

# Four-week specific training to increase speed, power and agility

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## **Objective:**

To increase speed, power and agility using a selection of exercises on the Versa Pulley.

## **Introduction:**

The following is a claim made by Heart Rate Inc., who manufactures and distributes Versa Climbers and Versa Pulley:

Versa Pulley is a high-low pulley machine designed to improve athletic performance. It utilizes a patented infinitely variable cam and MV2 technology for sport specific strength and power training. Versa Pulley provides a true stretch-shorten cycle for closed chain, multi-plane and multi-joint exercises. The infinitely variable automatically matches the force exerted by the user to the resistance provided by MV2 technology. The unique resistance is dynamic isokinetic resistance (or) a compliant force and compliant speed over the full range of motion. MV2 is a revolutionary, gravity free resistance system, using a flywheel mechanism to store energy an athlete provides through the concentric contraction then releases the energy through the eccentric contraction. This technology also allows for a short amortization phase to develop greater force and power production. Versa Pulley accommodates the athlete from a minimal to maximal rate of force development. It allows them to pre-load, load and release energy at full speed with maximum performance and efficiency. Superior to any other strength machine, the Versa Pulley increases the power of movements by developing the natural elastic stretch reflex component of muscle and tendon. The increased deceleration loading trains the muscles to store and release energy quickly to provide greater power in a non-impact environment, bridging the gap between sheer strength and power. The maximum sport specific transfer is obtained when the conditions and the demands of the sport are virtually identical to training sessions. The Versa Pulley allows for multi-plane and multi-joint exercises with variable speed and force to mimic an athlete's true movement patterns. Going far beyond the fixed loading and single plane movement of most weight stack machines, Versa Pulley allows for unlimited multi-joint and multi-plane movement. Rotational lifting to chopping movements integrates more muscle, joint stabilization and neuromuscular involvement for optimum sport specific training. This perpetual compliant resistance technology matches both the force and speed capability of the athlete. Thus, all sport

specific multi-plane, multi-joint movements can be performed at their maximum power output. MV2 technology provides a limitless amount of power, strength and endurance training routines to meet all training levels of an athlete. This functional form of exercise increases joint stability and the neuromuscular involvement that is required in sports. The more integrated and related the movement, the more likelihood for improving performance and preventing injury. Versa Pulley offers unsurpassed versatility to replicate simple to complex training movements. It gives you a tool to involve more planes, joints, stable to unstable movements, slow to fast intensity, all functionally matched to the capability of the user.

## **Method**

### *Subjects*

Healthy, active men (n=5) and women (n=2) with a history of participation in athletics. Backgrounds ranged from football, wrestling, track and field, volleyball and cross country. The average age for subjects was 28.86 years (SD= 6.79). All exhibited a variety of speed, power and quickness, voluntary as subjects. Each subject was taken through testing procedure with instruction. Also, throughout the four-week study an observer watched the subjects perform each exercise to ensure proper technique was used for each repetition.

## **Testing Protocols**

### **Power**

*Vertical Jump (VJ)*: The VJ was measured using a Vertec apparatus with a two-footed takeoff with no approach step allowed. First, the subjects measured their reach with fully extended double arm above head and then attempted three jumps. The best of the three jumps was scored and then the reach was subtracted from the total jump.

### **Speed & Agility**

Speed and agility was determined by using a photoelectric timing system for the following tests. The system consisted of a sensor pad for the start time and a laser component at the finish line to end the trial.

*Pro-shuttle Run (PSR)*: The athlete began in a three-point stance from a position in the middle of the timing gate. The electronic timer started when the athlete moved from the sensor pad. The test required the athlete to run 4.56m to either right or left, touch a cone with his/her hand, reverse direction and run 9.1m, touch the cone with opposite hand and run back through the timing gate that recorded the elapsed time. The faster of two trials was recorded.

*36.58m Dash*: Each athlete started in a three-point stance with one hand on the sensor pad. The time started when the athlete moved hand from the pad and ended when the athlete crossed the laser at 36.58m

## Procedure:

Each individual performed the following 12 lower extremity exercises using contra lateral arm motion (given the position on the machine, where resistance is traveling through and force level):

1. Standing single leg claw motion with foot strap (facing towards the unit):
  - a. Left Leg (Clip #5 with Force Level 1)
  - b. Right Leg (Clip #5 with Force Level 1)



2. Standing single leg knee drives with foot strap (facing away from unit):
  - a. Left Leg (Clip #2 with Force Level 1)
  - b. Right Leg (Clip #2 with Force Level 1)



3. Pelvic drives with Vertimax Belt (facing away from unit):

- a. Double leg (Clip #2 with Force Level 1)
- b. Right leg (Clip #2 with Force Level 1)
- c. Left leg (Clip #2 with Force Level 1)  
(as seen on video)

4. Lateral drives with rotation with Vertimax Belt (facing sideways to the unit):

- a. Left Leg (Clip #2 with Force Level 1)
- b. Right Leg (Clip #2 with Force Level 1)



5. Vertical jumps with tubing handles (facing towards the unit):

- a. Double leg (Base clip with Force Level 1)
- b. Left Leg (Base clip with Force Level 1)
- c. Right Leg (Base clip with Force Level 1)



Each individual performed 12 repetitions per exercise unless fatigue altered the pattern of the desired movement. Rest periods were determined on the performance of the exercise using a 3-to-1 principle. During the first week of the study, only one set of exercise was performed three times per week. During the second week of the study, two sets were performed with 12 repetitions per set. During the third week of the study, three sets were performed. That was the greatest amount of exercise performed. During the fourth week of the study, three sets were performed again to maintain the desire intensity.

## Hypothesis

By only using the Versa Pulley with MV2 technology, an individual can increase his/her speed, power and agility. The lower body movements included within the study replicate sport-type of skills necessary to succeed on the playing field. By performing the given 12 exercises listed in the study, an individual can enhance performance and prevent injury.

## Results

In the 36.58m run, only one subject's time increased. The mean improvement for each subject in the test was 0.09 seconds with the mean time of 5.97 seconds. Within the 12 exercises, only two exercises were directed toward lateral speed improvement, which could have inhibited the post-test scored for the PSR. The mean improvement for the PSR was only 0.02 seconds faster. The biggest improvement of the entire test came from the VJ with a mean of  $22.17 \pm 6.17$  inches. The mean improvement for each subject was 0.83 inches.

Tests	Pre-Test Score	Post-Test Score	Improvement
<i>Speed</i> 36.58m Dash	6.06±0.84	5.97±0.85	-0.09±0.1
<i>Agility</i> 18.29m Shuttle	5.08±0.59	5.06±0.57	-0.02±0.08
<i>Power</i> Vertical Leap	21.33±6.38	22.17±6.17	0.83±1.17

## **Discussion**

College coaches today want athletes who are faster, quicker and more powerful. The level of competition among the collegiate level continues to increase. The "gold standard" for the recruits is the 40-yard dash (36.58m). If an athlete can improve his/her time in that test, along with being explosive, college coaches will be knocking at his/her door with a scholarship. Speed improvement can be a great asset for an athlete to master, but it takes a lot of time for training and instruction. Proper mechanics need to be used to maximize ones' potential for speed, thus during the study, once the form of the exercise was compromised due to fatigue, the subject would be instructed to cease that set. VJ test is the best indicator for explosiveness in the lower body. Being able to propel ones own bodyweight up through the air requires great skill and power. Individuals with great lower body strength may not perform as well on the VJ test because of the speed component involved. The squat is the most traditional lower body strengthening exercise used in sports. When an athlete performs a squat, the movement is done in a slower pattern than a jump, thus missing the explosive power training required to improve VJ. By performing vertical jumps with low resistance, the legs receive the benefit of explosive training. It appears that specific training can help to improve an athlete's VJ and 36.58m run. The selection of exercise better suits the VJ and 36.58m run better than the PSR. If a few more exercises were added to the list to increase change of direction, speed and quickness, one could expect improvement in the PSR similar to the VJ and 36.58m run. Also, the skill level required in the PSR is greater than the 36.58m run and VJ, so practice could additionally better the time.

## **Summary and Conclusion**

Speed, power, and agility improved using the Versa Pulley following a 4-week specific training program of 12 exercises. The Versa pulley allowed for low resistance and the development of speed and quickness. Body balance and control were necessary and emphasized in performing all exercises; exercises ceased when proper technique was compromised. Timing, concentration, and being focused are important components of performance and injury prevention; the Versa Pulley enhanced these components of fitness.

The Versa Pulley in this study was used for the development of multi-planes of movement in the lower extremities using low resistance for the development of speed and quickness.