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Usefulness of Exoskeleton Rehabilitation Robot in Spinal Cord Injury : Pilot Study

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Usefulness of Exoskeleton Rehabilitation Robot in Spinal Cord Injury: A Pilot Study

Objective
Nowadays exoskeleton rehabilitation robot used in spinal cord injury (SCI) patients, but few study has yet reported the efficacy of exoskeleton rehabilitation robot. The aim of this pilot study is to evaluate the efficacy of exoskeleton rehabilitation robot in SCI patients and to plan the future prospective study.

Patient and Method
Six patients who were diagnosed with SCI did gait training, balance training, direction change training with exoskeleton rehabilitation Robot (ExoAtlet I) between November, 2017 and March, 2018. Patients perform 50 minutes per day Short Form McGill Pain Questionnaire, Beck's depression scale (BDI), Constipation Scoring system were compared between pre- and post-treatment.

Result
Of the 6 patients with SCI, 4 were men and 2 were women. 3 were Asia impairment scale (AIS) A and 3 were AIS C. Mean treatment time is 1641±633 minutes (table 1). Although every mean value of them were improved after treatment, it showed statistically no differences (table 2). No adverse events such as fall down, fracture or weakness were reported after treatment but in one patient pressure ulcer occurred on heel.

Conclusion
This study with 4-month follow up showed no statistically difference. But post treatment showed improvement individually. Further studies are needed to confirm the effect in a larger population and to verify the usefulness of exoskeleton rehabilitation robot.

Table 1 : Characteristics of patients

Gender	Age	Diagnosis	Treatment time (minutes)	Onset
M	45	Tetraplegia d/t C6/7(s), C8/6(m) SCI AIS C	2600	2001.5
M	50	Paraplegia d/t T10(s) SCI AIS A	850	2001.11
M	57	Paraplegia d/t T8/T7(s) SCI AIS C	1550	2009
M	38	Paraplegia d/t T10 SCI AIS A	1600	2017.7
F	31	Paraplegia d/t T3(s) SCI AIS C	2100	2010.5
F	35	Paraplegia d/t T11 SCI AIS A	1150	2012.10

Table 2. Changes in outcome measurements

	Pre-treatment	Post-treatment	P value[†]
BDI	10.66	6.66	0.116
McGill	14.6	13.4	0.344
Constipation	12.83	9.75	0.173

[†] Wilcoxon matched-pair signed rank test was conducted for between-group comparison (p<.05).