

WHAT'S YOUR VECTOR, VICTOR?



by Norm Meltzer

In the May 2002 Perform Better News & Views, Juan Carlos Santana wrote a very good article on non-vertical resistance training. In the article Mr. Santana discussed resultant force vectors and the advantages of improving one's ability to "overcome" them. I would like

to take this concept one step further and offer an additional training method for stimulating the multiple forces associated with athletic situations.

The traditional way of training to better deal with these complex forces is to predetermine an activity's resultant vector and then prescribe an exercise whose motion directly opposes it. Utilizing these kinds of exercises is both smart and effective, however, there are certain limitations.

In athletics, the direction of our motion isn't necessarily the direction of the force we are applying. Examples:

- throwing a football while being pulled down
- skating forward when an opposing player is pushing you sideways

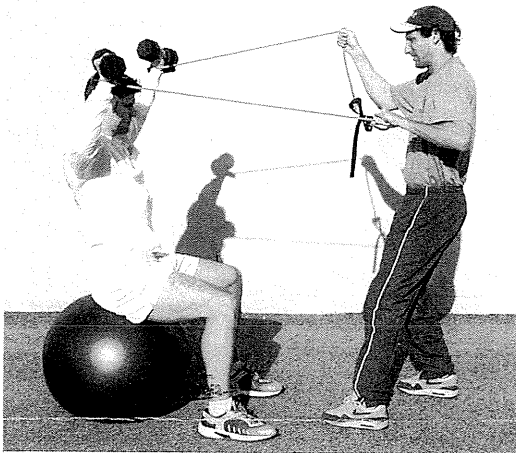
In these types of situations, the challenge is to maintain an intended directional motion while fighting off opposing forces. Instead of using only exercises whose motion is in direct opposition of the resultant force vector, one should also do some exercises that introduce additional forces that try to push or pull us off a straight path.

Throw Another Vector Into Some Regular Traditional Weightroom Exercises –

To achieve this training effect, we use a combination of band/cords with free weight exercises. Use any method you can think of.

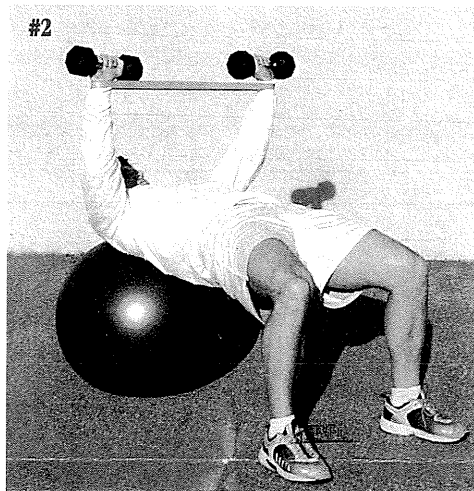
As long as an additional force is trying to disrupt the normal movement pattern of the exercise, you're on the right track.

#1



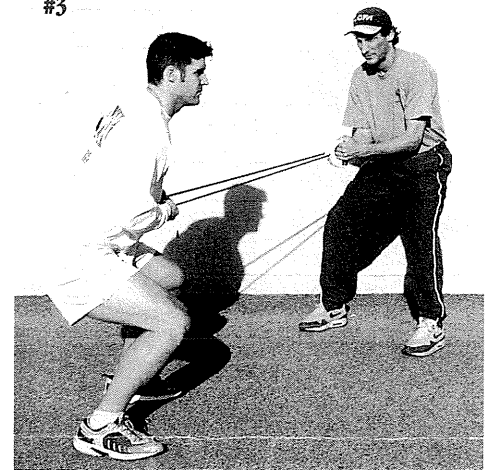
#1 This exercise was originally an experiment in shoulder injury prevention. Among my athletes with shoulder problems who were participating in sports associated with shoulder problems (ie.: swimming), there was a tendency of weak lower trapezius muscles. This version of the press was an alternative to some of the prone shoulder flexion/horizontal abduction movements. From there it evolved into a more interesting exercise with several variations. In my program, we most commonly include dumbbells and use the cord to provide random forces. This is accomplished by the cord holder pulling unpredictably in every conceivable direction; varying the cord tension, pulling side to side, diagonally, circular motions and so forth. There are many options depending on the objective of the exercise. The athlete performing the exercise has different grip positions from which to choose. The cord-holder can stand in front of the athlete, behind the athlete. Two holders can stand on each side or at any given angle.

#2



#2 This variation of the dumbbell bench press is a great dynamic stabilization exercise for the shoulders as is the exercise of illustration #1. Although I don't have EMG data on muscle activity, general assessments suggest recruitment of posterior deltoid, infraspinatus, middle trapezius, and rhomboid in addition to the typical bench pressing muscles. The exercise is performed with standard bench press technique while maintaining constant tension on the band (keeping the dumbbells equidistant) throughout the entire range of motion.

#3



#3 This is an example of the multiple force concept being applied to a lower extremity exercise. The athlete performs body-weight squats while a partner actively pulls on the athlete in an arching motion. We usually have the holder run back and forth from one side of the athlete to the other (180 degrees). The holder alternates sets of pulling from in front of the athlete and then behind the athlete. This is a great balance exercise because it's so conducive to athletic situations that involve physical battles between opposing players.

Balance involves keeping one's center of mass over a given base. The two variables that can be manipulated to make something a balance exercise are thus an athlete's center of mass and/or an athlete's base. Many of the popular balance exercises minimize the area of the base. Given the circumstances under which we play sports, I believe it's more functional to work balance by displacing the athlete's center of mass. The illustrated exercises accomplish this by applying substantial outside forces in an attempt to disrupt the athlete from his solid and comfortable athletic position.

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