



The true test of an athletic program is in competition. Shown here is game-day action from the Arlanda Jets, a football program in Sweden that will be featured in our next issue.

The Next Level of Athletic Fitness Training

How OptoJump is helping athletes achieve physical superiority

If you want to fly across the country to watch the Super Bowl in person, it's much more comfortable to fly first class than coach – but it will cost you. And for comfortable lodgings, you can choose to stay at a Hilton rather than a Motel 6 – but it will cost you. Likewise, when you invest in methods to test athletic and physical fitness, you

can do so relatively cheaply, but the savings will reflect on the results. This is something to keep in mind when looking at the tools available from Microgate to evaluate physical and athletic fitness.

Two of the most basic qualities in physical activity are running and jumping. Physical fitness tests have

been standardized over the years so that coaches and physical educators can assess these qualities in the athletes they work with. Let's start with jumping – specifically, the vertical jump.

Michael Jonathan Wahl, PhD candidate, is a strength coach from Newfoundland who has done extensive research on the vertical jump. Asked



Jump training, such as shown here with variations of horizontal and vertical jumps, is key to improving athletic performance in nearly every sport.



why the vertical jump is such a popular test, Wahl replies, “The vertical jump tells you how quickly an athlete can start movement and apply force. It’s

equivalent to that first step in tennis, that explosion off the line of scrimmage and that leap out of the starting blocks.” So, in addition to having

obvious benefits in sports such as volleyball and basketball, improving the vertical jump has applications in any sport that involves being able to move

quickly from a stationary position.

The standard test for measuring the vertical jump is called the Sargent Jump Test, which was invented by Dr. Dudley Sargent approximately 90 years ago. With the Sargent Jump Test you measure how high you can reach (such as by placing your hands on a wall and having someone assess the height), and then you jump as high as you can – the difference between the two measurements is the result. In the early days, athletes would place chalk on their fingers and then jump near a wall, touching it at the highest point.

Rather than using a wall, a coach could get a more accurate assessment by using a specially designed device that contains moveable plastic tabs set at half-inch increments that are attached to a pole. The athlete jumps as high as they can and sees how many

tabs they can displace.

The next level of assessment is to use a force platform that calculates your vertical based upon how long you spend in the air; surprisingly, this unit costs about the same as the plastic tab device. BFS sells such a device, called the Just Jump. One advantage of the force platform is that you do not have to measure an athlete's reach. This eliminates the chance that an athlete might add several inches to their vertical jump by not elevating their shoulders or extending their spine when they take the standing reach measurement. Also, the force platform is very quick; it takes only a few seconds for an athlete to step on the platform and perform the test.

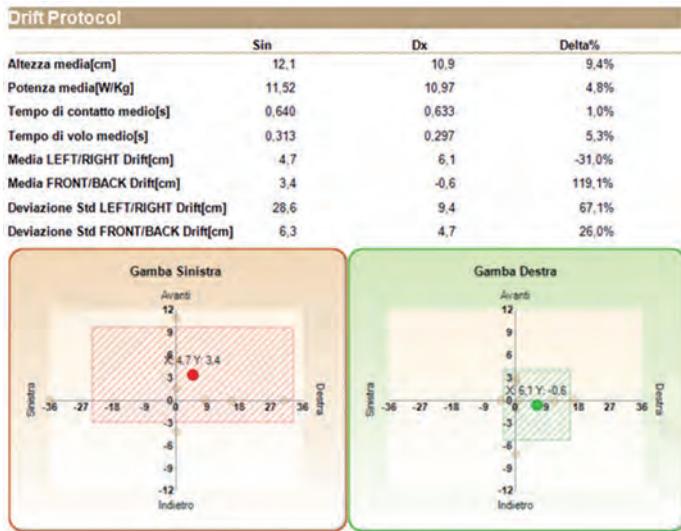
What is a good vertical jump for an athlete? First, it depends on the sport an athlete plays, such that a volleyball

player will usually outjump a swimmer. But typically an average 17-year-old female athlete will jump about 13 inches, and a boy about 20 inches; at the college level, females will jump about 20 inches and males about 30. BFS has developed standards for grades 9-12 for the vertical jump (along with several other jumping and speed tests), which are available in poster format. And for normative data for the major sports, one excellent scientific textbook on the subject is *Functional Testing in Human Performance* by Michael P. Reiman and Robert C. Manske (Human Kinetics, 2009).

Until recently, the following has been the evolution of vertical jump testing: the Sargent Jump Test performed on a wall, a pole device with plastic tabs, and a force platform. The next stage of evolution is the OptoJump™.



Vertical jump testing on a force platform, such as shown here with the BFS Just Jump system, was a marked improvement over previous methods of jump testing.



The OptoJump can duplicate the traditional vertical jump testing, and also provides a “Drift Protocol” to determine an athlete’s dynamic stability.

The Next Stage of Jump Testing

The OptoJump quickly and easily assesses body mechanics while an athlete is in motion. It uses real-time feedback in three formats: video, graphical and numerical. It can measure flight and contact times during a series of jumps with an accuracy of 1/10000 of a second. As such, the speed of the video can be reduced to “frame by frame” or still picture – and it’s possible to use various graphic tools (lines, arcs, circles, ruler, goniometer, etc.) to draw on the still picture for future analysis.

Let’s say you have been assessing vertical jumps with the pole device with plastic tabs. The OptoJump can simulate this test when the device is mounted on a tripod. To assess standing reach, the unit will direct the athlete to stretch their reaching arm to the top of the bars, and then the athlete will be asked to jump and reach as high as possible. The software will provide the jump height in terms of the difference between the two measurements.

But there are many more jumping tests the OptoJump can perform, such as measuring multiple jumps, determining the height of each jump, calculating the average of a set of jumps, or measuring squat jumps with weights. Furthermore, the Drift Protocol feature

of the OptoJump can measure an important biomechanical quality that is not possible to assess when using a simple force plate.

The Drift Protocol assesses an athlete’s “stability dynamics” by measuring the displacement (drift) axis in terms of vertical and horizontal. Such information can provide important information for a coach to determine faults in biomechanics that affect performance – for example, if an athlete has stability issues that give

them a “favorite side.” Further, this information will be helpful in preventing injury or determining if an injured athlete is ready to play again and at what level.

As a performance and training tool, OptoJump is among the most advanced tools to determine athletic performance and physical fitness. Yes, there are less expensive ways to assess athletes, but if you stay with those old methods, consider that, as always, “You get what you pay for!” 



The OptoJump quickly and easily assesses body mechanics while an athlete is in motion using real-time feedback in three formats: video, graphical and numerical. Shown demonstrating these features is Dr. Peter G. Gorman, president of Microgate USA.