

Reference

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The effect of microprocessor controlled exo-prosthetic knees on limited community ambulators: systematic review and meta-analysis.

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Products

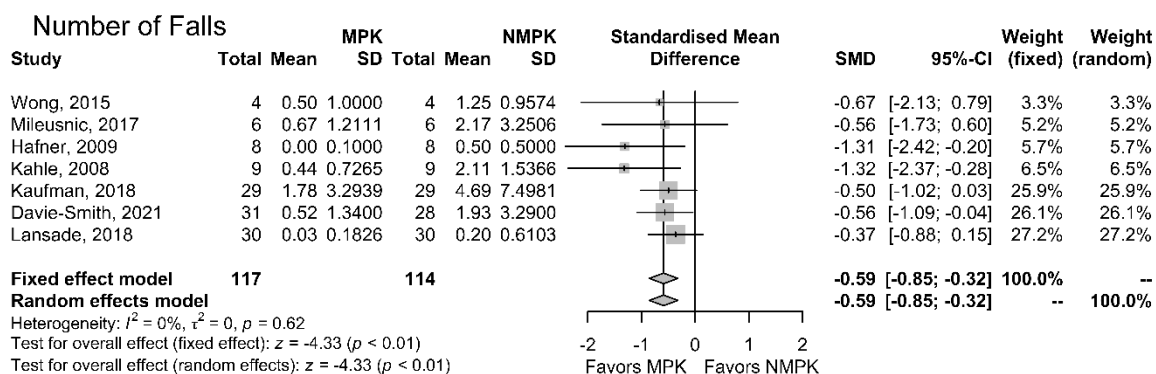
C-Leg, C-Leg Compact, Genium, Kenevo, other MPKs

Major Findings

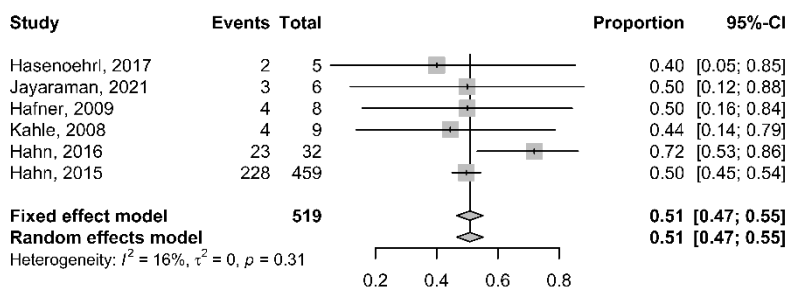
The use of MPKs in limited community ambulators lead to:

- **Increase in self-selected walking speed**
(SMD g:0.47; 95%-CI [0.14,0.81; I2=0%])
- **Reduction in number of falls (SMD g: -0.59; 95%CI [-0.85, -0.32; I2=0%])**
- **Reduction in fear of falls (SMD g: 1.2; 95%CI [0.55, 1.85; I2=80%])**
- **Reduction in risk of falling (SMD g: -0.45, 95%CI [-0.87, -0.02; I2=0%])**
- **Increase in Mobility Grade (0.51; 95%CI [0.47,0.55])**
- **Improvement in patient reported ambulation**
(MD 9.32;95%-CI [3.61, 15.02; I2=7%])
- **Improvement in patient reported utility**
(MD 7.76; 95%-CI [2.05;13.47; I2=0%])
- **No outcomes identified favoured NMPKs**

95% of users were fitted with linear-hydraulic stance control MPKs

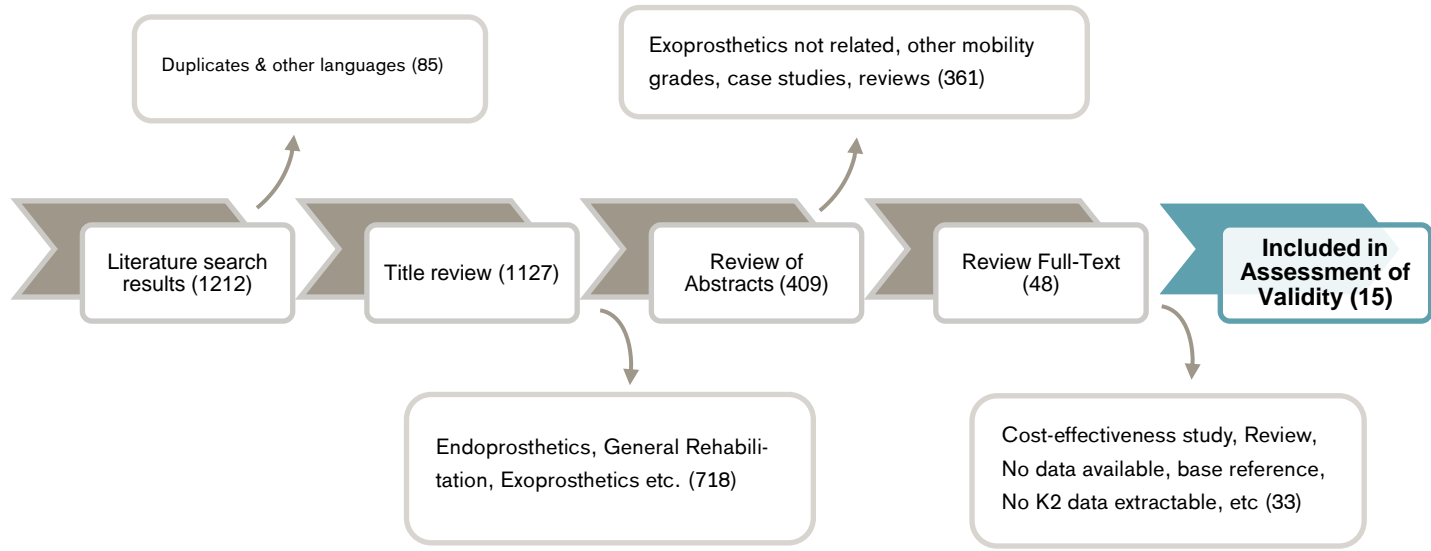


Positiv Mobility Grade Change



Population	Subjects: 704 subjects Previous prosthetic knees: Locked, brake, polycentric, hydraulic, MPK, other Amputation causes: Vascular disease, Trauma, Other Mean age: 54.1– 69.0 yrs. Mean time since amputation: n.a MFCL: 2
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Study Design Systematic literature review for meta-analysis



A systematic literature search was conducted in the databases Medline, Cochrane Library, CINAHL Complete, EMBASE and Google Scholar. Databases DARE, Cirrie (now NARIC Rehab Database), PEDRO, and OT Seeker were also searched. The publications were assessed based on the State of the Science Evidence Report Guidelines as recommended by the American Academy of Orthotists and Prosthetists (AAOP).

Results

Functions and Activities						Participation			Environment
Level walking	Stairs	Ramps, Hills	Uneven ground, Obstacles	Cognitive demand	Metabolic Energy Consumption	Safety	Activity, Mobility, ADLs	Preference, Satisfaction, QoL	Health Economics

Category	Outcomes	Results for MPKs vs NMPKs	Sig.*
Level Walking	Self-selected walking speed	SMD g:0.47; 95%-CI [0.14,0.81; I ² =0%] (6 publications)	++ Hafner 2009 Kahle 2008 Eberly 2013 Jayaraman 2021 Davie-Smith 2021
	Fastest possible walking speed	SMD 0.40; 95%-CI [-0.21;1.01; I ² =0%] (3 publications)	0 Kahle 2008 Eberly 2013

Category	Outcomes	Results for MPKs vs NMPKs	Sig.*
Safety	Number of falls	SMD g:-0.59; 95%-CI [-0.85, -0.32; I ² =0%] (7 publications)	Hasenoehrl 2017 ++
	Fear of falling	SMD g:1.20; 95%-CI [0.55,1.58; I ² =80%] (6 publications)	Wong 2015 Mileusnic 2017 Hafner 2009 Kahle 2008 Kaufman 2018 Davie-Smith 2021 Lansade 2018 ++
	Risk of falling	SMD g:-0.45; 95%-CI [-0.87; -0.02; I ² =0%] (6 publications)	Wong 2015 Jayaraman 2021 Lansade 2018 ++
Activity, Mobility, Activities of Daily Living (ADLs)	Mobility Grade	0.51; 95%-CI [0.47, 0.55] (6 publications)	++ Hasenoehrl 2017 Hafner 2009 Jayaraman 2021 Kahle 2008 Hahn 2015 Hahn 2016
Preference, Satisfaction, Quality of Life (QoL)	Ambulation PEQ	MD 9.32;95%-CI [3.61, 15.02; I ² =7%] (4 publications)	++ Hafner 2009 Jayaraman 2021 Theeven 2011 Kaufman 2018
	Appearance PEQ	MD 5.24; 95%-CI [-0.87;11.35; I ² =1%] (3 publications)	0 Hafner 2009 Theeven 2011 Kaufman 2018
	Residual Limb PEQ	MD 4.43; 95%-CI [-1.29;10.14; I ² =4%] (3 publications)	0 Hafner 2009 Theeven 2011 Kaufman 2018
	Sounds PEQ	MD 3.36; 95%-CI [-4.65; 11.37; I ² =0%] (3 publications)	0 Hafner 2009 Theeven 2011

Category	Outcomes	Results for MPKs vs NMPKs	Sig.*
			Kaufman 2018
	Utility PEQ	MD 7.76; 95%-CI [2.05;13.47; I ² =0%] (3 publications)	++
			Hafner 2009 Theeven 2011 Kaufman 2018
	Well-being PEQ	MD 4.97; 95%-CI [-1.01; 10.96; I ² =0%] (3 publications)	0
			Hafner 2009 Theeven 2011 Kaufman 2018
	ABC	MD 7.55; 95%-CI [-7.03; 22.14; I ² =48%] (3 publications)	0
			Wong 2015 Hasenoehrl 2017 Davie-Smith 2021
	Houghton Scale	g: 0.01, p=0.96)	0

MD: mean differences; SMD: standardized mean differences; g: Hedges' g; CI: confidence interval; I²: Higgins I²; PEQ: Prosthetics Evaluation Questionnaire; ABC: Activity based Balance Confidence Scale
* no difference (0), positive trend (+), negative trend (-), significant (++/--), not applicable (n.a.)

Author's Conclusion

"The results of this updated systematic review and meta-analysis suggest that limited community ambulators may experience reduced falls, fear of falling, and risk of falling, improve mobility grade and patient-reported of ambulation and utility. The availability of meaningful clinical evidence has increased significantly. A lack of clinical evidence may no longer be used as an argument for withholding MPK technology from individuals with transfemoral amputation and low mobility. Trial fittings of limited community ambulators with MPKs may be considered a means to identify specific responders. Further research to study the specific needs and characteristics of that population may be considered." (Hahn 2021)

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