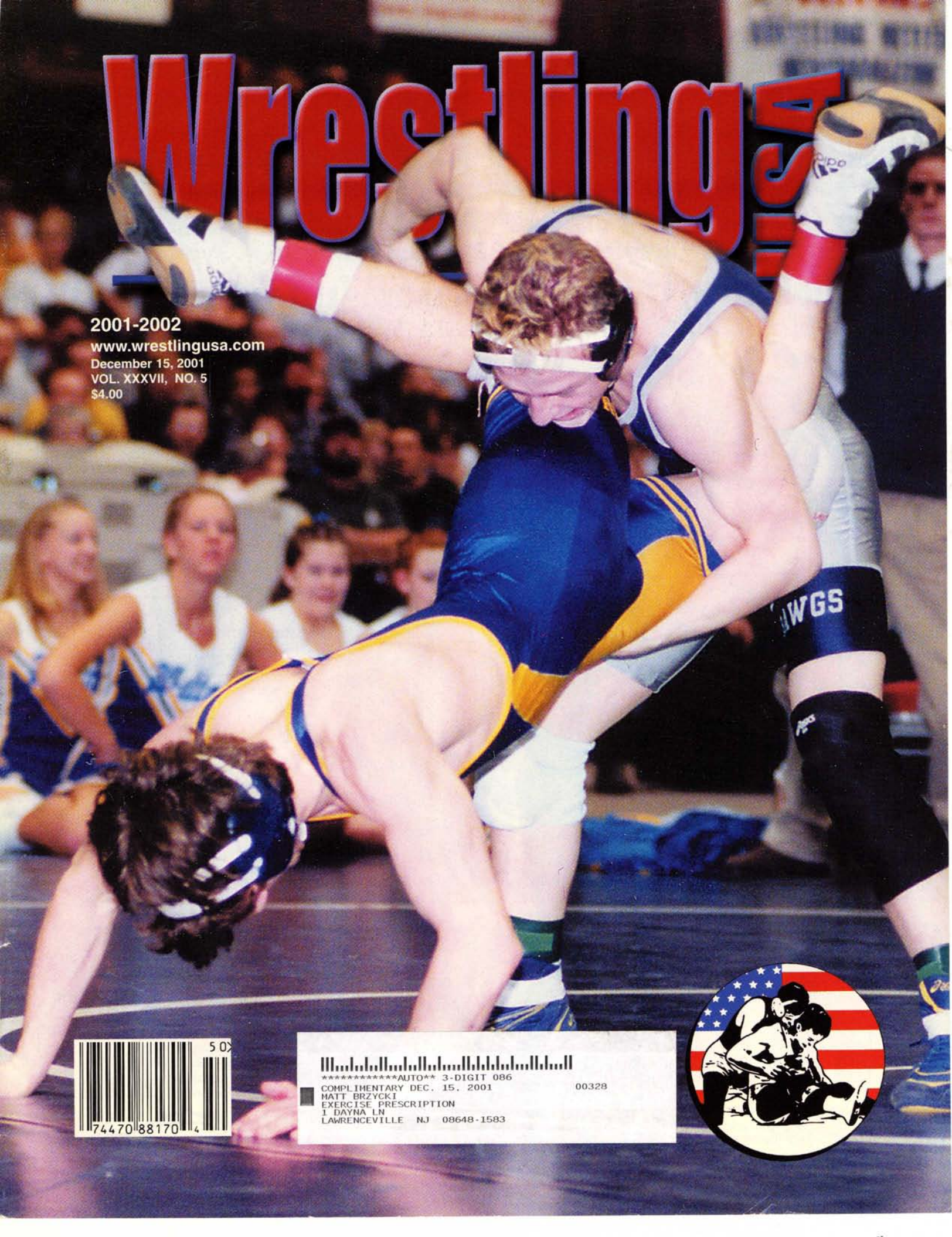

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Improving Power for Wrestling

By Matt Brzycki

One of the most important aspects of performance potential is power. It's no surprise, then, that coaches and wrestlers are constantly looking for ways to improve this valuable physical quality.

It has long been thought that you must perform the so-called "quick lifts - such as the power clean, push press, snatch and/or their derivatives - and do fast-speed repetitions to improve power. When coaches or wrestlers learn that our wrestling staff does not advocate these methods, they sometimes comment that we don't "train for power" or do "power training." The fact of the matter is that our wrestlers "train for power" and do "power training" - but not by implementing the quick lifts or fast-speed repetitions.

How is it possible for wrestlers (or other athletes) to improve their power without using these methods?

WHAT IS POWER?

Before discussing how power can be improved, it is important to understand the meaning of the term. In physics, a mathematical definition of "power" is "work divided by time." Since "work" is defined as "force times distance," it follows that power is also "force times distance divided by time."

Another definition of "power" is "force times velocity." The term "velocity" is defined as "distance divided by time." Once again, it follows that "power" is "force times distance divided by time."

So power has three variables: force, distance and time. Manipulating any of these three variables will affect power.

METHODS FOR IMPROVEMENT

Based upon the equation "power equals force times distance divided by time," you can improve power output three different ways: (1) increase the amount of force; (2) increase the distance of application; and (3) decrease the time of application.

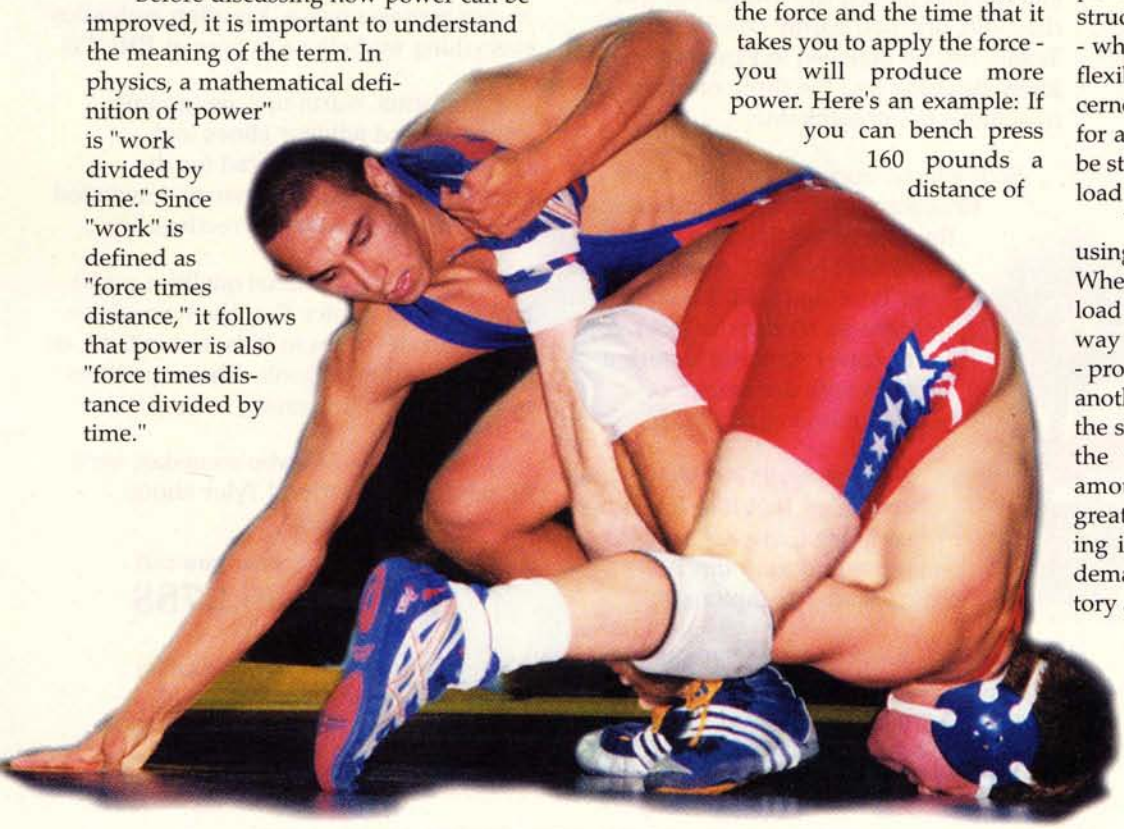
Increase the Amount of Force

If you increase the amount of force that you apply and keep the other two variables in the equation the same - namely, the distance over which you apply the force and the time that it takes you to apply the force - you will produce more power. Here's an example: If you can bench press 160 pounds a distance of 18 inches (1.5 feet) in 2 seconds, your power output is 120 footpounds per second. [160 lbs. x 1.5 ft ÷ 2 sec = 120 ft-lbs/sec.] Suppose that at some point in the future, you increased your bench press to 180 pounds. Assuming that the distance you moved the resistance (18 inches) and the time it took you to move the resistance (2 seconds) remained the same, your power output is now 135 foot-pounds per second. So by increasing the amount of force that you applied, you have improved your power output.

How do you increase the amount of force that you apply? The short answer is to increase the strength of your muscles. If you increase the strength of your muscles, they can produce more force; if your muscles produce more force, you will have the potential to produce more power.

How do you improve your strength so that you can produce more force? While there is no shortage of opinions, any strength-training program will be productive if - and only if - it incorporates the Overload Principle. Arguably, this principle is the most important underlying construct for improving physical performance - whether it is strength, endurance or even flexibility. As far as strength training is concerned, the principle suggests that in order for a muscle to increase in strength it must be stressed - or "overloaded" - with a workload that is beyond its present capacity.

You can overload your muscles by using the Double-Progressive Technique. When implementing this technique, overload is accomplished by two means. One way is to make the resistance - or the "load" - progressively more challenging over time; another way is to do more repetitions with the same resistance. A muscle will adapt to the "overload" - from using a heavier amount of resistance or performing a greater number of repetitions - by increasing in strength. Without imposing greater demands, there will not be any compensatory adaptation because a muscle will liter-



2001 Junior National Freestyle Championships. 191.5 lb. Andy Rios, Ohio, in a scramble against Jeff Clemens, Ohio. Clemens won the match 6-5 for the national title. Photo by Linda McIntire.

ally have no reason to get stronger. Stated otherwise, a muscle must be exposed to demands that it has not experienced previously.

Also remember that it matters little whether a muscle is loaded with resistance from machines, barbells, dumbbells, stretch cords, sandbags, bricks or even other human beings. A muscle does not possess the ability to distinguish between different modes of resistance. It simply responds to being loaded.

Increase the Distance of Application

If you increase the distance over which you apply the force and do not change the other two variables in the equation - specifically, the amount of force that you apply and the time that it takes you to apply the force - you will produce more power. Consider this example: If you can squat 300 pounds a distance of 21 inches (1.75 feet) in 2 seconds, your power output is 262.5 foot-pounds per second. [300 lbs. x 1.75 ft ÷ 2 sec = 262.5 ft-lbs/sec.] Suppose that at some point in the future, you increased your range of motion in the squat so that you are now displacing the resistance a distance of 24 inches. Assuming that the resistance you lifted (300 pounds) and the time it took you to move the resistance (2 seconds) did not change, your power output is now 300 foot-pounds per second. So by increasing the distance over which you applied the force, you have improved your power output.

How do you increase the distance over which you apply force? One way is to become more flexible. If you become more flexible, you can increase the ranges of motion of your joints; if you increase the ranges of motion of your joints, you will have the potential to produce more power.

How do you improve your flexibility so that you can apply force over a greater distance? Like strength training, there is no one optimal program for improving flexibility. Successful flexibility programs, however, have several commonalities. To reduce your risk of injury, you should stretch under control without any bouncing, bobbing or jerking movements. Moreover, you should hold the stretched position for about 30 - 60 seconds. Similar to strength training, you must make your flexibility training progressively more challenging. You can do this by attempting to stretch a little bit farther than the last time. Finally, it is important to stretch each of your major muscle groups and do so on a regular basis.

Decrease the Time of Application

If you decrease the time that is takes you to apply the force and keep the other two variables in the equation the same - namely the amount of force that you apply and the distance over which you apply the force - you will produce more power. Here's an example: If you can deadlift 400 pounds a distance of 18 inches (1.5 feet) in 2 seconds, your power output is 300 foot-pounds per second. [400 lbs x 1.5 ft ÷ 2 sec = 300 ft-lbs/sec.] Suppose that at some point in the future, you increased your speed of movement in the deadlift to 1.5 seconds (that is, you did the repetition faster). Assuming that the resistance you lifted (400 pounds) and the distance you moved the resistance (18 inches) remained constant, your power output is now 400 footpounds per second. So by increasing the speed at which you applied force, you have improved your power output.

How do you decrease the time that it takes you to apply force? One alternative is to perfect your wrestling technique. If you perfect your technique, you can perform the skill more quickly; if you can perform the skill more quickly, you will have the potential to produce more power.

How do you improve your technique so that you can decrease the time that it takes you to apply force? The motor-learning literature is in general agreement as to how this can be best achieved. It is important that you learn how to do the skill correctly. In addition, you must perform the skill over and over again until you can execute it without conscious effort. The skill must be practiced in a flawless manner. Remember, practice makes perfect . . . but only if you practice perfect.

Lastly, the skill should be practiced exactly as you would use it on the wrestling mat. Tim Wakeham, assistant strength and conditioning coach at Michigan State University, offers this insight: "Students do not study algebra to take a geometry test even though those are similar subjects. Both subjects are under the umbrella of mathematics, and because of their similarities, studying one may positively affect test results in the other. But it should be obvious that the best results would come from preparing for an algebra test by studying algebra."

MAT APPLICATIONS

Examples in the weight room were given to illustrate how the three variables in the power equation - that is, force, distance and time - can be manipulated to improve power output. Several applications of those concepts can also be illustrated on the wrestling mat:

- If you apply more force over the same distance in the same amount of time, you will have the potential to lift an opponent with more power.
- If you move a greater distance (without overpenetrating) with the same amount of force in the same amount of time, you will have the potential to execute a double-leg takedown with more power.
- If you move in less time with the same amount of force over the same distance, you will have the potential to perform a fireman's carry with more power.

POWER TO YOU!

So an athlete who is powerful can apply a large force over a long distance in a short period of time. As demonstrated earlier, your power output can be improved by three different means: (1) increase the amount of force that you apply; (2) increase the distance over which you apply the force; and (3) decrease the amount of time that it takes you to apply the force. This can be accomplished by improving your strength, flexibility and technique.

Be forewarned, however, that just because you can produce more power during a given exercise in the weight room does not mean that you will automatically produce more power during a given skill on the wrestling mat. Simply stated, there is no legitimate, scientific evidence that the ability to produce power transfers from one activity to another.

Think about it: If doing power cleans or another explosive-type movement improves your stand up, for example, then doing stand ups should improve your power clean. But they do not. The bottom line is that producing power in the weight room is one thing and producing power on the playing field is another.

Matt Brzycki has been involved in the strength and conditioning of collegiate wrestlers for more than 20 years. Since 1986, he has authored nearly 60 articles for Wrestling USA Magazine. He is also the author of three books - including A Practical Approach to Strength Training - and the editor of Maximize Your Training, a 455-page book that features chapters written by more than 30 strength and fitness professionals.