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Power Plate® Training Improves Sprint Performance

Effects of Power Plate® Training on Sprint Running Kinematics and Explosive Strength Performance

This is a summary of a study published in the international scientific journal *Journal of Sports Science and Medicine* (2007) 6, 44–49.

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Study Conclusions:

1. Performance on the 10 m, 20 m, 40 m, 50 m and 60 m sprint improved significantly after six weeks of Power Plate® Training, with an overall improvement of 2.7%.
2. Step length and running speed improved by 5.1% and 3.6% respectively.
3. Countermovement jump height increased by 3.3%, and explosive strength endurance improved by 7.8% overall.

The Power Plate® Training period of six weeks performed on the "classic" Power Plate machine produced significant changes in sprint running kinematics and explosive strength performance.

Introduction:

Sprint performance is determined by the ability to attain maximum running speed as fast as possible, achieving the highest running speed and by maintaining this speed for the required time or distance. By improving specific kinematics such as step length, step rate and running speed, as well as increasing explosive strength, sprint performance can be improved. These kinematics can be trained by improving optimal motor neuron excitability and fast twitch fiber recruitment.

Previous studies suggest that Power Plate® Training causes length changes in the muscle which stimulates receptors, most likely muscle spindles, eliciting the "tonic vibration reflex." This reflex plays a part in making movements more efficient. Additionally, there are indications that the recruitment thresholds of motor units of muscles during vibration are lower, compared to voluntary contractions. This means your muscles will contract with a smaller stimulus, resulting in faster reactions. As Power Plate® Training is also reported to improve fast twitch recruitment, it was hypothesized that Power Plate® Training would result in a significant increase in sprint running kinematics and explosive strength/jumping performance in non-experienced athletes.

Method:

Twenty-four volunteers were randomized into two groups. One group performed a six-week training program on the Power Plate machine; the control group did not participate in any training.

Figure 1

Squat

Wide Squat

The "classic" Power Plate was manufactured by LATAM b.v. for PPI between 2000 and 2004

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The training group performed a warming up followed by a session on the Power Plate machine for 16 to 36 minutes, three times per week. They performed four static exercises (squat, wide squat, one-legged squat for both legs, see fig. 1). For the first weeks, all of the exercises were performed at 30 Hz low and an acceleration of 2.28 g. During the course of their training, the program was intensified according to the overload principle:

Week	Exercises	Time (sec)	Repe-titions	Rest between exercises (min)	Sets	Rest between sets (min)
1-3	4	40	2	1	3	2
4-6	4	60	3	1	3	2

Results and Conclusions:

It can be argued that increasing step length could produce more velocity. However, if step length increases and muscle force remains the same, step rate should decrease. Accordingly, producing a slower step rate should lose the gain from a greater step length. The results of the present study indicate that the gain of step length was greater than the decrease of step rate (5.6% vs. - 3.9%), so the net effect was an improvement of running velocity (see fig. 2).

The Power Plate® Training period of six weeks produced significant positive changes in kinematical characteristics of sprint running and explosive strength characteristics in non experienced sprinters, most likely due to the improved muscle contractions it provokes. The Power Plate Training group showed improvement in all of the parameters that were tested: running time, running speed, step length, step rate and counter movement jump. The explosive strength endurance improved by 7.8% (see fig. 2).

Sprint performance was enhanced, with a net effect of improvement of running velocity and decreased time interval over 60 meters. Jump height and explosive strength endurance also improved in the group that used the Power Plate machine.

Overall, the conclusion of the researchers is that Power Plate Training stimulates the sensory receptors and the afferent pathways, leading to a more efficient use of the stretch reflex. It allows for specific training of the fast-twitch fibers, contributing significantly to high-speed movements. In everyday life, improving these qualities will allow people to increase efficiency of movement and to prevent injuries.

Figure 2

A Power Plate® Training period of six weeks produced significant positive changes in kinematical characteristics of sprint running. The results of the present study indicate that the gain of the step length was greater than the decrease of step rate (5.6% vs. - 3.9%), so the net effect was an improvement of running speed, resulting in enhanced sprint performance.