

# WHOLE BODY VIBRATION TRAINING (WBVT) – CONTINUING EDUCATION

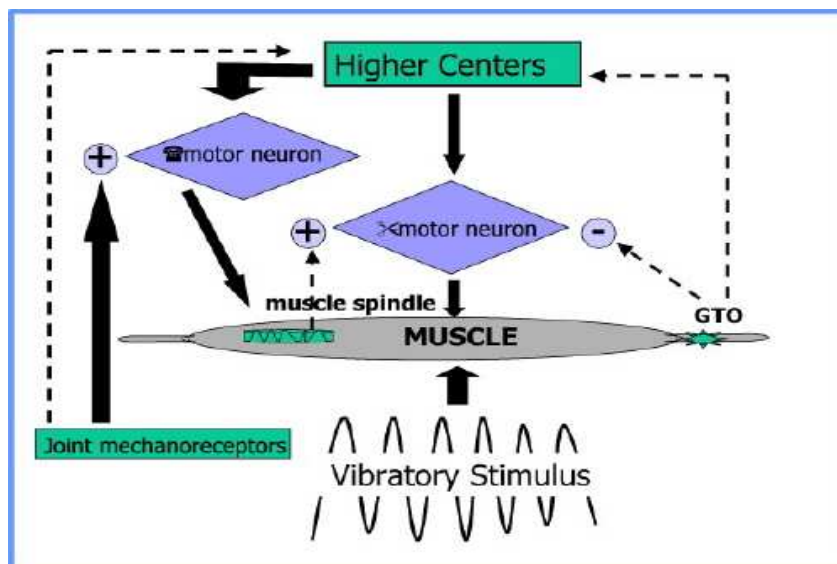
WBVT is a relatively new training aid that has been linked to enhanced muscular strength, power and flexibility (1). Oscillating vibrations are delivered to the entire body via a vibration platform; this apparatus is set at a frequency and amplitude sufficient enough to provide a training stimulus for strength, power and flexibility gains. To date only limited research is available on the optimum protocols for targeting specific training adaptations using WBVT, however, it has been suggested that WBVT augments strength, power and flexibility training and therefore leads to enhanced athletic performance.

## VIBRATION

- \_\_\_\_\_ of vibration (acceleration  $\text{g m}\cdot\text{s}^{-2}$  or displacement - mm, cm, m)
- \_\_\_\_\_ of vibration - measured in Hertz (Hz)
- The level of pre-contraction of the muscle and the position of the body. (5)

Mechanical vibration applied to a muscle stimulate the:

- \_\_\_\_\_ - VT reflex triggers all muscles fibres agonist and antagonists simultaneously but physical load is not exerted on the musculoskeletal system (4). The VT reflex decreases the activation threshold of type II muscle fibres, thus, they are recruited and act simultaneously with type I muscle fibres (4). As seen in Figure 1 the WBVT stimulus sends signals to the brain, initiating the Vibration Tonic Reflex that drives the alpha motor neurons which in turn excite powerful muscle contractions in both \_\_\_\_\_ and \_\_\_\_\_ muscle groups
- Length-detecting sensory receptors the \_\_\_\_\_ (\_\_\_\_\_)



## **FLEXIBILITY**

There are three potential mechanisms responsible for the positive effect VT has on flexibility (14):

- increase in pain threshold
- increase in blood flow with a commensurate increase in temperature, and
- induced relaxation of the stretched muscle

Table 1: Research summary showing the relationship between WBVT and improvements in flexibility.

Author	Muscles/Test	Duration	Amplitude	Frequency	Results
Sands et al 2006 (13)	Static Stretch in Front Split position	10s Stretch 5s Rest for 1 min	2 mm	30 Hz	The acute effects of the vibration treatment resulted in immediate and startling increases in range of motion
Fagnani et al 2006 (15)	Sit and Reach Test	15-45s. Rest 30- 60s 3-4 sets	4 mm	35 Hz	WBV-loading induced percentage increase in flexibility (13%)
Van Der Tillar 2006 (16)	Static/PNF/Vibration Treatment	30 sec before each different stretch – 6 sets	10mm	28 Hz	WBV group showed a significantly larger increase (30%) in ROM than did the control group (14%)

## **RECCOMENDATIONS**

1. Duration: 30 sec/3 sets (Each side)
2. Frequency: 30 Hz (Level 22)
3. Amplitude: Ideally 2-5mm (Our machine = 13mm)
4. Body Position – Hold the static stretch on the machine (Relaxing the stretched muscle)

## **STRENGTH AND POWER**

The most significant role WBVT has in regards to strength and power development is the implications it has on the neuromuscular system. The mechanical vibrations applied to the body simulate a hyper gravity condition (8) and reportedly lead to:

- Increased \_\_\_\_\_ (2, 9,10,11)
- Increased \_\_\_\_\_ (2).

- It has also been shown that vibration-induced activation of muscle spindle receptors not only affects the muscle to which vibration is applied, but also affects the neighbouring muscles (3).

## **RECOMMENDATIONS**

These particular recommendations are very broad and represent the general consensus in the research up to date that current research in this field has failed to identify optimum protocols for gains in strength and power.

1. Duration: 30-60 sec / 3-5 sets (Each side)
2. Frequency: 30-40 Hz (Level 22)
3. Amplitude: Ideally 2-4 mm (Our machine = 13mm)
4. Body Position – Repetitions for desired time of exercise e.g. squat, lunge. Isometric hold of position e.g. squat position at 90 degree angle at knee.

Author	Muscles/Test	Duration	Amplitude	Frequency	Results
Roelants et al 2006	HS, LS, OL-isometric.	4 x 20 sec duration. 1 min rest	2.5mm	35 Hz	Increase in muscle activity v Control Group
Torvinen et al 2002	Vertical Jump/Lower-limb extension	4min – intervals – 3-5/week 8 weeks –	2mm	25-40Hz	Increase in VJ/ Increase in Lower-limb extension strength.
Bosco et al 1999	Leg Press (70kg,90kg, 110kg,130kg)	10mins – 60s on – 60s rest	10mm	26Hz	Improvement in average force average power and average velocity. Shift of velocity/force and power/force curve to the right.

Table 2: Research summary showing the relationship between WBVT and improvements in strength and power.

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