

# Performance Point

## Training to Enhance Power

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Power is defined as force x velocity or commonly as strength x speed. Maximal power output and the rate at which an athlete can develop power are major determining factors in most sports. Since power is multi-factorial it can be trained using various training modalities.

1. Maximal Strength Training: As strength is a component of power, training designed to develop an athlete's ability to maximally produce force will also contribute to increasing overall maximal power output.
2. Olympic Lifting: Training using the Olympic lifts addresses both factors of the power equation. Olympic lifting allows an athlete to move heavier loads at relatively high velocities, therefore touching both components of the power equation.
3. Speed Strength Training: Involves using traditional strength lifts at lower percentages of 1RM where velocity is a focus. An example of this type of training would be to conduct 3 reps of squats at only 70% of the weight normally used for 3 reps this will allow the athlete to focus more on the velocity of the movement.
4. Ballistic Training: Ballistic training involves the athlete projecting either their own body under load or a loaded implement. Practical examples of ballistic training include jump squats and bench press throws. Medicine balls can also be used as a form of ballistic training. Ballistic training can be separated based on the power property being addressed.
  - a. Max Power Training (Pmax): Involves using a heavier resistance, due to the magnitude of the resistance used the athlete will not be able to move as fast as possible, even while attempting to. Max power work involves using weights in the range of 35-55% of 1RM.
  - b. Rate of Force Development Training (RFD): Involves using lower resistance which will allow the athlete to move at high velocities. RFD training involves using weights in the range of 10-25% of 1RM.
5. Plyometrics: Is a form of training that allows an athlete to tap into their Stretch Shortening Cycle (SSC). The SSC involves an athlete tapping into the natural elastic properties of muscle by pre-loading the muscle before an explosive contraction. The preload or stretch enhances the power produced in the subsequent muscle contraction by returning stored elastic energy to the muscle. To effectively tap the SSC athletes must look to minimize the time they are in contact with the ground or an object.

The best approach to use when designing a strength program to enhance power output is to look at all of the above training modalities in a structured yearly training plan (YTP). A conjugated yearly approach is best used with athletes. This approach looks to address all physical properties throughout the training year (hypertrophy, strength, power, and injury prevention/management) but modulates the primary training focus depending on which phase of the YTP the athlete is currently in. This method can successfully develop and maintain all athletic physical properties throughout the YTP.

A YTP should be a collaborative effort amongst coach, strength and conditioning coach and the exercise physiologist. A well designed YTP will successfully develop an athlete through the off season straight through to the competitive season, peaking the athlete for one or two major competitions per year.



Canadian Sport Centre Pacific swimmer Rick Say at the 2006 Swim Canada Pan Pacific Championships preparatory training camp.

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