

A BASIC STUDY ON THE EFFECTS OF VIBRATOR-ATTACHED LEG-PRESS ON THE KNEE AND ANKLE JOINT TORQUES



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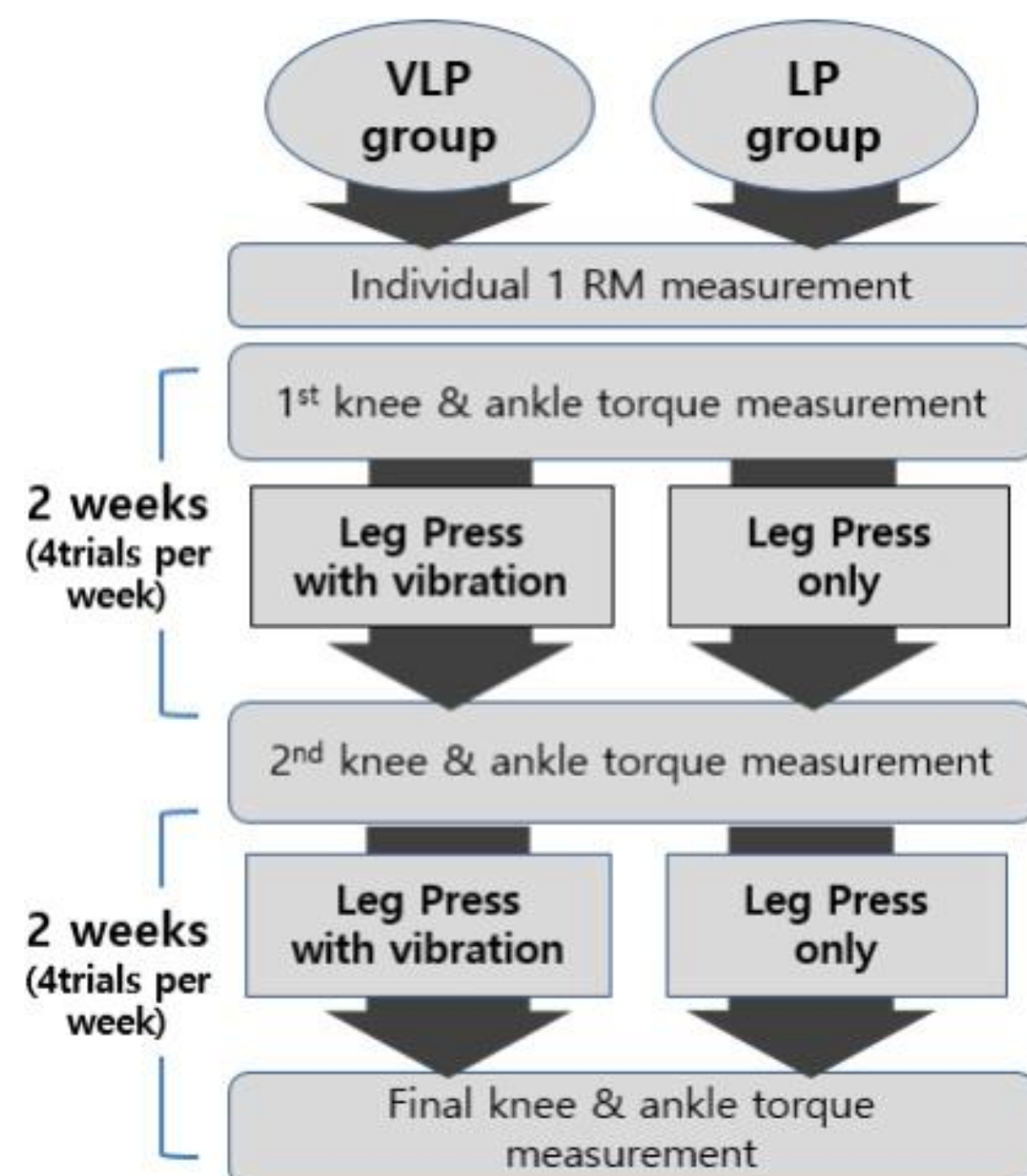
There is insufficient research with regard to cases wherein the vibration is applied while resistance training is performed simultaneously for comparison.

In this study, we compare the effects of vibration on the knee and ankle torques after performing leg-press exercises for four weeks.

Methods



Fig. 1.
Vibrator-attached leg-press.



20 participants
(VLP:10, LP:10)

Vibration
-Freq.:30 Hz
-Mag.:1.5 mm

Fig. 2.
Experimental procedure.

Table 1. Four-week exercise protocol.

	Week 1	Week 2	Week 3	Week 4
RM (%)	20	40	60	80
No. of trials	25 × 3 sets	20 × 3 sets	15 × 3 sets	10 × 3 sets

To examine the effects of the exercise, the **isometric and isokinetic joint torques of the knee and ankle** were measured using Biodex (Biodex Medical Systems, USA) for a total of three times, namely: before exercising and after two and four weeks.

Results & Conclusion

Table 2. Summary of repeated measure ANOVA results within-group (zero, two, and four weeks) and between-groups (leg-press without and with vibration).

		Within-group			Between-groups			Interaction effect		
		df	F	Sig.(p)	df	F	Sig.(p)	df	F	Sig.(p)
Isokinetic (90°/s)	Knee extensor	2	2.402	0.106	1	0.192	0.667	2	1.307	0.284
	Knee flexor	2	18.301	0.000*	1	1.716	0.208	2	0.078	0.925
	Ankle extensor	2	10.871	0.000*	1	2.516	0.131	2	0.504	0.608
	Ankle flexor	2	12.142	0.000*	1	0.201	0.659	2	1.075	0.352
Isometric	Knee extensor	2	26.598	0.000*	1	0.370	0.551	2	2.152	0.132
	Knee flexor	2	2.402	0.106	1	0.192	0.667	2	1.307	0.284
	Ankle extensor	2	12.622	0.000*	1	0.798	0.384	2	0.864	0.431
	Ankle flexor	2	5.630	0.008*	1	0.294	0.595	2	0.294	0.747

The Bonferroni correction analyzed in this study presented the results of the pairwise analysis of durations (zero, two, and four weeks) within-group regardless of between-groups (see Figs. 3 and 4); *(asterisk) represent a statistically significant differences within-group.

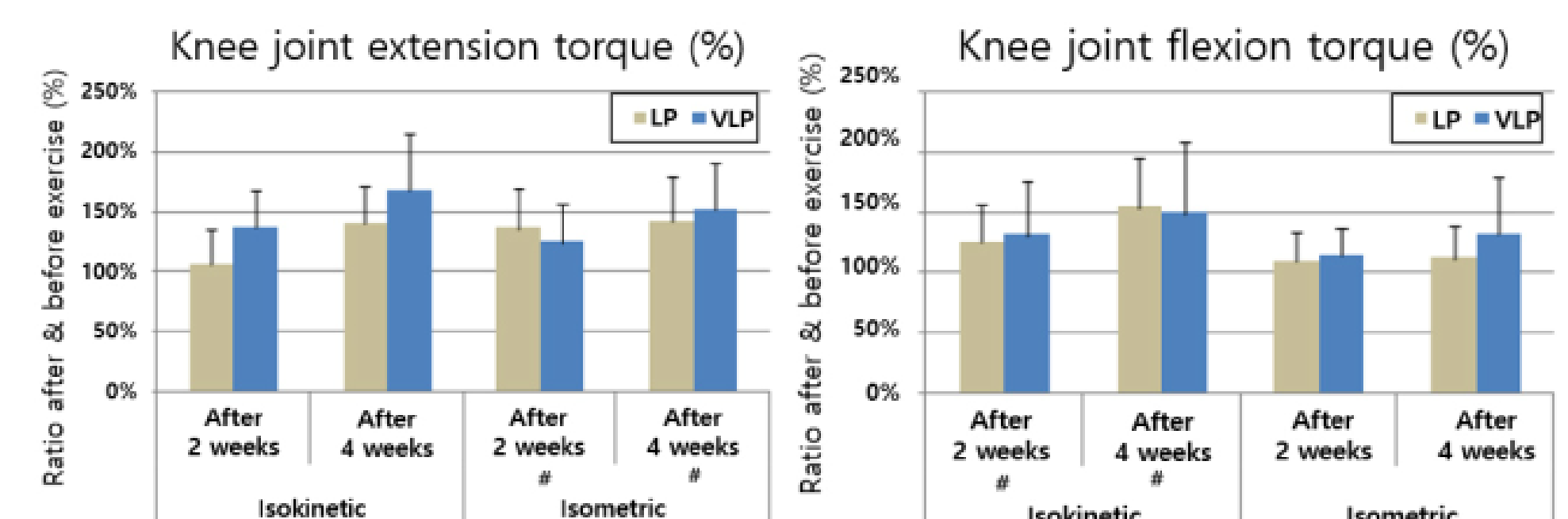


Fig. 3. Summed increase in both knee joint extension and flexion torques.

Note: LP: leg-press; LPV: leg-press with vibration; #: difference between before and after two or four weeks of exercise.

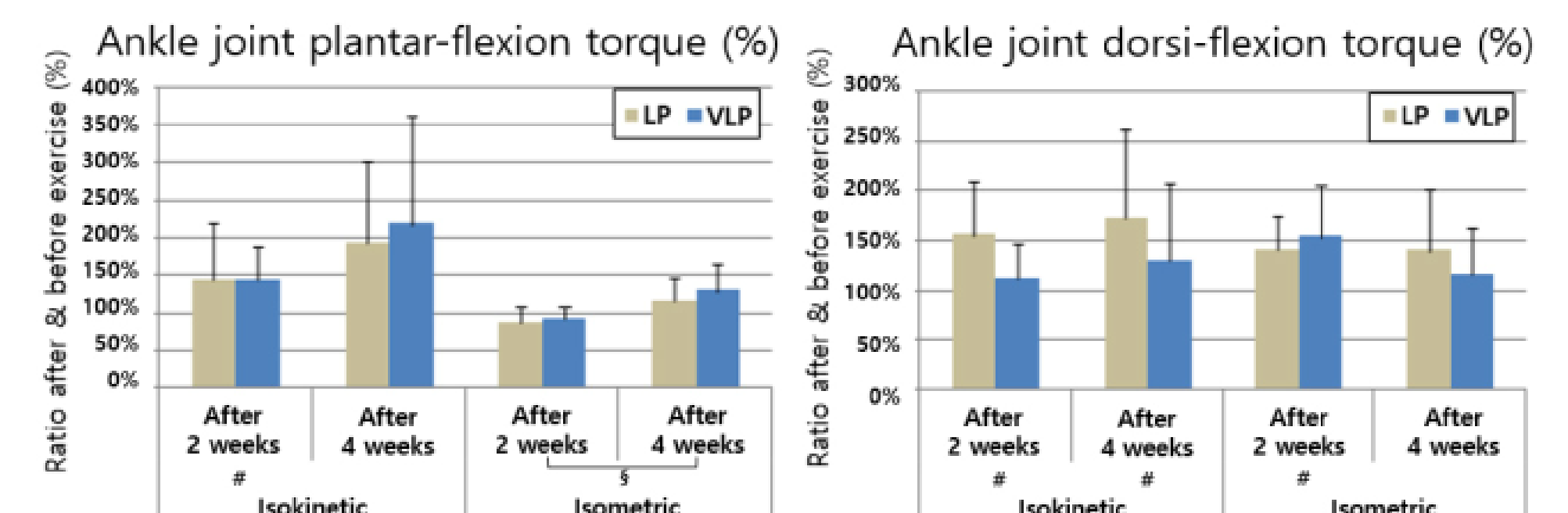


Fig. 4. Summed increase in plantar-flexion and dorsi-flexion torques of both ankles.

Note: LP: leg-press only; LPV: leg-press with vibration; #: difference between before and after two or four weeks of exercise; and §: difference between two weeks and four weeks of exercise.

As a result, both groups had an exercise effect of two weeks or/and four weeks, but **there was no significant difference due to the vibration**. The results are contrary to the findings of many previous studies; this indicates that further research on how vibration is applied as well as on the effects of frequency and amplitude is required.

Acknowledgment

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