

## Mustang Power • Performance Principles

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Scientific research has confirmed that the principles presented here, applied together, will unlock the potential to achieve peak performance. The proper application of specific exercises and drills are crucial to maximize performance potential for power sports.



### 1. GROUND-BASED ACTIVITIES

Sport skills are initiated by applying force with the feet against the ground. You need to select lifting exercises and conditioning drills that apply force with the feet against the ground such as the squat and hang clean, hang snatch, or push jerk. The more force your athletes can apply against the ground, the faster they will run and the more effective they will be in sport skills.

### 2. MULTIPLE JOINT ACTIONS

Your strength and conditioning program should be based on exercises and drills involving multiple joint actions to improve athletic performance. Sport skills such as jumping, tackling, or running require multiple joint actions timed in the proper neuromuscular recruitment patterns. Otherwise you have no coordination or the ability to generate explosive force.

Think of a core lifting exercise such as the hang snatch. It requires joint actions at the hips, knees, ankles, shoulders, and elbows to work together as a unit generating explosive force. Isolating on single joint actions might work for body builders to improve their appearance, but athletes need to concentrate on activities involving multiple joint actions to improve performance.

### 3. THREE DIMENSIONAL MOVEMENTS

Sport skills involve movements in the three planes of space simultaneously: forward-backward, up-down, and from side to side. Your strength and conditioning program should improve functional strength with exercises and drills approximating these skills.

In strength training, only free weights allow movement in three dimensions simultaneously. This makes the transfer of strength and power easier to merge with the development of sport skills. Machines limit the development of sport skills. For example, when you use free weights, the muscles regulate and coordinate the movement pattern of the resistance, while machines use lever arms, guide rods, and pulleys to dictate the path of the movement. An additional benefit from free weights is help preventing major joint injuries. The smaller synergistic muscle groups involved in free weight exercises develop joint integrity better than machines do due to the balancing action required with free weights. For example, squatting using free weights requires the back and stomach muscles to stabilize the torso isometric ally. This allows the legs and hips to work with the back and stomach muscles as a unit to perform the lift. The adjustable board on the hip sled substitutes as the stabilizer restricting movement and isolating muscle contractions to the hips and legs.

When developing a running program, explosive exercises, similar to specific sport movements should be used. Agility, rather than straight ahead speed, is the factor that impacts most performance. It is important for athletes to be quick, but they must be able to control their bodies and execute change of direction quickly on the field or on the court to be effective.

### 4. TRAIN EXPLOSIVELY

Strength gains are not only determined by the size of the muscles, many times an athlete will get stronger because of an improved ability of the nervous system to recruit motor units. A motor unit is a motor nerve and all the muscle fibers that it innervates. The more fibers a motor unit consists of, the more force it can generate. Through training the body learns to recruit more motor units so that more force can be generated.

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The amount of force required for a given activity is regulated by the use of two different types of motor units found in the body, fast twitch and slow twitch, which vary greatly in their ability to generate force. The number of fibers a fast twitch fiber innervates is greater than with a slow twitch fiber, and the contractile mechanism of fast twitch muscle fiber is much larger. These factors combined mean a fast twitch fiber generates a force four times greater than a slow twitch fiber. Training explosively with free weights allows fast twitch muscle fibers to be recruited and in return improves an athlete's performance potential.

## 5. PROGRESSIVE OVERLOAD

The load or amount of weight lifted for each exercise is the most fundamental component of a strength-training program. The application of the load has a crucial impact on maximizing performance and keeping injuries to a minimum. Overload happens when the body responds to training loads greater than normal. The overload causes the muscle tissue of the body to go into a catabolic state or to break down. The body then adapts, through good nutrition and rest, by compensating through the development of more strength or endurance.

There are thousands of different lifting programs on how to apply the load. The best programs take the basic principles developed by weightlifters and body builders and apply them to developing sports' performance. Monterey Trails program does just this. We use the most current scientific data to develop our programs. But, as breakthroughs bring more insight as to how the body adapts to different loads, they also raise more questions. It is because Monterey Trail is on the cutting edge of athletic performance development that a program we recommend today will most likely be different in the future.

Intensity and volume are the key factors used to progressively increase the overload. The use of heavier loads increases the intensity; adding more repetitions increases the volume. Each method causes specific adaptations. Increasing the weight and keeping the repetitions low develops strength and power; increasing the number of repetitions and keeping the weight lighter causes improvement in muscular endurance and muscular size.

## 6. APPLICATION OR PERIODIZATION

Strength will eventually plateau and even diminish if the same combination of sets and reps are always used. An alternative approach is Periodization or Cycling. Cycling uses different combinations of volume and intensity, or Phases, each translating into different responses by the body. Usually a cycle starts off with a base phase which progresses to a strength phase and finishes with a peak phase.

Mustang Power uses a pyramid with three levels to represent the phases. The area of each building block of the pyramid represents the volume of the load. The base phase represents the greatest area or capacity of volume. The top of the pyramid, or peak phase, represents the least amount of volume done. The height of the pyramid represents the magnitude of intensity. Your program should go from high volume/low intensity to low volume/high intensity.

## 7. SPLIT ROUTINE

Most strength training programs usually include three workouts per week, not three successive days, but three alternate ones. For example Monday-Wednesday-Friday schedule, or Tuesday-Thursday-Saturday program. This approach gives the muscles a one-day rest on the off days. In our programs, we use a much better program called a split-routine. This is a very efficient and widely used principle in stimulating gains. It simply means alternating the type of exercises performed and executing them on alternate days. The explosive lifts such as the hang clean and power press are performed on Monday and Thursday. The strength lifts, squat and bench, on Tuesday and Friday. The split routine allows more recovery and rebuilding. With the split-routine, you get at least two full days of recovery from each exercise.

## 8. HARD/EASY SYSTEM

You make more progress over longer periods of time if you do not work at maximum loads during each workout. The Hard-Easy System eliminates overtraining and mental burnout. With it, there is only one hard workout per week for each type of lifting. The other day is a light workout, in which both the volume and intensity are reduced. With only one heavy workout load a week for the

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explosive exercises and one for the strength exercises, you will be ready both physically and mentally as the loads become greater. The first two workout days of the week (Monday & Tuesday) are the hard days. Thursday and Friday are the easy days.

## 9. TRAIN THE CORRECT ENERGY SYSTEM

The primary objective of conditioning is to improve the energy capacity of an athlete to improve performance. Many coaches and athletes are confused or misinformed on how to implement the correct conditioning methods for a particular sport. For effective conditioning, training must occur at the same intensity and duration as you play in competition in order to develop the proper energy system predominately used.

ATP, or adenosine triphosphate, is the immediate energy source for all muscle contractions. It comes from the breakdown of the food we eat. It is supplied by the interaction of three types of energy systems. The first system is the ATP-PC system. High intensity, short duration activities such as the 40 yard dash or snatch are performed using energy from this system. Energy is supplied immediately, and the amount of force generated from the muscle contraction is high, but the amount of energy readily available is limited and ATP is depleted within six seconds.

The second system is the lactic acid system. The amount of force generated by this system is less than from the first system. ATP is produced from the breakdown of glycogen in the absence of oxygen and a metabolic byproduct called lactic acid is produced. The highest amount of accumulation of lactic acid is reached during activities that last from one to three minutes. Too much lactic acid builds up when the energy system is depleted. This causes pain which results in a loss of coordination and force production like often happens at the end of a 400 or 800 meter race.

The third system is the oxygen system. This system is more specific to the slow twitch muscle fibers used during activities requiring endurance over a long duration at a low intensity. After about three minutes of low intensity exercise, ATP is almost completely supplied from the third system

As you can see, which system the ATP comes from depends upon the intensity and duration of the exercises? The first step in setting up a conditioning program is to determine the energy system used by the activity according to the intensity and duration of it. Then a similar type of activity is used for conditioning. That way the proper energy system will be trained.

## 10. INTERVAL TRAINING

Your conditioning program should be based on interval training principles. Interval training is work or exercise followed by a prescribed rest interval. The program must meet the specific conditions for each sport. A common training error that coaches make in their conditioning programs is making the rest intervals too short. If the rest period is too short, the amount of energy is not sufficient to meet the demands of the next maximum intensity effort, and force output will be reduced. This problem is very common. Coaches who make the rest interval too short, cause the force to be reduced, and in this case slow twitch muscle fibers are trained rather than fast twitch fibers.