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Feasibility of Sliding Rehabilitation Machine on Stroke Patients with Severe Cognitive Dysfunction

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Objective
Sliding Rehabilitation Machine (SRM) allows closed kinetic chain exercises of hip, knee, and ankle, and offers repeated weight bearing exercise with flexion and extension of the lower extremities. The aim of the present study was to explore feasibility of the SRM when used for intensive rehabilitation program for stroke patients with severe cognitive dysfunction.

Subjects & Methods
The retrospective study conducted at Department of Rehabilitation Medicine at University hospital. Included patients were admitted to the department of rehabilitation medicine for intensive inpatient rehabilitation after stroke with severe cognitive dysfunction(MMSE<10). Patients with visual impairment or other neurologic and musculoskeletal problem were excluded. Training with SRM was performed twice per day from Monday to Friday during 3-4 weeks of admission. The number of sessions and the occurrence of side effects were documented daily. The SRM's angle of inclination, Berg balance scale (BBS), Korean-modified Barthel index (K-MBI) were documented at admission and discharge.

Results
In 30 patients, 1754 sessions were actually performed from a total of 1736 scheduled sessions of SRM training. The performance rate was 98.9%, and there were no serious side effects. Transient side effects such as dizziness, nausea, knee pain were observed in a few cases. The cause of the absence in SRM training was due to knee pain (5 times), sleep disturbance or depressive mood (7 times), dizziness (3 times) or schedule error (3 times). At discharge, patients showed improvement in inclination angle of the SRM, BBS and K-MBI.

Conclusions
This study shows the use of SRM for intensive muscle strengthening early in the ischemic stroke patient with severe cognitive dysfunction is readily applicable and demonstrates that the physical therapy with SRM is safe when used as part of an inpatient rehabilitation program.

Table 1. General characteristics of subjects.

Variables	
Patients (number)	30
Age (years)	74.3±8.5
Sex (Male/Female)	12:18
Location(Rt./Lt.)	10:20
Training day	29.2±7.9
Time from stroke to inclusion (days)	15.8±6.0
MMSE-K	1.6±2.6
NIHSS	16.9±6.0

Values are mean ± standard deviation.

MMSE-K, Mini–Mental State Examination-Korean

Table 2. The measurement values of clinical parameters.

Clinical parameters	Baseline	After training	p
Angle of inclination	6.7 ± 4.6	12.6 ± 7.3	0.000
BBS	5.1 ± 9.1	15.4 ± 17.4	0.006
K-MBI	8.0 ± 9.2	28.2 ± 22.8	0.000

Values are mean ± standard deviation.

BBS, Berg Balance Scale; K-MBI, Korean Modified Barthel Index;

(a)

(b)

Fig 1. Patient performing lower extremity extensor strengthening using Sliding Rehabilitation Machine; (a) patient was knee flexion, (b) patient was knee extension