Dose-Response Relationship of Locomotor Training in Patients with Spinal Cord Injury[1]: Preliminary Results

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Aim

- Evaluate whether prolonged robot-assisted walking training leads to a better walking outcome in patients with incomplete spinal cord injury (SCI), who are initially unable to walk independently (i.e. B and C according to the International Standards for Neurological Classification of SCI-ISNCSCI)
- Evaluate whether such training is feasible or is associated with undesirable effects

Conclusions

Longer training sessions using a robotic device

- Are feasible
- Are not associated with undesirable effects
- Results show a trend towards a positive dose-response relationship
- However, there was a larger proportion of patients with a motor incomplete SCI (i.e. ISNCSCI: C) in the intensive training group

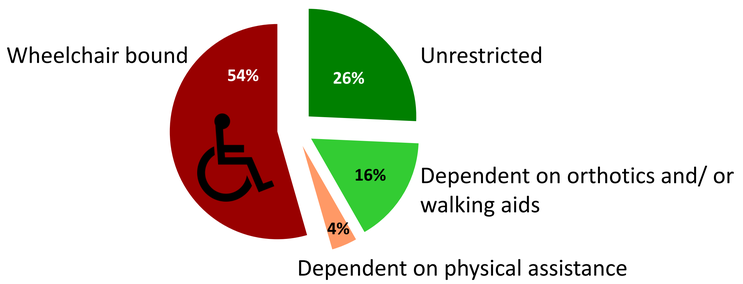
Implications

- The duration of a standard training session needs to be re-addressed
- Results indicate that more intensive training leads to a better outcome

Background

A large proportion of patients regain ambulatory function one year after onset of SCI (fig. 1)[2]. However, during the first 3 months most patients are unable to walk without support.

Fig1: Ambulatory function 1 year after SCI (n=393)[2]



Training effects depend on the intensity (duration, frequency) of the training. E.g. augmented training results in a better walking function in patients with stroke[3].

Robot-assisted locomotor training is applied early after injury which allows for long training duration.

Methods

Sample

Patients with an acute incomplete SCI (within 60 days after injury)

Intervention/ Control

Random allocation to either:

- intensive training (session duration ≥ 50 minutes) or
- standard training (session duration ≤ 25 minutes)

Outcomes

Comparison after 8 weeks of training:

- Adherence to the intervention protocol
- Walking ability (Walking Index for SCI-WISCI), 0=not able to walk, 20= able to walk independently
- Patients' global impression of change (PGIC), 0= much better, 5= no change, 10= much worse
- Rate of perceived exertion (RPE) 1=very light, 10= very, very hard
- Occurrence of adverse events

Results

			Intervention	Control	All
Sample	*Tetra*	*B*	1	4	5
		C	6	1	7
	Para	*B*	2	2	4
		C	0	1	1
					Test statistic
Training	*Number*		34.9±6.0 (26-40)	33.8±6.8 (22-40)	n.s.
	Duration [min]		48.3±3.2 (1-78)	24.9±0.6 (1-37)	p=0.01
WISCI	*Week 0*		0 (0-0)	0 (0-0)	n.s.
	Week 8		10.5 (0-19)	4 (0-20)	n.s.
	Within group		p<0.05	n.s. (p=0.109)	
PGIC	*Week 8*		2.5 (1-4)	3.5 (0-5)	n.s.
RPE	*Average*		6 (1-10)	6.5 (1-10)	n.s.
Adverse events			No adverse events due to the training were observed		

Tetra: Tetraplegia; Para: Paraplegia; WISCI: Walking Index for Spinal Cord Injury; PGIC: Patients Global Impression of Change; RPE: Rate of Perceived Exertion.
Figures are counts or mean ± standard deviation or median and (range).

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