

Improvement in gait parameters in adults with Spastic Hemiparesis due to Stroke or Traumatic Brain Injury using Wheeleo® crutch



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Background & aims Methods

Patients with chronic hemiparesis following stroke or traumatic brain injury (TBI) often necessitate a quadripod crutch to improve the balance during gait. The quadripod crutch, by inducing a 3-step gait participates to an asymmetric and slow walking speed. This study aims to assess changes in gait parameters and balance in patients using a quadripod crutch with small wheels (Wheeleo®) compared with a classical quadripod crutch.

Prospective, multicentre, randomised study comparing Wheeleo® and quadripod crutch (NCT02279069). Thirty-two ambulatory adults with spastic hemiparesis following stroke or TBI necessitating a quadripod crutch for walking participated to the study. The walking speed (WS), the frequency of the 2-step gait, the physiological cost index (PCI) and the number of therapist interventions to control the balance during a 10-meter walking test (10mWT) and a 6-minutes walking test (6MWT) were assessed with a Wheeleo® and a quadripod crutch at comfortable and maximal WS. The cadence (during a 10mWT) and the distance (during a 6MWT) were also monitored. The patient satisfaction was assessed by a VAS scale.

Results

When using a Wheeleo®, improvements in WS, cadence, frequency of a 2-step gait, PCI and distance were observed at comfortable and maximal WS. The number of therapist interventions to control the balance remained unchanged.



Table 1. Changes at comfortable walking speed



		Quadripod Mean (SD)	Wheeleo® Mean (SD)	Difference Mean (SD)	%	p
10mWT	WS (m/s)	0.39(0.17)	0.46(0.19)	+ 0.08 (0.12)	+27	<0.001
	Cadence/min	66 (18)	74 (17)	+ 8 (13)	+17	<0.01
	2-step gait	22/32	29/32	+ 7		<0.05
	PCI	1.00 (0.63)	0.65 (0.41)	- 0.35 (0.1)	- 27	<0.01
	PT contact	0.09 (0.50)	0.03 (0.18)			NS
6MWT	WS (m/s)	0.41(0.20)	0.51(0.21)	+0.1(0.09)	+ 30	<0.001
	Distance (m)	147 (73)	183 (77)	+ 36 (34)	+ 30	< 0.001
	2-step gait	24/32	29/32	+ 5		NS
	PCI	1.48 (1.01)	1.33 (0.76)	- 0.15 (0.17)	- 26	NS
	PT contact	0.75 (2.69)	0.78 (1.74)			NS

Conclusion Improvements in WS, cadence, distance, 2-step gait, energy cost and patient satisfaction were achieved in hemiparetic adults using a Wheeleo® crutch without additional fall risk.