

## **Quantitative Weight Bearing Exercise Using Lower Body Positive Pressure Treadmill: Case series Study**

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### **Introduction**

Weight bearing after lower extremity fracture is an important issue in post-operative rehabilitation, but it has not been established yet. High-quality clinical studies of weight bearing protocols have been rarely studied, since it is difficult to quantify the actual loads of each limb and provide a constant weight load. By training with a lower body positive pressure treadmill (LBPPT) and using a pressure measurement insole, weight bearing exercise can be performed with actual loads quantified during training. In this study, we reports three cases of lower extremity fracture patients who underwent 4-week quantitative partial weight bearing rehabilitation program using LBPPT.

### **Cases**

Three patients began training within 1 month of injury, and were trained through a 4-week rehabilitation program consisting of 10 sessions per week and 30 minutes each. The foot impulse (FI) was measured weekly prior to training, and body weight percentage was set based on the Results. Functional evaluation was performed before, after, and 6 months after the training. (Fig 1) Patients showed significant improvement in functional assessment such as the 10-meter walking test and the berg balance scale. (Table 1) The FI of the surgically treated limb was gradually increased, while the ratio of FI to the contralateral foot remained constant during rehabilitation program. In the 6-month evaluation, the FI of the affected side was almost the same to the unaffected side. (Fig 2) Complications such as fixation failure did not occur during training.

### **Conclusion**

This study suggests that quantitative partial weight bearing training using LBPPT is feasible and that this rehabilitation program is useful and safe for patients with lower extremity fractures.

Table 1. Functional outcome

		10MWT(s)	TUG(s)	L-test(s)	BBS	NRS-R	NRS-W
Case 1	pre	NT	NT	NT	37	0	NT
	post	15.96	17.15	40.46	41	0	3
	6mo	9.34	11.2	23.33	52	1	2
Case 2	pre	NT	NT	NT	NT	5	NT
	post	19.73	18.67	46.66	36	3	5
	6mo	11.93	12.37	22.38	44	3	3
Case 3	pre	NT	NT	NT	NT	5	NT
	post	26.96	25.57	65.16	NT	2	4
	6mo	8.77	8.54	17.98	48	1	2

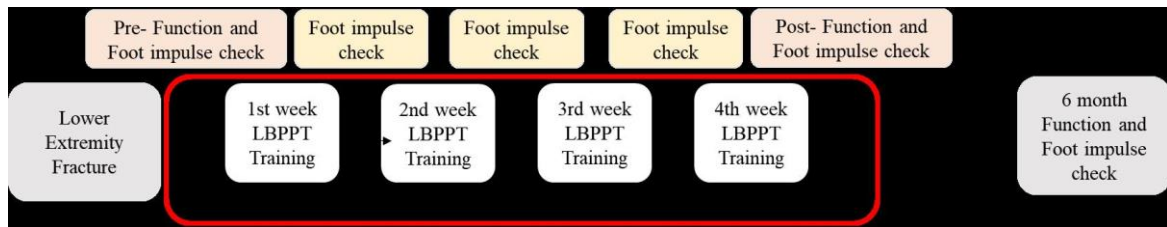


Fig 1. Rehabilitation program

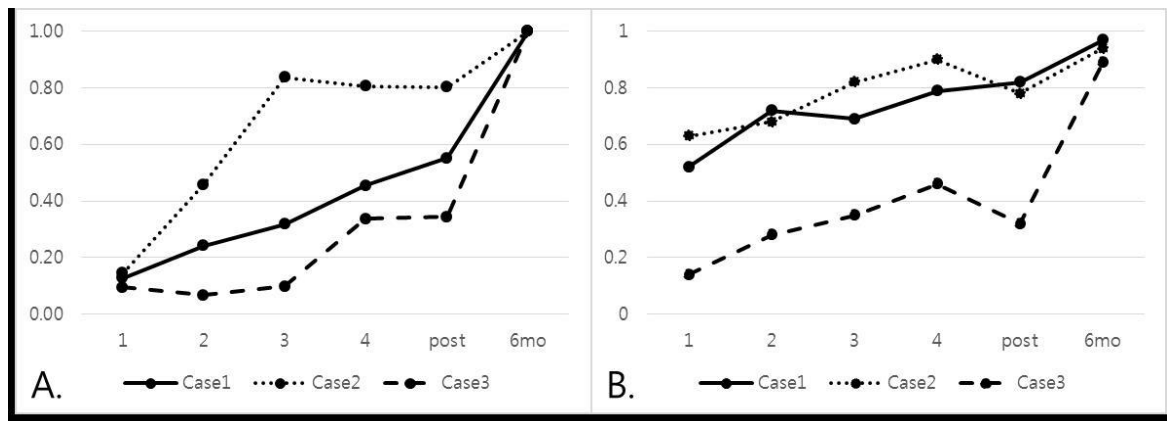


Fig 2. A. The ratio to estimated normal value of FI B. The ratio of affected and unaffected side