around, walking 3 meters, sitting down. The marked part indicated a greater risk of falling assessed from a healthy geriatric population.

Population

Subjects:	16 unilateral, transtibial amputees
Previous socket system:	not reported
Amputation causes:	100% peripheral vascular disease
Mean age:	65 ± 10 yrs
Mean time since amputation:	5.2 ± 2.2 yrs
MFCL:	37.5% K2, 62.5% K3

Study Design

Interventional, pre- to post-test design:



Results

Body Function				Activity			Participation	Others	
Wound Healing	**Limb Volume Fluctuation**	**Pain**	**Comfort, Limb Health**	**Level Walking**	**Balance**	**Activity, Mobility, ADLs**	**Preference, Satisfac-tion, QoL**	**Pistoning**	**Pressure Measure-ment**

Category	Outcomes	Results for VASS compared to previous socket	Sig.*
Level Walking	Timed up and go (TUG) test	**All: Time to complete the task decreased by 19% (11.6 vs 14.3 s).**	++
		K2: Trend towards decreased time to complete task (13.0 vs 15.3 s).	+
		K3: Time to complete the task decreased by 22% (10.7 vs 13.7 s)	++
	6 min walking test (6MWT)	**All: Walking velocity improved by 11% (0.89 vs 0.80 m/s).**	++
		K2: Trend towards improved walking velocity (0.76 vs 0.73 m/s).	+
		K3: Walking velocity improved by 15% (0.97 vs 0.84 m/s).	++
Balance	Berg Balance Scale (BBS)	**All: Balance improved by 7.2% (average scores 49.1 vs 45.8).**	++
		K2: Trend towards improved balance (47.3 vs 45.5).	+
		K3: Balance improved by 9% (average scores 50.1 vs 45.9).	++
	Four square step test (FSST)	**All: Time to complete the test was de-creased by 18% (15.0 vs 18.2 s).**	++
		K2: Time to complete the test was de-creased by 15% (17.4 vs 20.6 s).	++
		K3: Time to complete the test was de-creased by 19% (13.5 vs 16.7 s).	++
Activity, Mobility, ADLs	Locomotor Capabilities Index (LCI)	All: Trend towards improved mobility (average score 47.4 vs 43.3).	+
		K2: Trend towards decreased mobility (average score 44.2 vs 46.2)	–
		K3: Mobility improved by 19% (average score 49.4 vs 41.6)	++
	Houghton Scale	All: Trend towards improved prosthesis use (average score 9.9 vs 9.3).	+
		K2: Prosthesis use improved by 7.4% (av-erage score 9.7 vs 9.0).	++
		K3: Trend towards improved prosthesis use (average score 10.0 vs 9.5).	+

Category	Outcomes	Results for VASS compared to previous socket	Sig.*
Preference, Satisfaction, QoL	SAT-PRO Scale	All: No difference in satisfaction. K2: Trend towards increased satisfaction. K3: Trend towards decreased satisfaction.	0 + –

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

Author's Conclusion

"In conclusion, the Harmony® P2 & HD is a useful device in dysvascular transtibial amputees over 50 years of age. In our study, use of the VASS improved balance, gait and transfers in patients with MFCL-3 mobility grade and balance and prosthesis use in patients with MFCL-2 activity level. In patients with a lower activity level, the use of an additional distal valve in the socket should be considered." (Samitier et al. 2014)