

**TREATMENT OF LOW BACK PAIN IN THE WORKSITES  
---Evaluation of PROTEC, a self-traction chair---**

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**1. Introduction**

More than eighty percent of the Japanese adult population has at least one episode of low back pain in their lifetime. In the last decade in Japan, accidental low back injuries accounted for 60 % of all reported occupational diseases and disorders. However the existing countermeasures for the patient in the working place are not enough. With this situation in mind, a chair-type self-traction machine (PROTEC) was developed. This contraption has several advantages. It saves in space because of its compact design. The machine can be self-controlled and needs no electrical energy compared to the ordinary motor-driven traction system used in orthopedics. This study was done to evaluate the effectiveness of PROTEC in alleviating low back pain experienced by patients who used the device for traction treatment.

**2. Method**

PROTEC consists of framework, backrest, flexible arms, leg hangers and a chair (Figure). A patient sits down on a chair, restrains himself with flexible arms provided and lowers the chair to his lower extremities free. Leg hangers are optional. A total of 13 ambulatory patients with low back pain at an orthopedics clinic were included in the study. The subjects were instructed to use PROTEC for traction treatment for 20 minutes. The range of motion (ROM) was determined using the BackTracker™ before and after using PROTEC to evaluate its effectiveness.

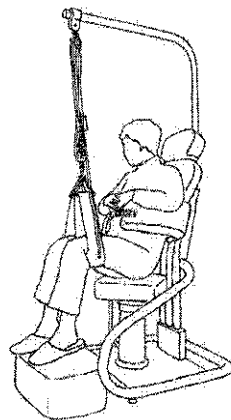


Fig. Treatment with PROTEC

The ROM was monitored in the 3 axes, namely, flexion-extension, right-left lateral bending and right-left rotation. The subjects were asked to perform maximum movements in each axis. The highest value after 3 trials was recorded as the maximum ROM. A questionnaire was also administered before and after traction with PROTEC to determine the extent of change in intensity of the low back pain. The results are shown in the table.

**3. Results and Discussion**

Seven out of the thirteen patients (54%) improved their ROM in the 3 axes. An increase of more than 20 degrees after using PROTEC was noted in 5 of those whose ROM improved. The intensity of low back pain decreased in 8 subjects. Of these 8 patients, 6 responded that the pain much decreased and 2 reported slight alleviation of the pain. Four of the 13 subjects experienced no change while one subject had slight worsening of the condition.

Four subjects who reported much decrease in pain also exhibited improvement in ROM by more than 20 degrees. Despite the decline in the ROM in 6 patients, only 1 reported a slight worsening in the pain. No change in pain intensity was noted by another subject while 4 experienced slight to marked improvement of the condition.

As viewed from the results of the study, PROTEC is a promising alternative to conventional traction treatment of low back pain. Even with a one-time trial study, a decrease in low back pain intensity was noted after use of PROTEC. The reason might be attributed to tender traction or self-traction that uses gravity only. The ease of use and compact design of PROTEC allows its use in the worksites during workers' breaks. To validate the results of this study, comparison of the effects of PROTEC and the conventional motorized traction machine is being recommended. The effects of PROTEC from its long-term use should be examined also.

**Table ROM and Low back pain before and after using of PROTEC**

Subject	Sex	Age	Diagnosis	Before [degree]			After [degree]			Difference [degree]			Sum of ROM	Intensity of low back pain after PROTEC use
				Flexion Extension	Lateral bending	Rotation	Flexion Extension	Lateral bending	Rotation	Flexion Extension	Lateral bending	Rotation		
1	F	64	LDL	33.6	21.5	33	38.5	23	49	4.9	1.6	16	22.1	Much decreased
2	F	56	LDL	21.2	14	38	14.5	12	23	-6.7	-2	-14	-23.4	No change
3	F	76	FJL	45.7	24.6	46	51.1	34	67	5.4	9.3	21	35.4	Much decreased
4	M	65	FJL, SCS	51.9	34	71	60	38	81	8.1	3.7	9.5	21.3	No change
5	F	72	S, FJL	34.1	33.7	71	34.4	25	62	0.3	-9	-9	-17.7	Much decreased
6	M	83	FJL, SCS	25.8	13.4	54	18.7	16	43	-7.1	2.2	-11	-16.2	No change
7	M	46	LDL	27.8	18.1	53	23.3	25	47	-4.5	7.2	-6	-3.4	Slightly worse
8	F	70	FJL	28.2	10.4	53	39.1	16	46	10.9	5.5	-7	9.8	No change
9	F	69	SCS, FJL	39.2	23.4	71	24.9	14	53	-14.3	-10	-17	-41.3	Slightly better
10	M	59	FJL	40.6	25.3	58	42.9	34	69	2.3	8.6	11	22.1	Much decreased
11	F	79	S, FJL	28.6	27	84	37	28	74	8.4	1.4	-10	-0.3	Slightly better
12	F	67	FJL	10.7	8.5	34	10.4	8.6	38	-0.3	0.1	4	3.8	Much decreased
13	M	45	LDL	70	35.5	51	115.5	71	171	45.5	36	120	200.7	Much decreased

Diagnosis; LDL: Lumber Disc Lesion, FJL: Facet Joint Lesion, SCS: Spinal Canal Stenosis, S: Spondylolisthesis  
Value in Before and After columns is the maximum in three trials. [Difference]=[After]-[Before]  
[Sum of ROM]=[Total of Difference ([Flexion Extension]+[Lateral bending]+[Rotation])]