Why Competitive Swimmers Need Explosive Power

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SUMMARY

THE PURPOSE OF THIS COLUMN IS TO TALK ABOUT THE DIFFERENT WAYS AN INCREASE IN POWER CAN IMPROVE SWIM PERFORMANCE. AFTER THE DEFINITION OF POWER IS ESTABLISHED, THE DIFFERENT COMPONENTS OF A SWIM RACE THAT BENEFIT FROM INCREASED POWER OUTPUT WILL BE DISCUSSED. FINALLY, WE WILL GO OVER TRAINING METHODS.

The purpose of this column is to establish the instances in a competitive swim race in which power plays a significant role and how to train for these aspects in the gym. The column will focus on the basic components of a swim race: the start, turn, and pull of the stroke. Increasing power in the lower body (hamstrings, gluteus muscle groups, quadriceps) and pulling muscle groups (latissimus, posterior deltoids) may provide a huge benefit in swimming because they are the muscle groups that are in dominant in the sport.

Technique is one of the most important factors in swimming, and adding power to these movements certainly plays a role in improving performance. Components of the race, such as the starts, turns, breakouts, the kick, and the pull of the stroke, could benefit from a training program that provides an improvement in power production.

Power is a perfect blend of speed and strength or work in a given period of time. Either one of these mathematical expressions can be directly applied to any race.

$$\text{Power} = \text{force} \times \text{velocity}$$

If two people can have the same amount of strength but the one whom can apply that strength faster than the other, who is better-off? Of course, the individual who applies his or her strength faster has a clear advantage; the individual will have a greater power output.

Let us examine the different ways to train for explosive power and how it can help to improve different components of a race.

Swimmers need to take advantage of every start and turn during a race. Having a superior start and turn in their skill execution provides a distinct advantage to them during competition, particularly in sprinters. Training the paraspinal muscles, gluteal muscles, hamstrings, hip flexors, and quadriceps explosively will increase the amount of power one is able to generate off the start and the turn, as well as increase total kicking power and good alignment in the water. These muscle groups are keys in producing power off the start and the turn, which are the only 2 portions of the race in which a swimmer is able to produce force off of a solid base (the starting block and the wall) and take advantage of ground reaction forces.

One method used to develop power in the lower body at the Institute of Human Performance is the box jump (Figure 1). The box jump is a great exercise that enhances leg power and reduces the landing forces that may cause undo stress to the lower body. Increasing the height of the box or adding resistance (weighted vest) to the athlete's mass will progress the intensity of the box jumps.

The pulling muscles (latissimus, posterior deltoids, etc) of the arm are used during upper-body propulsion in swimming. The breaststroke pullout provides a good example of how training the pulling muscles of the upper body can assist in increasing propulsion. The pullout is the first movement during breaststroke when the swimmer is coming off the start or the turn. While under water, you are allowed to pull your hands all the way down from the overhead position, underneath the body, and continue to extend the elbows until the hands go down past the hips one time off of every wall. The pullout is one of the

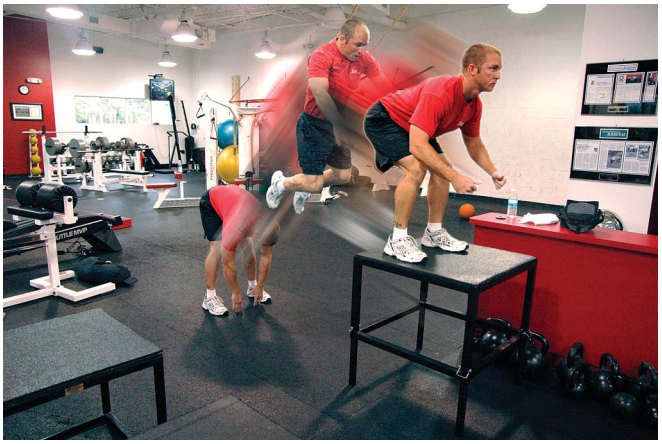

Figure 1. Box jump sequence.

most explosive pulling actions you will see in a swim race, and it is an element of a race that is very crucial to performance. Because it is the first movement of each start and turn, it is a factor in accelerating to maximum speed quickly. A swimmer whose pullout lacks power is basically playing catch-up after every turn, which leaves little chance to beat someone of equal swimming ability but with a better pullout.

Including pulling power exercises in a swimmers strength training program will allow these muscles to generate force at a faster rate, thus increasing the athlete's total pulling power. Increasing a swimmer's pulling power will assist his or her ability to create more propulsion during each stroke cycle. An increase in power will not only allow a swimmer to increase his or her speed but also assist in maintaining proper body position and alignment in the water. This theory applies to all 4 strokes, regardless of the difference in different stroking patterns.

Another way to train for a more powerful breaststroke pullout is the overhead medicine ball toss (OMBT) (Figure 2), which replicates the breaststroke pullout closely. The 2 movements are very similar when looking at the joint action of the upper-body extremities. The OMBT may be used in 2 ways, one performing the exercise with the goal of completing as many repetitions as possible in a certain period (e.g., 30 seconds) and as quickly as possible to develop anaerobic endurance. The OMBT can also be

Figure 2. Overhead medicine ball slam sequence.

Table 1
Lower body power program

Circuit 1	
BB squat	3 × 5
Box jumps	3 × 5
Band swims	3 × 20
Stability ball rollouts	3 × 12
Circuit 2	
RDL	3 × 5
Reverse scoop toss	3 × 5
T-stability push-ups	3 × 10
Stability ball log rolls	3 × 10
Circuit 3	
Lunges	3 × 5
Split jumps	3 × 5
Recline rope pulls	3 × 10
Body blade	3 × 30 s

Table 2
Power endurance program

Circuit 1	
Free motion rows	3 × 5
Explosive rope pulls	3 × 5
Triple threat	3 × 10
Hyperextensions	3 × 10
Circuit 2	
Free motion lat pull	3 × 5
Medicine ball slams	3 × 5
Hands on medicine ball push-up	3 × 10
Reverse hyperextensions	3 × 10
Circuit 3	
Bent over dumbbell row	3 × 5
Explosive band swim	3 × 5
Stability ball pike	3 × 10
Prone BOSU streamline position	3 × 30 s

performed with the focus on generating as much power as possible (i.e., force × velocity) during each repetition when working on maximum power.

The following is an example of a power development training program we have used with great success that focuses on the lower body (Table 1). The program consists of 3, 4-exercise circuits. A 45- to 60-second rest period is taken between the first (the strength exercise) and second (the power exercise) exercise of each circuit. The movement of the first exercise should be no slower than a 2:1 concentric to eccentric ratio. The second exercise should always be fast and explosive. The third and fourth exercises are functional and core exercises. Functional exercises are those defined by training movements and not isolated muscle groups.

Next is an example power endurance workout (Table 2), where the focus is to hold on to power for a longer duration. The goal here is to hold on to at least 85% of the maximum power output for at least 45 seconds. The 45-to 60-second rest period is eliminated to improve power endurance. This particular workout is focused on the pulling muscles.

These are just a few examples of training programs and exercises that can be used to increase power in swimmers. We have used the training programs and exercises as previously described to increase power in swimmers. Although building strength in swimmers may improve swimming times, adding power exercises to swimmers' programs should produce an even greater improvement to swim times. These power exercises have been integrated into all our swimmers' power training programs.

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