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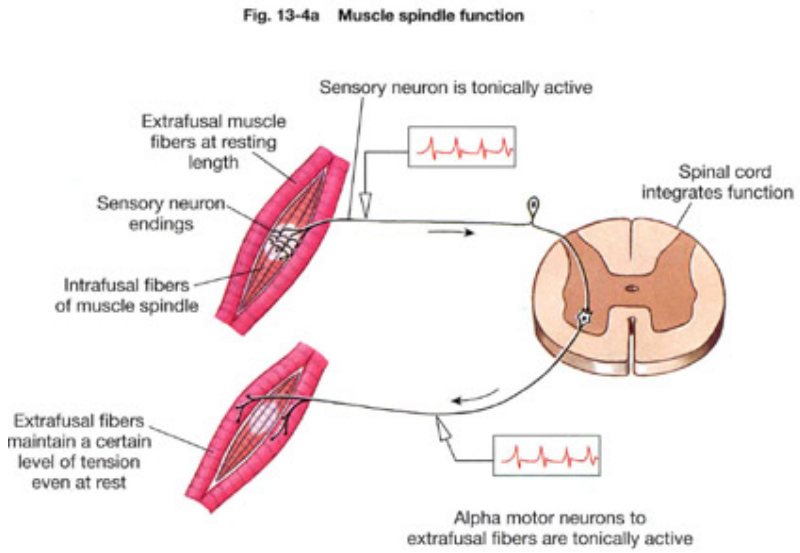
Exercise and Whole Body Vibration

Interventions for Performance enhancement are being developed, researched and modified continuously in the hopes of determining the best and most effective forms of exercise intervention to create optimum physiological adaptation and reach new performance heights. Over the last couple of decades, Whole Body Vibration (WBV) has demanded a fair amount of attention as a possible intervention of exercise for both rehabilitation and performance enhancement.

The current whole body vibration machines work on the principle of increasing muscle activity via activation of the stretch reflex. High frequency postural displacements induced by vibration of the platform produces reflex muscle contractions. The major gains from this form of exercise are in the muscle activity provoked by the vibration stimulus. A Mechanical stimulus is transmitted to the body where it stimulates the sensory receptor called the muscle spindle. When these muscle spindles are stimulated via a stretch in the muscle, the muscle spindle sends impulses to the alphamotoneurons which initiates muscle contractions comparable to the tonic vibration reflex. This facilitates the activation of high threshold motor units which can affect recruitment patterns of fast twitch fibres. These changes in neural integration affect such aspects of performance as power, speed of contraction (velocity) and strength. These have implications in training for different needs amongst groups and individuals.



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Neural Integration is a key component of improvement of the efficiency of muscle activity. Neural integration includes:

Synchrony of muscle activation- This can be best described as an occurrence of events in time that happens without delay or incorrect sequencing. For example, the perfect synchrony of a throw starts with muscle activation and contraction in the core then the shoulder, down the arms, through the wrist and finishing with fingers. The better synchronised, the better (faster and more accurate) the throw is.

Minimisation of antagonist muscles- Best described as the muscle that counteracts the prime mover (muscle demonstration the desired action). If the antagonist does not work efficiently, it can restrict speed of limbs resulting in decreased velocity of movement or greater workload

Muscle recruitment- Greater efficiency in muscle recruitment leads to a greater ability to utilise the muscle fibres available to the individual. This allows greater maximal strength and endurance of lower intensity contractions.

Proprioception- Is defined as the ability to know where the body parts are in relation to space. This improves balance and gait and reduces the chances of falls.

These changes in neural activation lead to an increase in lower limb production that can be vital in increasing performance, rehabilitation or minimising the effects of

Here is a list of benefits associated with Whole Body Vibration as an exercise intervention:

High level vibration (chronic)

Increase strength (dynamic and isometric)

Improved proprioception

Increased balance

Improved gait (elderly and PD)

Increased torque in lower limbs

Increased bone density of hip and spine

Compliance amongst elderly

Increased gait velocity

Improved power

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Low to medium level vibration (Chronic)

Good form of exercise for those with respiratory problems

Increase muscle function in those with Cystic Fibrosis

Decreased spasticity in spastic diplegia

Increased posture in Multiple Sclerosis

Decrease arterial stiffness

High Level vibration (acute)

Decreased postural sway

Negligible cardiovascular risk

Increase in muscle strength and activity post stroke

Low to Medium level vibration (acute)

Increased Flexibility

Safe, low impact exercise

Increase blood flow

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Basic exercises to produce such results in target areas:


Quadriceps and Gluteals


Chest, shoulders, arms

Calves and gluteals

These are not an exhaustive selection of exercises, but these are the most suitable for individuals dealing with neurological conditions due to balance issues as outlined earlier in the booklet. It is recommended that those using WBV for a neurological condition, a chair is placed nearby to rest in between sets. For those looking at performance enhancement, exercises can be created accordingly to target specific areas under the supervision of fitness professionals. Research shows that biggest gains are seen after 8 to 12 weeks with sessions only required to go for 10minutes a couple of times a week.