

Identifying modifiable factors that influence walking in patients undergoing surgery for neurogenic claudication. A prospective longitudinal study

Supplementary material

Title: Identifying modifiable factors that influence walking in patients undergoing surgery for neurogenic claudication. A prospective longitudinal study

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Contents

Supplementary Table S1 Change in disability, pain, quality of life, fear of falling and fear of movement after surgery for neurogenic claudication..... 2

Supplementary Figure S1 Box plots demonstrating disability (ODI), quality of life (EQ5D) and leg and back pain at rest and on walking, fear of movement (Tampa) and fear of falling (SFESI) at baseline and follow up. 3

Supplementary Table S2 Residualised change scores for the walking measures..... 5

Supplemental Table S3 Unadjusted correlations between pre-operative predictor variables and walking measures pre and post-operatively..... 6

Supplemental Table S4 Correlations between post-operative candidate predictor variables and 12-week walking measures 7

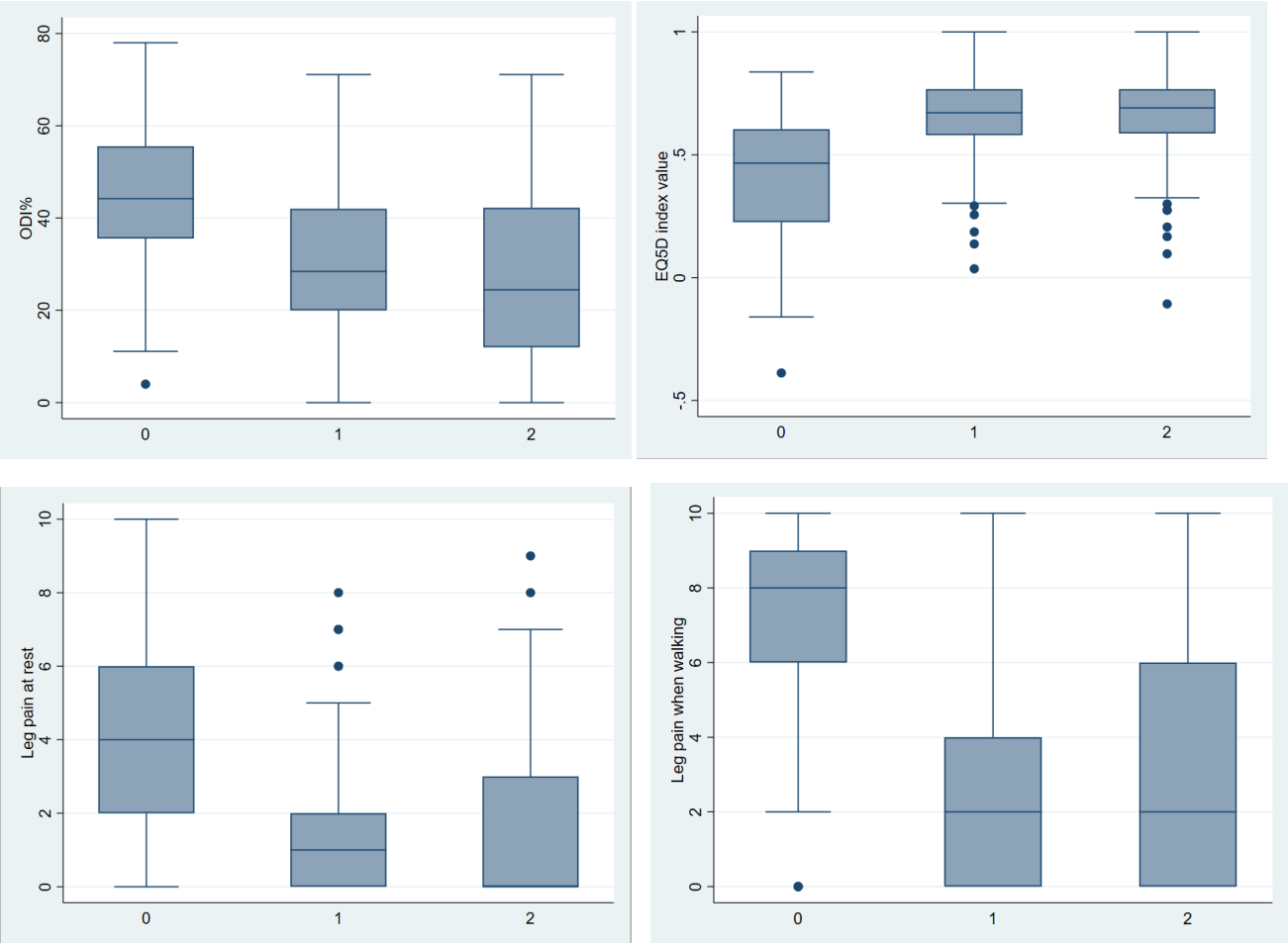
Identifying modifiable factors that influence walking in patients undergoing surgery for neurogenic claudication. A prospective longitudinal study

Supplementary Table S1 Change in disability, pain, quality of life, fear of falling and fear of movement after surgery for neurogenic claudication

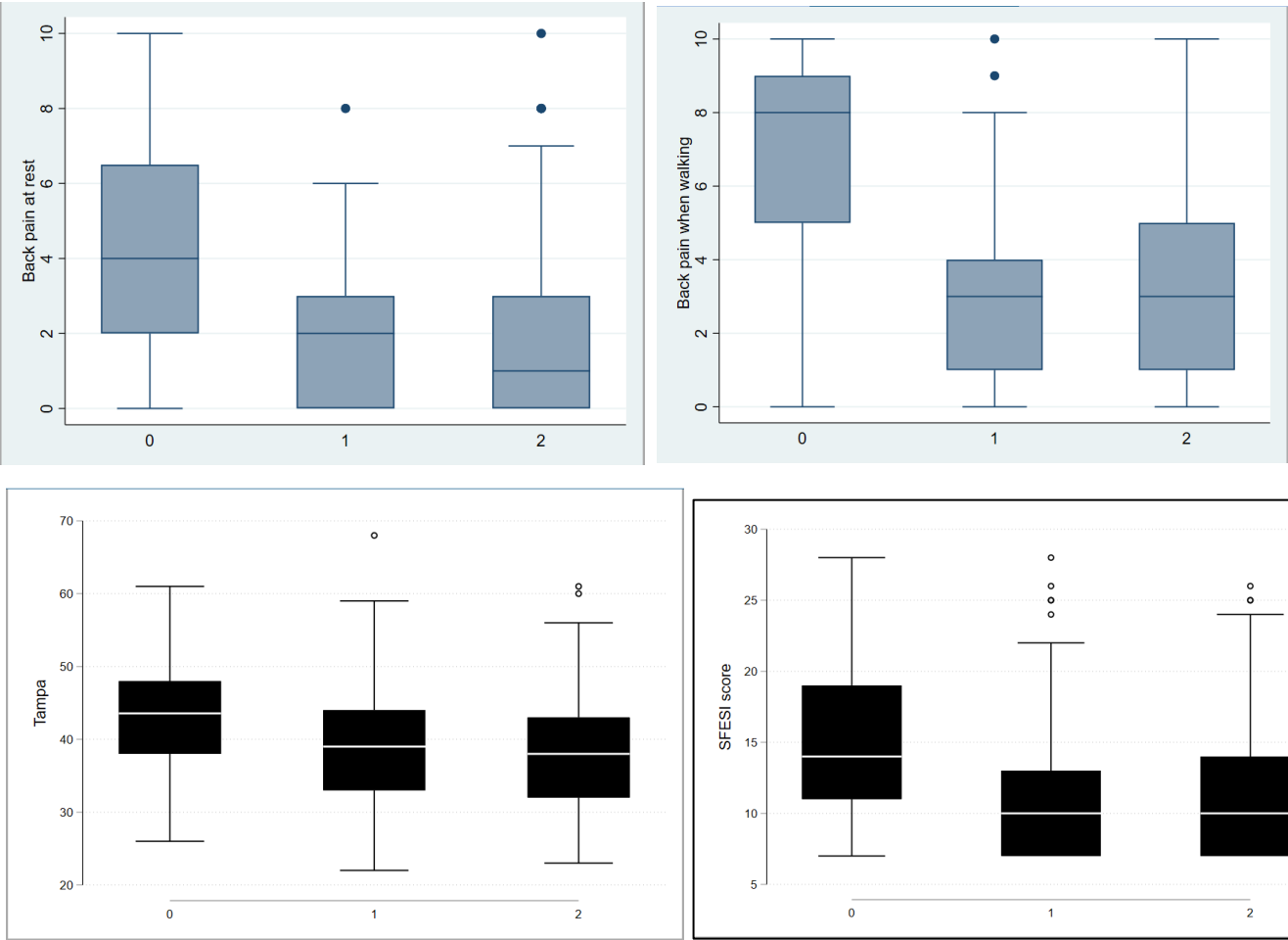
Variable	n	Baseline mean ($\pm$ SD) n=133	12 weeks post-operative mean ($\pm$ SD)	Mean difference ($\pm$ SD)	95% confidence intervals of mean difference	P value
Disability (ODI)	107	42.99 (15.08)	27.08 (17.86)	-15.90 (15.45)	-18.87, -12.94	<.001
Leg pain at rest (NRS)	104	4.20 (2.86)	1.55 (2.21)	-2.65 (2.82)	-3.20, -2.10	<.001
Leg pain when walking (NRS)	104	7.29 (2.38)	3.03 (2.99)	-4.26 (3.19)	-4.88, -3.64	<.001
Back pain at rest (NRS)	103	4.22 (2.84)	1.81 (2.45)	-2.42 (2.72)	-2.95, -1.89	<.001
Back pain when walking (NRS)	103	6.84 (2.86)	3.53 (2.86)	-3.33 (3.01)	-3.92, -2.74	<.001
Quality of life (EQ5D-5L)	106	.434 (.230)	.660 (.203)	.226 (.245)	.178, .273	<.001
Fear of falling (SFESI)	106	14.53 (5.14)	11.31 (4.84)	-3.22 (4.37)	-4.06, -2.38	<.001
Fear of movement (Tampa)	100	42.65 (7.27)	38.45 (7.83)	-4.20 (6.92)	-5.57, -2.83	<.001
ODI: Oswestry disability index; NRS: numerical rating scale; EQ5D-5L: EuroQol five dimension, 5-level questionnaire; SFESI: Short Falls Efficacy Scale International; Tampa: Tampa Scale of Kinesiophobia						

Identifying modifiable factors that influence walking in patients undergoing surgery for neurogenic claudication. A prospective longitudinal study

Supplementary Figure S1 Box plots demonstrating disability (ODI), quality of life (EQ5D) and leg and back pain at rest and on walking, fear of movement (Tampa) and fear of falling (SFESI) at baseline and follow up.



Identifying modifiable factors that influence walking in patients undergoing surgery for neurogenic claudication. A prospective longitudinal study



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Supplementary Table S2 Residualised change scores for the walking measures

Walking measure	6MWD			Step Count			Log of max walk distance		
	B	p	95II/95ul	b	p	95II/95ul	b	p	95II/95ul
_base	0.77	0.000	0.63 to 0.91	0.91	0.000	0.77 to 1.04	0.41	0.000	0.24 to 0.57
age10	-2.08	0.046	-4.12 to -0.04	-2.89	0.004	-4.85 to -0.93	-0.30	0.832	-3.07 to 2.47
age10 # age10	0.13	0.077	-0.01 to 0.28	0.19	0.008	0.05 to 0.34	-0.00	0.980	-0.20 to 0.20
female	-0.09	0.536	-0.36 to 0.19	0.07	0.549	-0.16 to 0.30	-0.49	0.004	-0.83 to -0.16
White British	0.31	0.044	0.01 to 0.61	-0.13	0.360	-0.42 to 0.15	0.30	0.135	-0.09 to 0.68
Obese	-0.03	0.805	-0.31 to 0.24	0.18	0.166	-0.08 to 0.44	-0.37	0.053	-0.75 to 0.00
Current smoker	0.15	0.408	-0.20 to 0.50	-0.29	0.086	-0.63 to 0.04	0.14	0.563	-0.34 to 0.63
Constant	7.64	0.031	0.71 to 14.57	10.61	0.002	3.94 to 17.28	2.34	0.625	-7.15 to 11.83
Observations	96			88			99		
R-squared	0.674			0.753			0.380		
Table demonstrating the residualised change scores for the walking measures									
Key: 6MWD: 6 minute walk distance; 95II/95ul: 95% confidence intervals									

Identifying modifiable factors that influence walking in patients undergoing surgery for neurogenic claudication. A prospective longitudinal study
Supplemental Table S3 Unadjusted correlations between pre-operative predictor variables and walking measures pre and post-operatively

Correlations between pre-operative variables and walking measures at baseline & 12-weeks post-surgery						
	Baseline walking measure			Walking measure at 12-weeks post-surgery		
	6MWD (m)	Max walking distance (m)	Step Count	6MWD (m)	Max walking distance (m)	Step Count
Pre-operative variables						
6MWD (m)	1.000			0.779***	0.305**	0.427***
Max walking distance (m)	0.487***	1.000		0.374***	0.402***	0.263*
Step Count	0.585***	0.461***	1.000	0.548***	0.414***	0.825***
Sit to Stand Score (SPPB)	0.659***	0.204*	0.275**	0.548***	0.194	0.319**
Standing Balance Score (SPPB)	0.541***	0.222*	0.335***	0.464***	0.242*	0.225*
Gait Speed (SPPB)	0.704***	0.348***	0.375***	0.563***	0.225*	0.262*
SPPB Total score	0.799***	0.325***	0.418***	0.673***	0.277**	0.345***
Maximum grip strength (kg)	0.249**	0.068	0.125	0.369***	0.128	0.168
Walking aid	-0.668***	-0.326***	-0.465***	-0.677***	-0.310**	-0.432***
Fallen in last year	-0.315***	-0.044	-0.141	-0.299**	-0.122	-0.207*
No. of falls	-0.259**	-0.080	-0.142	-0.223*	-0.035	-0.090
Ability to plan exercise	0.282**	0.158	0.210*	0.099	0.156	0.176
Ability to self-regulate exercise	0.257**	0.275**	0.243**	0.072	0.246*	0.190
Physical environment and suitability for walking (ALPHA)	0.317***	0.151	0.116	0.202*	0.103	0.162
Social support & exercise survey	0.299***	0.209*	0.230*	0.255*	0.104	0.317**
Live alone	0.010	0.054	-0.124	-0.259*	-0.153	-0.165
In a relationship	0.039	-0.001	0.079	0.299**	0.232*	0.226*
PHQ4 score	-0.219*	-0.115	0.103	-0.122	-0.004	0.180
EQ5D VAS	0.390***	0.254**	0.328***	0.293**	0.191	0.219*
EQ5D index value	0.435***	0.355***	0.326***	0.306**	0.135	0.209*
Consequences of condition	-0.403***	-0.414***	-0.344***	-0.216*	-0.111	-0.125
Timeline beliefs	-0.126	-0.058	-0.123	-0.061	-0.150	-0.091
Perceived personal control	0.220*	0.175*	0.291**	0.322**	0.232*	0.168
Perceived treatment control	0.062	0.047	0.038	0.158	0.096	0.109
Identity (symptom severity)	-0.332***	-0.358***	-0.247**	-0.079	-0.135	-0.029
Illness concern	-0.079	-0.171	-0.081	0.107	-0.260**	0.025
Coherence of condition	-0.141	-0.098	-0.006	-0.050	0.062	-0.009
Emotional response	-0.214*	-0.210*	-0.044	-0.197	-0.237*	0.025
Fear of falling:	-0.596***	-0.301***	-0.376***	-0.509***	-0.251*	-0.281**
Fear of movement	-0.442***	-0.176	-0.282**	-0.224*	-0.200*	-0.151

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ ALPHA: physical activity-related environmental factors (ALPHA) scale; PHQ4: Patient health questionnaire 4; EQ5D-5L: EuroQol five dimension, 5-level questionnaire; VAS: visual analogue scale; NRS: numerical rating scale; SPPB: Short physical performance battery; 6MWD: six minute walk distance

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Supplemental Table S4 Correlations between post-operative candidate predictor variables and 12-week walking measures

Correlations between variables at 6-weeks and 12-weeks post-surgery and walking measures at 12-weeks post-surgery						
Variables	Correlations between variables at 6-weeks and 12-week walking measures			Correlations between variables at 12-weeks post-operative and 12-week walking measures		
	6MWD	Max walking distance	Step Count	6MWD	Max walking distance	Step Count
6MWD (m)	n/a	n/a	n/a	1.000		
Maximum walking distance (m)	0.498***	0.514***	0.273*	0.430***	1.000	
Step Count	n/a	n/a	n/a	0.513***	0.481***	1.000
Sit to Stand Score (SPPB)	n/a	n/a	n/a	0.686***	0.411***	0.471***
Standing Balance Score (SPPB)	n/a	n/a	n/a	0.415***	0.240*	0.259*
Gait Speed (SPPB)	n/a	n/a	n/a	0.655***	0.383***	0.403***
SPPB Total score	n/a	n/a	n/a	0.781***	0.451***	0.499***
Maximum grip (kg)	n/a	n/a	n/a	0.380***	0.205*	0.191
Walking aid	-0.718***	-0.379***	-0.462***			
Fallen in previous 6 weeks	-0.252*	-0.154	-0.103	-0.230*	-0.165	-0.135
No. of falls last 6 weeks	-0.179	-0.081	-0.097	-0.208*	-0.113	-0.117
Ability to plan exercise	0.065	0.079	0.242*	-0.040	0.087	0.176
Ability to self-regulate exercise	0.105	0.161	0.314**	0.060	0.171	0.252*
Social support & exercise survey (ALPHA)	0.158	0.165	0.160	0.220*	0.318**	0.246*
Consequences of condition	-0.328**	-0.382***	-0.280**	-0.497***	-0.395***	-0.284**
Timeline beliefs	-0.401***	-0.321**	-0.262*	-0.223*	-0.224*	-0.105
Perceived personal control	0.328**	0.178	0.166	0.250*	0.233*	0.213*
Perceived treatment control	0.276**	0.230*	0.159	0.165	0.156	0.137
Identity (symptom severity)	-0.383***	-0.366***	-0.304**	-0.323**	-0.407***	-0.308**
Illness concern	-0.336***	-0.357***	-0.147	-0.307**	-0.327***	-0.177
Coherence of condition	0.174	0.110	0.031	0.088	0.042	-0.043
Emotional response	-0.393***	-0.299**	-0.178	-0.391***	-0.233*	-0.142
Total PHQ4	-0.126	-0.003	0.181	-0.109	-0.003	0.187
EQ5D index value	0.555***	0.329***	0.403***	0.569***	0.402***	0.430***
EQ5D VAS	0.433***	0.276**	0.169	0.466***	0.304**	0.261*
Fear of falling	-0.531***	-0.358***	-0.328**	-0.651***	-0.402***	-0.394***

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Fear of movement	-0.386***	-0.282**	-0.226*	-0.339***	-0.327***	-0.276**
Hospital recorded complication	-0.183	-0.084	-0.074	n/a	n/a	n/a
Length of stay post-op	-0.401***	-0.225*	-0.303**	n/a	n/a	n/a
Patient reported post-op complication	-0.027	-0.055	-0.110	-0.074	-0.149	-0.049
Received inpatient physiotherapy	0.031	-0.121	0.031	n/a	n/a	n/a
Received outpatient physiotherapy	0.033	0.054	0.241*	-0.106	-0.118	0.071
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ PHQ4: Patient health questionnaire 4; EQ5D-5L: EuroQul five dimension, 5-level questionnaire; VAS: visual analogue scale; NRS: numerical rating scale; SPPB: Short physical performance battery; 6MWD: six minute walk distance; 6MWD: 6 minute walk distance						