

Referent/in

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Titel

The effect of microprocessor controlled exo-prosthetic knees on limited community ambulators: Systematic Review and Meta-Analysis

Coauthors

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Zusammenfassung

Effects of MPKs in low mobility ambulators are of similar or larger magnitude than in unlimited community walkers. The results of this work suggest that MPKs should be considered a valuable therapeutic option in limited community ambulators with an above-knee amputation.

Hintergrund

The clinical benefits of microprocessor-controlled prosthetic knees (MPK) in unlimited community ambulators are well-established. A systematic review in limited community ambulators published in 2014 found benefits in safety, function and perception in a limited number of studies1. This work provides an updated of systematic review and for the first time a meta-analysis of all published data.

Material Methode; Durchführung/ Prozess

Literature search was conducted in seven scientific data bases. Search terms related to MPK, transfemoral amputation, MFCL-2 and low mobility. Rating followed the recommendations of the American Academy of Orthotics and Prosthetics. Inclusion required the studies to comprise quantitative and analyzable information allowing a direct comparison to non-MPKs. Outcomes were categorized whether they favor the use of MPK, non-MPK or were inconclusive. Mean differences (MD) or standardized mean differences (SMD) were calculated with 95% CIs. Selected effect sizes for SDMs were calculated using Heges` g.

Ergebnisse

Literature research identified 1212 items. Fortyeight publications were reviewed in full text. Data of thirteen studies presented in fifteen publications 2-11 were analyzed. Studies covered one randomized trial, one controlled trial, eight before-after controlled trials and three

observatory trials. The literature describes 2,366 patients, 704 thereof being classified as low mobility ambulators. The meta-analysis demonstrated that the use of MPKs in limited community ambulators led to a reduction in falls (SMD g:-0.59;95%CI[-0.85,-0.32;I^2=0%]), fear of falling (SMD g: 1.2; 95%CI[0.55,1.85; I^2=80%]), risk of falling as indicated by the TUG (SMD g:-0.45, 95%CI[-0.87,-0.02;I^2=0%]), an improvement in mobility grade (0.51;95%CI[0.47,0.55]), self-selected walking speed (SMD g:0.47;95%CI[0.14,0.81;I^2=0%]), and patient-reported ambulation (MD9.32;95%CI[3.61,15.02;I^2=7%]), and utility (MD7.76;95%CI[2.05-13.47;I^2=0%]).

Diskussion/ Schlussfolgerung; Fazit für die Praxis

The results of this updated systematic review and meta-analysis suggest that limited community ambulators may experience reduced falls and fear 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.

Literaturreferenzen

- 1.) Kannenberg 2014, JRRD
- 2.) Kahle 2008 JRRD
- 3.) Theeven 2011 JRM, 2012 JRM
- 4.) Burnfield 2012 POI, Eberly 2014 POI
- 5.) Hahn 2015 JPO, 2016 Medicine
- 6.) Hasenöhrl 2017 Dis.Rehab. AT
- 7.) Mileusnic 2017 JPO
- 8.) Kaufman 2018 Clin. BioM
- 9.) Lansade 2018 APRM
- 10.) Jayaraman 2021 JNER
- 11.) Davie-Smith 2021 POI



Image: fig 1 Number.of.Falls.Hedges.g_72.png

Number of Fal Study	∣S Total	Mean	MPK SD	Total	Mean	NMPK SD	Standardised Mean Difference	SMD	95%-CI	Weight (fixed)	Weight (random)
Wong, 2015	4	0.50	1.0000	4	1.25	0.9574		-0.67	[-2.13: 0.79]	3.3%	3.3%
Mileusnic, 2017	6	0.67	1.2111	6	2.17	3.2506		-0.56	[-1.73; 0.60]	5.2%	5.2%
Hafner, 2009	8	0.00	0.1000	8	0.50	0.5000		-1.31	[-2.42; -0.20]	5.7%	5.7%
Kahle, 2008	9	0.44	0.7265	9	2.11	1.5366		-1.32	[-2.37; -0.28]	6.5%	6.5%
Kaufman, 2018	29	1.78	3.2939	29	4.69	7.4981		-0.50	[-1.02; 0.03]	25.9%	25.9%
Davie-Smith, 2021	31	0.52	1.3400	28	1.93	3.2900		-0.56	[-1.09; -0.04]	26.1%	26.1%
Lansade, 2018	30	0.03	0.1826	30	0.20	0.6103		-0.37	[-0.88; 0.15]	27.2%	27.2%
Fixed effect model 117 114 Random effects model Heterogeneity: $J^2 = 0\%$, $c^2 = 0.62$ Test for overall effect (fixed effect): $z = -4.33$ ($p < 0.01$) Test for overall effect (random effects): $z = -4.33$ ($p < 0.01$) Test for overall effect (random effects): $z = -4.33$ ($p < 0.01$)							-2 -1 0 1 2 Favors MPK Favors NMPK	-0.59 -0.59	[-0.85; -0.32] [-0.85; -0.32]	100.0% 	 100.0%