

Robotic assist therapy for upper limb rehabilitation in infratentorial stroke patients

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Objective

Infratentorial stroke cause various symptoms depending on the position of the lesion, and upper limb motor function impairment is one of the major symptoms appealing to a large number of patients. The benefits of robotic therapy for the rehabilitation of upper extremity motor function after stroke are well known, but there are few studies on infratentorial stroke patients. The aim of this study is to determine the effects of newly developed upper limb rehabilitation training robot trainer (Camillo[®], Man&tel co., Korea) which can perform task specific training using game contents in infratentorial stroke patient.

Materials and Methods

Ten patient with hemiplegia admitted to rehabilitation center enrolled in this study. Patients were categorized as the combination treatment (conventional and robotic assist therapy) group, and the control group was matched one by one to the conventional treatment group according to the location of the lesion, function, and age. The treatment session was performed during 30 minute for 2 weeks (total 8 sessions) using a robotic device. Patients in the treatment group received conventional occupation therapy additionally, one session of robotic therapy, while the control groups received two sessions of conventional occupation therapy. Outcome were compared for Fugl-Meyer assessment (FMA), box & block test (BBT), nine hole pegboard test (NHPT), functional independence measure (FIM), and hand strength were evaluated at each time before and after treatment.

Results

Ten patients participated in this study, The two groups (combination treatment vs control group) seems to be no differences in improvement on FMA, BBT and FIM (Table 1). The combination treatment group showed improvement in NHPT and hand strength compared with the control group (Table 1). There was no significant differences in upper extremity function test score installed in robotic device.

Conclusion

Robotic assist therapy seems to be improves fine motion of upper limb, hand strength in infratentorial stroke patient. Additional patient enrollment is required to determine the effects of robotic assist therapy for upper limb rehabilitation in infratentorial stroke patients.

Table 1. Comparison of outcome measures between treatment and control group

		Δ FMA-UE	Δ BBT (E.a.)	Δ NHPT (Sec.)	Δ FIM	Δ hand strength (Kg)
Treatment group (n=3)	mean	1.33	10.67	43.85	12.33	4.67
	<i>p</i> value	.637	.507	.05	.184	.05
Control group (n=3)	mean	2.33	8	12.60	0	0.33
	<i>p</i> value	.637	.507	.05	.184	.05

FMA, Fugl-Meyer assessment; K-MBI, korean version modified Barthel index; MMT, manual muscle test; K-MMSE, korean version mini-mental state examination; BBT, box & block test; NHPT, nine hole pegboard test; FIM, functional independence measure



Figure 1. (A) Camillo® robotic device, an upper extremity rehabilitation robot, consisting of a video monitor, a robot arm and a computer: (B) The patient performing robot-assisted game training with the upper extremity rehabilitation robot.



Figure 2. The upper extremity function (accuracy) evaluation tools installed in Camillo® robotic device.