

Research Report Entrusted by TSKOREA Co., Ltd.

**Clinical Experimental Report on Aerobic
Exercise Effects of Turbo Sonic
Whole-body Vibration Device**

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I . Research outline

This study attempted to examine the effects of aerobic exercise by measuring oxygen uptake according to whole body vibration by number of vibrations (Hz) using sonic whole-body vibrator.

II. Setting up research questions

1. How many percentage of maximal exercise capacity (maximum oxygen uptake: VO_2max) does whole body vibration correspond by each number of vibrations using a sonic whole-body vibrator?
2. At what speed does the exercise using a sonic whole-body vibrator have an effect of walking (running) when conversing it into general walking (running) exercise?

III. Research methods

1. Research subjects

6 male students who were attending at the department of physical education at K University participated as subjects in this study and their physical characteristics were as in the following.

Table 1. Physical characteristics of research subjects

Group	Age (Yrs)	Height (cm)	Weight (kg)	M±SD
				Maximum oxygen uptake (ml/kg/min)
Experimental group	20.67±2.73	175.00±5.51	70.17±11.58	56.12±5.84

2. Research procedures and contents

This study was conducted by the following procedures.

- 1) 1st experiment: The study conducted an exercise stress testing using a treadmill for 6 testees. All of the testees were young and healthy students; for this reason, the measured protocol was conducted by using Bruce Protocol and the maximum oxygen uptake was obtained by analyzing respiratory gas through a gas analyzer.
- 2) 2nd experiment: It analyzed respiratory gas through gas analyzer while conducting whole body vibration using a sonic whole-body vibrator for 6 participants (testees). In order to measure the effects by number of each vibration (Hz) accurately, it performed the following number of each vibration (Hz) after recovering the respiratory conditions in the stable level by taking a seat and rest for 2 minutes before the variation of Hz for each testee. The change of Hz was conducted as in the following order: 30Hz(3min) - Rest(2min) - 20Hz(3min) - Rest(2min) - 15Hz(3min) - Rest(2min) - 10Hz(3min) - Rest(2min) - 6Hz(3min).
- 3) 3rd experiment: In order to figure out to what intensity of exercise whole body vibration using a turbo trainer would correspond, the study performed a walking (running) while increasing speed by each 3 minutes at speed of 2.7km/h(warming up) - 4km/h(walk lightly) - 6km/h(walk with a quick step) - 8km/h(run lightly) - 10km/h(run fast) for 6 participants and obtained oxygen uptake in each speed by analyzing respiratory gas through a gas analyzer.

IV. Results of study

The following results were obtained through the aforementioned experimental procedures.

1. Exercise intensity of whole body vibration using a sonic whole-body vibrator

After measuring exercise strength of whole body vibration by the number of various vibrations (Hz) using a sonic whole-body vibrator, it has been found that it would correspond to approximately 35~50% of maximum oxygen uptake, and it satisfied 40~70% intensity of maximum oxygen uptake (intensity of aerobic exercise) generally recommended to the patients with geriatric diseases such as obesity or hypertension, diabetes, etc.

The exercise intensity by each number of vibrations (Hz) is shown as in <Table 2>.

Table 2. Exercise intensity by each number of vibrations (Hz)

Item	Oxygen uptake (M±SD) by each number of vibration (Hz)					Maximum oxygen uptake (VO ₂ max)
	30Hz	20Hz	15Hz	10Hz	6Hz	
Oxygen uptake (ml/min/kg)	20.27±1.9	24.66±1.2	26.50±1.7	28.71±3.1	26.85±2.6	56.12±5.84
%VO ₂ max	36.11%	43.94%	47.22%	51.16%	47.84%	

2. Comparison of exercise intensity of whole body vibration and walking (running) exercise using a sonic whole-body vibrator

As a result of comparing and analyzing the exercise strength of whole body vibration and walking (running) exercise using a sonic whole-body vibrator, it has been shown that approximately 35~50% of maximum oxygen uptake (exercise strength of whole body vibration) using a turbo trainer had the same effects as walking (running) at the speed of approximately 4.5km/h(ordinary walk)~7.0km/h(quick step or slow running) when converting it into a walking (running) exercise.

Exercise intensity by each speed is shown as in <Table 3>.

Table 3. Exercise strength by speed of walking (running) exercise

Item	Oxygen uptake (M±SD) by speed of walking (running) exercise					Maximum oxygen uptake (VO ₂ max)
	2.7km/h	4km/h	6km/h	8km/h	10km/h	
Oxygen uptake (ml/min/kg)	6.72±0.98	15.59±2.4	23.52±3.2	32.82±2.1	45.77±4.4	56.12±5.84
		8	4	9	8	
%VO ₂ max	11.97%	27.78%	41.91%	58.48%	81.56%	

V. Conclusion

From the aforementioned results, it has been found that whole body vibration using a turbo sonic whole-body vibrator has been varied to some extent according to the number of vibrations (Hz); however, it was corresponding approximately to 35~50% of maximum oxygen uptake (maximal exercise strength) and it would have the same exercise strength as the walking speed of approximately 4.5km/h~7km/h when converting it into a walking exercise.

Therefore, whole body vibration using a turbo sonic whole-body vibrator would be an effective aerobic exercise that satisfies 40~70% of the maximum oxygen uptake provided as the strength of exercise treatment applied to general geriatric diseases.