

Measuring Speed The Tendo Unit

By: Louie Simmons

Have you ever wondered how you measure up to other athletes or lifters? Are you quick with light loads? What about heavy loads? How explosive are you when jumping or bounding? These are just a few very important questions that need to be addressed.

Let's look at a device that can do just that. It's the Tendo velocity measuring device. It measures the speed of a lift in meters per second or the actual wattage produced by an athlete.

For sprinting you can determine the quickness of the athlete. Quickness is the ability to perform high-speed movements with no significant external resistance or great energy, meaning simply how fast one reacts to a stimulus. Some drills for sprinting would be one-leg bounding for either stride length or frequency or bounding over hurdles or box jumping or plyometrics. By attaching the Tendo unit to the athlete, the speed being developed can be measured. The Tendo unit can also measure the velocity with which one throws a medicine ball of different weights.

While beginners will gain explosive strength as well as maximal strength from jumping, for the advanced athlete the same exercises will not produce the same results. Barbells must now be incorporated into the training. The Tendo unit can be attached to a bar to measure how fast one can move a light weight for speed strength and near-maximal weights as well. By using a determined amount of rubber bands on the bar, one can regulate the bar speed to simulate explosive speed or even strength speed work. The more bands used, the slower the bar speed becomes, representing near-maximal or maximal loading. If you do not become faster, you will not become stronger. Also, if you do not become stronger, you will cease to become faster. The Tendo unit can determine this.

When the yearly plan calls for a general preparation microcycle or a sport-specific microcycle with different activities or with weights plus jumping, the Tendo unit can help log important data from month to month or year to year. It can help determine how many jumps per set or the total volume of jumps for the optimal jump loading. This could provide valuable information to the coach and athlete.

The Tendo unit can regulate the intensity zone at which an athlete can best perform as well as when to wave into a different loading zone. Training is individual. Introverts need a slower pace of exercise, whereas extroverts require more stimulation, meaning more exercises of variable intensity. The Tendo unit could dictate when it's time to switch exercises.

Many times exercises are performed in a fatigued state to simulate a contest environment. The Tendo unit could be used to regulate the amount of sets or reps before a decreased training value distorts progress.

The Tendo device can be used by hockey players when hitting a regular or heavier puck or to determine what weight is optimal for a baseball player's bat. It could be used for all types of strength development, not only for vertical but also for lateral movement. A shot-putter can track his or her speed with the Tendo unit with shots ranging from 7 to 12 kg. A hammer thrower can be tested with a short, standard, and long wires to determine his quickness with each. This would tell the coach which types of strength the athlete needs improvement on.

In powerlifting or weight lifting, top velocity while lifting weights is essential, especially with the five classical lifts. The amount of weight will determine just how fast the particular load moves. The Tendo unit can measure the speed of any load up to 100% max lifts.

Does an individual lifter squat 700 pounds mostly by speed strength or strength speed? This can be determined by doing squats with a high percentage of bands, roughly 65%, with 35% bar weight. This type of squat is very slow, allowing for no momentum. This produces strength speed.

For speed strength 40% of the total weight is bar and plates. At the top, bands add 25%, making the top weight 65% of a 1RM. At the bottom, the band tension adds 10% to the bar, thereby making the weight at the bottom 50%. The bands accommodate resistance. They reduce the deceleration phase of the barbell. Remember, any motion that has acceleration also has a deceleration phase.

While pressing, pulling, or squatting, the acceleration of the bar depends on the net force acting on the bar. This changes as external resistance is increased or decreased. With the Tendo unit, the bar velocity can be checked at any bar speed, whether for speed strength, strength speed, or near-maximal weights of 90-97% of a 1RM.

The Tendo unit is used primarily to control bar speed for the development of special strengths. As an experiment in the bench, Karen Sizemore, an official 450 bencher, was tested with a variety of weights. Her power output was measured with each weight:

| Weight (lbs) | Power output (watts) |
|--------------|----------------------|
| 45 | 270 |
| 95 | 379 |
| 135 | 474 |

145

453

155

459

Karen's normal training weight is 135 for 9 sets of 3 reps. As you can see, 135 pounds resulted in the highest power production. A band was attached to Karen's bar to add 45 pounds extra at the chest to equal 180 pounds. The bands added an additional 85 pounds at the top to equal 220 at lockout. The Tendo unit proved we were using the correct weight for her speed work.

What if you want to raise a training weight for speed strength? Fred Boldt has made official benches of 450, 480, and 495 at 165 pounds. His bar speed was 68-72 meters/second with 185. We raised his training weight to 195. Fred's bar velocity remained the same, which produced an official 540 bench at 163 pounds. Without the Tendo unit we could only guess as to what weight to use as his strength is raised. (Fred also used the same band tension as Karen.)

It may be surprising to many, but if you look only at Karen's chart, you can see that weights can be too light or, of course, too heavy to produce much force. The Tendo unit has many applications in sport. Sometimes what appears to be the truth is not.

At Westside, we do a lot of lifts in the lightened method to increase speed. In track, the athlete runs down a track inclined 4 degrees or runs while being pulled back by an elastic cord. A rower can row a lighter boat. Throwers can use lighter shots, hammers, or disks. All of these movements can be measured by the Tendo unit. Training is based on a particular sport, but must be controlled individually by the athlete. These are just some applications that the coach or athlete can use to determine optimal training loads to increase progress. It works while doing general, directed, or sport-specific exercises, which highly trained athletes must do year round. The Tendo unit is a great tool for anyone whose goal is to reach the top.