



Power Plate®

Basic Fitness Academy Training

Application & Effects



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Physiology

Strength I

What happens by a Power-Plate strengthening exercise?

- initiation of muscle stretch reflexes by **pre-tensioned muscles**
(Tonic-Vibration-Reflex = **TVR**)
- Intensive stimulus of nearly all muscle fibers (> 95 %)
- Improvement of inter-muscular and intramuscular coordination



High-quality and high-effective training of strength





Physiology

Strength Ia

What happens by a Power-Plate strengthening exercise?

- Repetitive initiating of the muscle stretch reflex as a function of the chosen frequency and the **muscular pre-tension (Tonic-Vibration-Reflex = TVR)**
- Increase of the recruitable motor units
- Improvement of the synchronization of motor units
- Recruitment of **UNCONSCIOUS** motor units [also volitionally non-responsive motor units]

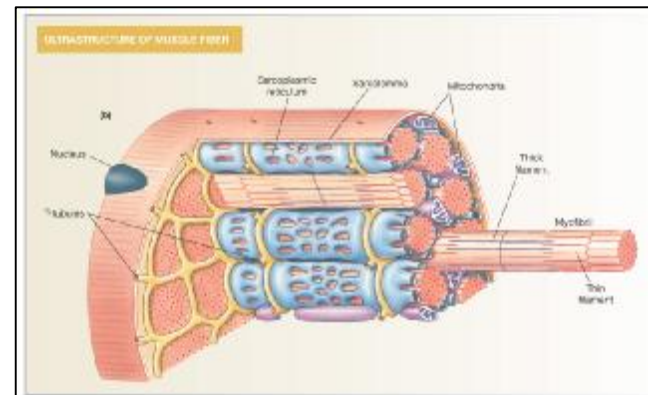
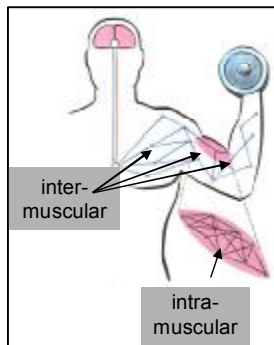
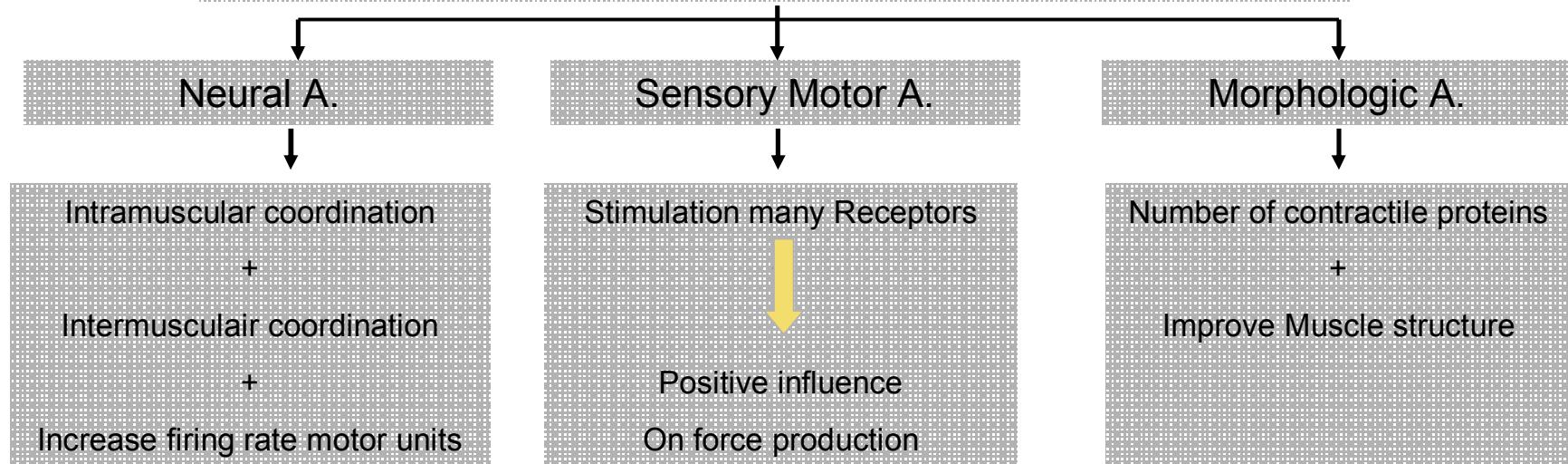


High-intensive and high-effective training of strength with a high coordinative strain



Strength II

There are different levels of adaptation processes





Physiology

Strength III



**Power-Plate strength-training
is training in a “closed system”***



advantages:

Co-contraction of Agonist (e.g. quadriceps) and Antagonist (e.g. hamstrings)

+

Joint-sparing training through reduced shear forces

+

Improvement of the **inter-muscular coordination**

+

Functional patterns of movement

* accept A 15

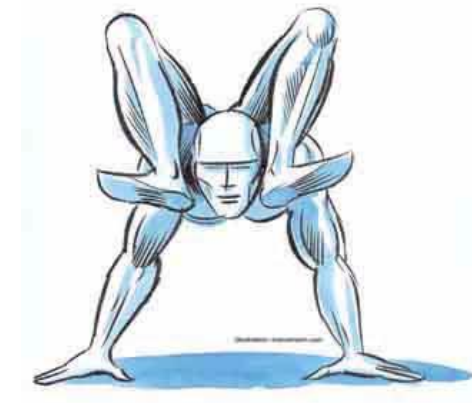


Application & Effects

Flexibility I

What happens during a Power-Plate stretching exercise?

- Reflexive relaxation of muscle
(Relaxing impulses by Golgi-Tendon-Organs and simultaneous reduced activity of muscle spindle)
- Vibration-induced increase of blood-flow causes an increase of muscle temperature
(Reduction of stretch-resistance)
- Reduced sensation of pain



Immediate improvement of flexibility



Application & Effects

Overview: Strength and flexibility with the Power-Plate



Vibrations initiated by high muscle pre-tension



dominance of the muscle spindle activity



positive adaptation in strength



Vibrations initiated by low muscle-tension



Dominance of the Golgi-tendon-organ-activity



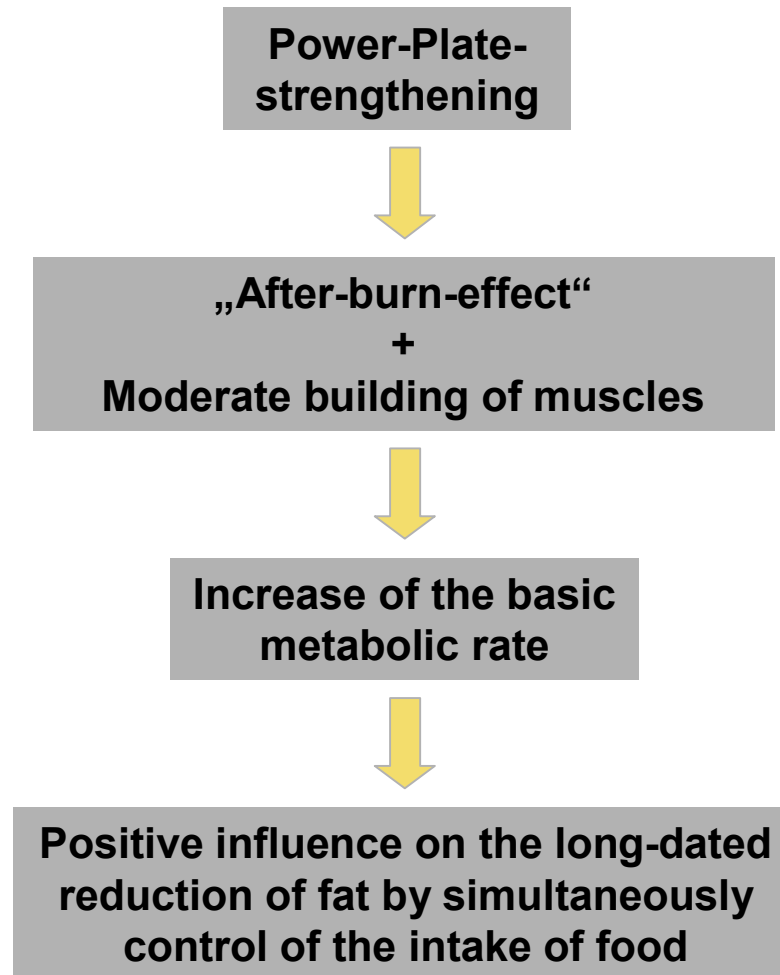
positive adaptation in flexibility

The described effects are depending on the tension in the muscles!



Application & Effects

Power-Plate Influence on body-composition Ia



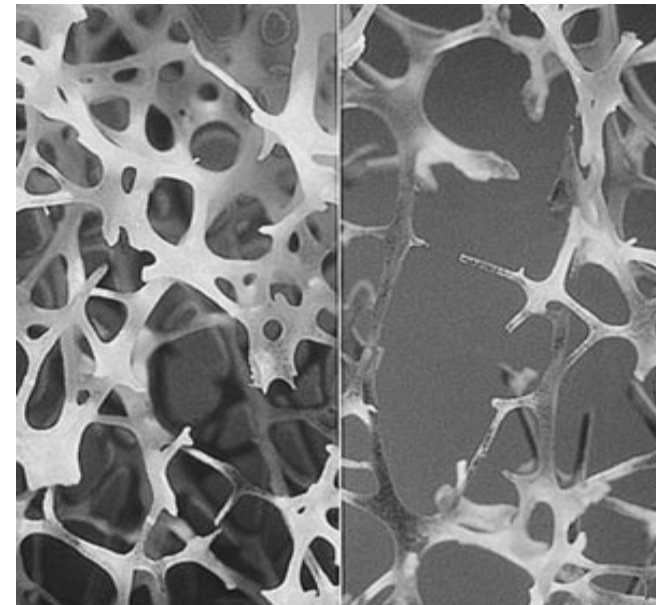


Application & Effects

Power-Plate Influence on bone-density

The following factors determine the bone density:

- Tensile and compressive loading on the bones as a reaction of muscle activity
 - Velocity of deformation
 - Increase of fluid flow in the osteomatrix
-
- UV-light (vitamin D)
 - Hormones
 - Nutrition



healthy

osteoporotic

Power-Plate Effects



Application & Effects

Power-Plate Influence on hormones

Release of:

- Human growth hormone (muscle building)
- Endorphins („happy“ hormones)
- Testosterone (muscle building)

Reduction of:

- Cortisol (long-time-stress marker)





Application & Effects

Power-Plate Influence on pain

All structures of the skeletal system contains nociceptors excluding cartilage

Selection of pains:

- Muscular pains
- Connective tissue pains
- Neural pains

Power-Plate effects:



- Stimulation of all the mechanoreceptors
- Stimulation of the lymphatic system



- **Less stimulation of the nociceptors**
- **desensibilization**

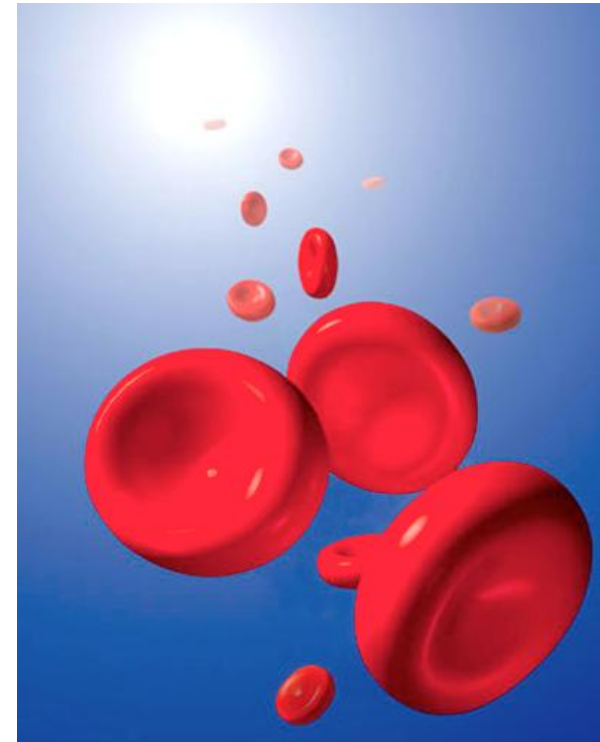


Application & Effects

Power-Plate Influence on blood flow

Vibrations stimulates the muscle-pump-effect and causes an increase in blood-flow (i.e. in problematic areas!) with an improvement of transport capacity for:

- Oxygen / carbon dioxide
- Vitality components (micro nutrients)
- Energy components (macro nutrients)
- Derivates and wastes (i.e. acids)

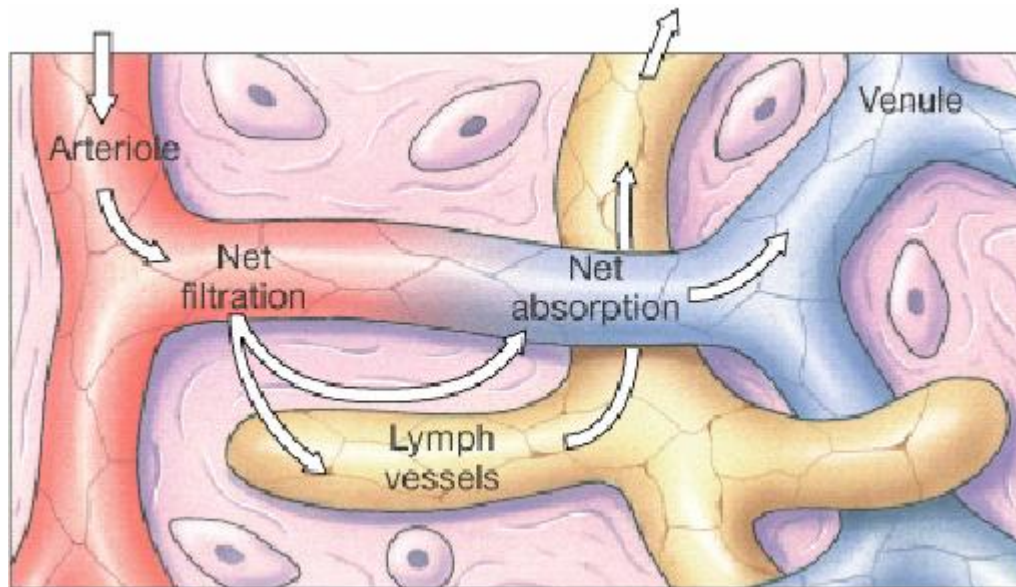




Application & Effects

Power-Plate Influence on lymphatic system

The lymphatic system is responsible for drainage of fluids and filtering of derivatives. Malfunction and bad eating behavior provokes edema, higher concentration of acids and derivatives in the connective tissue.



Power-Plate leads to vibration-induced muscle-contractions and an increased blood flow, which stimulates the lymphatic reflux.

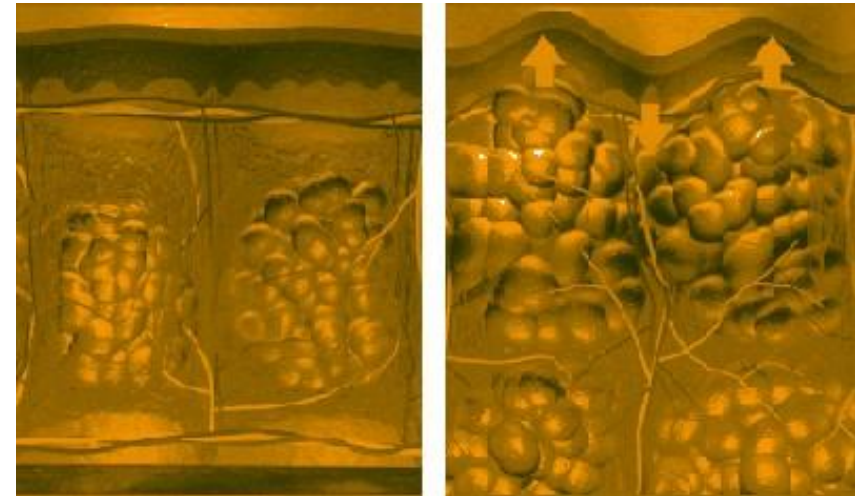


Application & Effects

Power-Plate Influence on cellulite

Reasons of cellulite:

- Enlargement of the fat cells
- Development of buckles by weakening of the connective tissue
- Additional metabolic problems:
 - reduced lymphatic- and blood-reflux
 - edema
- Genetic predisposition



Effects of Power-Plate:

- stimulation of the lymphatic reflux („muscle-pump“)
- stimulation of the blood-flow in problematic areas

