

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

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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%

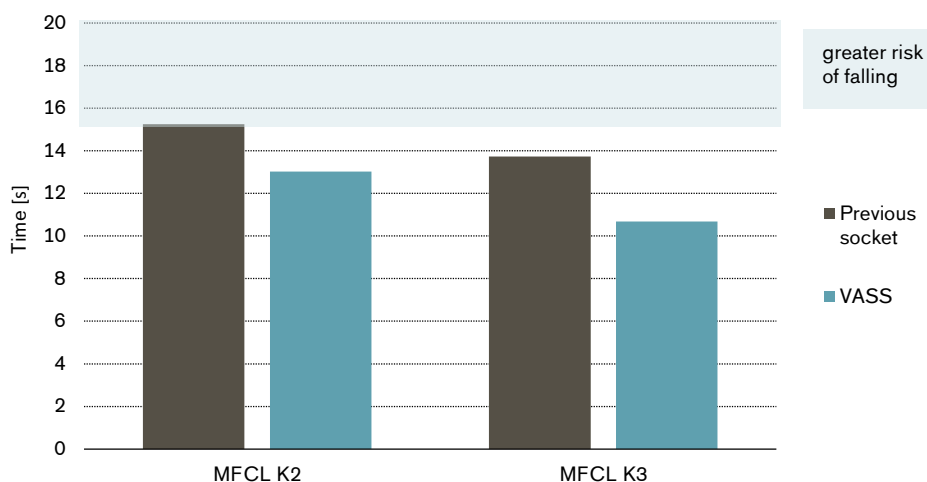
→ Walking velocity increased by 15% and mobility by 19%

→ Increased balance by 19%

→ Subjects tend to more satisfied

→ Time of prosthesis use tends to be increased

Decreased time to complete TUG with VASS



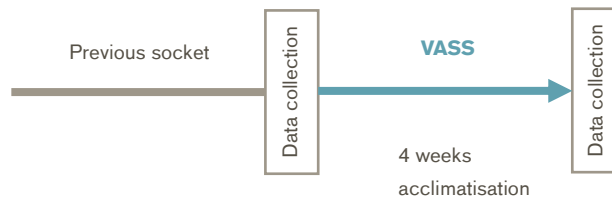
The timed up and go test (TUG) includes standing up from a chair, walking 3 meters, turning around, walking 3 meters, sitting down. The marked part indicated a greater risk of falling assessed from a healthy geriatric population.

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, Satisfaction, QoL	Pistoning	Pressure Measurement

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 decreased by 18% (15.0 vs 18.2 s). K2: Time to complete the test was decreased by 15% (17.4 vs 20.6 s). K3: Time to complete the test was decreased 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% (average 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)

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