

Power-Plate Stimulates Recovery After Anterior Cruciate Ligament (ACL) Rupture

By J.D. Bastian, W. Franz

Lutrina Klinik, Department of Knee Surgery, Kaiserslautern, Germany

Research shows using the Power-Plate expedites recovery of muscle performance after ACL rupture. Combination with conventional physiotherapy, exercises on the Power-Plate lead to improved muscular power, enhanced proprioceptive abilities and stabilization of the knee joint (articulatio genu).

This is a summary of a study published in **Deutsche Zeitschrift für Sportmedizin**[®], Vol. 56, No. 7/8 (special abstract issue), p. 228: "Erfahrungen mit Ganzkörpervibrationstraining nach arthroskopischer Rekonstruktion des Vorderen Kreuzbandes – Empirical study of the effects of whole body vibration after arthroscopic reconstruction of the ACL".

Conclusions:

Six weeks after the operation, the group that performed additional WBV training did not show significant reduction of the muscle thickness 10 and 20 cm proximal to the patella, as the control group did. Secondly, twelve weeks after surgery the WBV group was more satisfied with the results of the operation. The answers they provided on their questionnaires also indicated that they were experiencing less pain than the control group. Therefore, we conclude that additional Power-Plate therapy is significant for anyone wanting to recover as quickly as possible from this kind of surgery in order to get back to normal daily activities such as work and sports.

In general, a major problem after reconstruction of the ACL of the knee is the weakness of the m. quadriceps femoris. The aim of this study was to examine the effects of additional whole body vibration (WBV) on an oscillating platform (Power-Plate). In this study we could fall back on positive experiences published earlier in specialist literature: WBV leads to an increased co-activation of the extensor and flexor muscles of the lower extremities, it has positive effects on joint stabilization and it improves circulation.

Methods:

16 subjects were divided between a vibration group (n=7, physiotherapy and vibration) and one control/conventional group (n = 9, physiotherapy only). Any contraindications for vibration training were taken into consideration. The training program for the conventional group followed the routine schedule after ACL rupture (2 – 3 times per week, squats and lunges). The WBV group performed a ten-minute schedule twice a week for ten weeks, beginning in the third week after surgery, in addition to normal physiotherapy. After warming up by doing a massage for quadriceps and hamstrings, the schedule consisted of a squat and a lunge, followed by a stretching exercise for the hamstrings.

Measurements of the leg circumference (10 and 20 cm proximal, as well as 15 cm distal of the patella) were taken pre-operative, immediately after surgery and after 6 and 12 weeks. To estimate the success of the therapy, subjective evaluations of pain perception and health were assessed by having all subjects filling in a questionnaire (SFA = Flandry score).

Results:

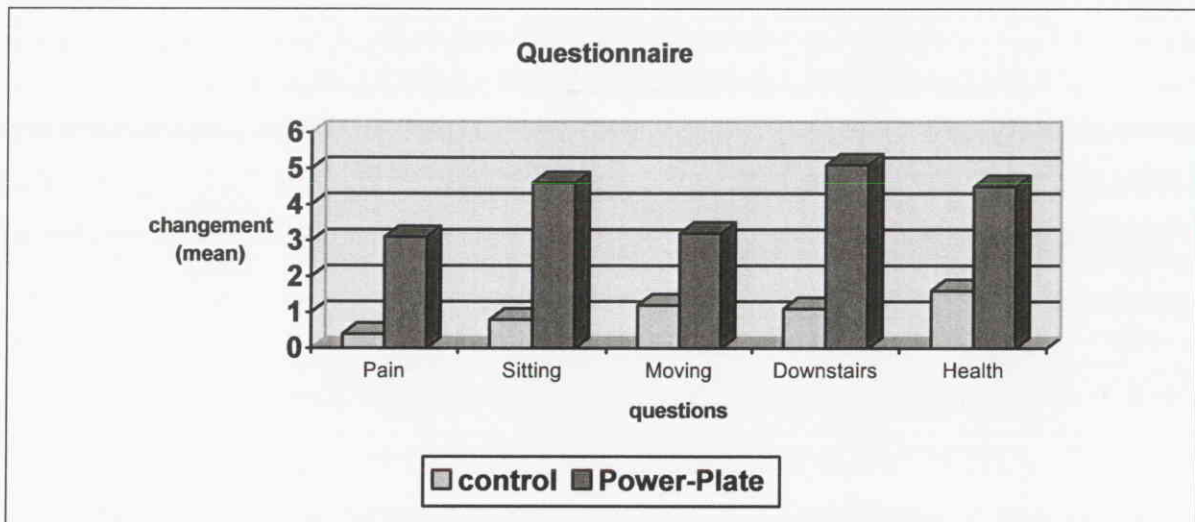
a: Circumference

	pre - op		6 weeks post - op		12 weeks post - op	
	Power-Plate and physio	Physio only	Power-Plate and physio	Physio only	Power-Plate and physio	Physio only
Circumference quadriceps 20 cm proximal [cm]	55,8 / ± 8,2	54,8 / ± 5,3	55,4 / ± 6,3	50,5 / ± 3,1	56,5 / ± 6,5	55,3 / ± 5,6
Circumference quadriceps 10 cm proximal [cm]	46,3 / ± 9,3	44,9 / ± 5,5	45,9 / ± 5,8	41,8 / ± 2,6	47,3 / ± 5,4	41,8 / ± 2,6
Circumference gastrocnemius 15 cm distal [cm]	39,9 / ± 3,2	38,9 / ± 2,4	39,0 / ± 3,0	37,6 / ± 2,1	40,5 / ± 2,9	40,3 / ± 2,1

No significant differences were expected in the circumference of the calves, as the exercises on the vibrating platform were designed to target the muscles of the upper leg. No specific calves exercises were performed.

b: Questionnaire

Question	control vs. Power-Plate
How often does your knee feel painful?	p = 0.037
Is your knee painful while sitting?	p = 0.009
Do you have problems standing up and sitting down?	p = 0.024
Do you have problems walking down stairs?	p = 0.016
How would you judge your general health?	p = 0.013



In this case, improvement is greater when there is more difference between initial and final data.

Conclusions:

The rupture of the ACL generally leads to atrophy of the femoral muscular, coordinative dysfunction and a decrease in mobility of the affected knee. Training by using Power-Plate can lead to an accelerated increase of muscle thickness, recovery of the coordinative abilities and improvement of the muscular flexibility. As a result, this special kind of therapy can be used for stabilizing joints and preventing additional trauma. Power-Plate therapy is significant for anyone wanting to recover as quickly as possible from this kind of surgery in order to get back to normal daily activities such as work and sports.