

Principles for Training Your Wrestlers

The training we put athletes through is done to teach them the sport and to improve their performance. Through the years, coaches, teachers and sport scientists have identified some key principles and concepts that can guide coaches to safely and effectively train athletes. These basic principles form the basis for this article, and can be successfully applied by coaches at all levels.

Principle of Adaptation

We know that our bodies undergo changes as a result of participating in a sport. Our bodies adapt to the particular demands placed upon it. When the body encounters a stress to which it is not accustomed, over a period of time it adapts so as to better meet this new stress. Just by doing the sport, these changes will occur. A person takes up cycling and will experience an increase in the strength and endurance of the thigh muscles; a kayaker will experience similar changes in the upper body muscles; soccer and basketball players will find increases in their ability to run harder for longer periods of time; and wrestlers will get stronger and larger neck muscles because of the unique stress applied to this region. During the earliest stage, the body will react by becoming sore and there may even be a decrease in performance, but this is followed by an adaptation which overshoots the starting performance level. Effective coaches take advantage of these adaptations by planning training sessions which will maximize the desired adaptations. Conversely, failure to use the basic training principles and concepts can also have a negative impact on sport performance.

Principle of Progressive Overload

Two important concepts are the foundation for all sports training—**overload** and **progression**. Overload is the stress mentioned in the previous paragraph to which the body is unaccustomed. A beginning wrestler engages in some activities where his partner is pushing the head down to execute a half-nelson. The first response will be soreness, but is quickly followed by an increase in the strength of these muscles allowing for a stronger resistance to this applied pressure. Progression involves increasing the overload. In this example with the neck muscles, coaches will further increase this overload by using specific exercises, such as bridges, that strengthen the neck musculature to even higher levels.

Principle of Specificity

Training adaptations are specific to the type of activity performed. For example, a swimmer must swim, or runner has to run, in order to effectively adapt to their particular sport. These adaptations are also specific to the manner in which the activity is done. If the runner is a sprinter, the training would emphasize shorter sprints, rather than the slower, longer distances of the distance runner. The weight training of a shot-putter would emphasize low repetitions done explosively, rather than slow actions with a high number of repetitions. The principle of specificity dictates that the training program must stress the physiological systems that are critical for top performance in the sport in order to get the necessary specific training adaptations.

In order to apply this principle, one has to have an understanding of the needs for the sport, along with a basic understanding of how the body produces energy for movement. During physical activity, the energy output from the working muscles can be 120 times higher than when at rest.

Depending on the intensity and duration of the activity, the relative contributions of the body's various means for energy production will be different. There are three main energy systems our body's use to supply the energy for activity.

Immediate Energy: The ATP-PC System is an immediate source of energy for muscles, used within the first 5-15 seconds of activity. The energy is provided from the bonds in the phosphates adenosine triphosphate (ATP) and phosphocreatine (PC) stored in the muscles. There is enough stored energy from these sources to sustain all-out exercise for less than 10 seconds. Brief, maximal efforts such as the beginning of a sprint, a maximum lift in weight lifting, or a double leg takedown, use energy from these stored phosphagens.

Short-Term Energy: The Lactic Acid System (also called Anaerobic or Glycolytic system) is an intermediate source of energy for high intensity activity and is used from the time that the stored energy already present in ATP and PC is used up (about 6 seconds in all-out activity) and can extend up to two minutes. This short term system actually "recharges" the ATP high energy bonds for further use. When ATP is used to transfer the stored energy to the muscles for work, one of the high energy phosphate bonds is broken and energy is released. This leaves adenosine diphosphate (ADP), and phosphate. The energy to recharge ADP back into ATP comes mainly from the sugar glucose. This blood sugar is also stored, and available in muscles as the chemical called glycogen. When glucose is split to recharge this ADP under intense conditions, it results in the formation of lactic acid. This short-term energy pathway, along with the energy from the already present in the immediate system, probably supplies about 90% of the energy for wrestling. Competitive, or live wrestling, uses an all-out effort from a large amount of muscles mass.

Why can we only use this system for only 1 to 2 minutes? As was stated, an intermediate by-product of this short-term energy system is lactic acid. Accumulation of lactic acid can increase to 25 times that over rest or light activity. This acidification inhibits or shuts down the enzymes which control these glycolytic (sugar splitting) reactions in the body. We have to stop, or at least lower the intensity of the activity.

Long Term Energy: The Aerobic System (also called oxidative system) is a long-term source of energy and can be employed for hours. It uses a constant supply of oxygen which can keep pace with the intensity of the activity. This is also the energy pathway used to complete the entire breakdown of glucose to water and CO₂, which during use of the anaerobic system ends with the temporary by-product of lactic acid.

Training the appropriate energy system results in physiological changes which will allow for greater energy production in the manner most suitable for the sport. Wrestling is an intense, short burst, explosive sport using predominately anaerobic energy sources (early in the match from the immediate system, then predominately from the glycolytic, or lactic acid system). However, it is a "mixed" sport, in that all three systems are used in both competition and training. While wrestlers do not need the endurance of a distance runner, a well-developed aerobic system will allow for some recovery of the lactic acid system following a flurry, or a break in the action. It also will allow for the most effective use of practice time.

Defining the needs of the sport is the first step in designing a good training program. We need to identify the factors that contribute towards success in wrestling. The next step would be to plan training activities that develop these factors, along with training the appropriate energy system. Some important components for wrestling are:

- Technique
- Aerobic Capacity or cardiovascular endurance
- Anaerobic Capacity – this means explosive, high intensity activity
- Strength-both static and dynamic
- Strength Endurance
- Explosive Power
- Power Endurance
- Tactics & Strategy
- Flexibility
- Speed & Quickness
- Balance & Kinesthetic Awareness

Components of the Training Program are the variables that the coach can manipulate in planning workouts. These are **frequency** (the number workouts per week), **intensity** (the difficulty or pace of the training), and **duration** (the length of time of the training activity). **Volume** is a function of frequency and duration and gives the overall amount of training. **Interval Training** is a technique used by coaches to vary these components in individual workouts, and as the season goes on. This can mean lengthening the length of live wrestling, decreasing the rest interval, and increasing the intensity of the wrestling. This can be accomplished through more challenging partners, wrestling when pre-fatigued, and establishing the number of attacks that must be initiated in a particular time, to name a few methods.

Principle of Hard/Easy and Variability

Many athletes train hard every time they workout. Many coaches follow this regimen as well. Sport scientists are finding that continual hard training with little variation from high intensity and high volumes can lead to less than optimal adaptation, or worse yet, a decrease in performance. This can also explain the success and popularity of “cross-training” used to break up the routine.

Principle of Periodization is defined as the gradual cycling of the components of the training program so as to achieve top levels of fitness/performance at the right time of the year. The term **peaking** is used to describe this situation. It makes no sense to be in this peak state for early season dual meets and to be worn out by the time important tournaments come towards the end of the season. Application of periodization requires planning in advance. Some coaches of elite athletes begin their planning around the four-year Olympic quadrennium. More frequently, one begins with an annual cycle. In periodization terminology, this is referred to as a **macrocycle**. This macrocycle is further divided into 1-3 **mesocycles** which represent the most important competitions. Because of a shorter season, a plan for high school team might have just one mesocycle, built around the end of the season state tournament series. It could also add an additional mesocycle that builds towards important summer competitions. The guiding principle is to begin with a high volume of more general activities and gradually move towards a decrease in volume and an increase in intensity with more specific drills and exercises. Each mesocycle is broken down into periods of preparation, competition, and transition. In the **preparation** phase practices consist of a higher number of repetitions in drilling and exercises. There may be more technique work performed at a slower speed. Aerobic work may take the form of distance runs.

Volume is gradually built up to high levels. It is important to note that there may be competition during this time, but it is not most important target of the training. As the **competition** phase is begun, the intensity is elevated. There may be less work on presenting new technique, drilling is faster, there is more live wrestling, sprints replace distance runs. There may be reductions in rest intervals and fresh partners are rotated onto one wrestler. All of these methods increase the intensity.

What happens if the practices and training continue with both high volume and high intensity? A decrease in performance is a likely result. This phenomenon is called **overtraining**. An older term that used to describe this condition was “staleness.” How can overtraining be avoided? Coaches must plan for allowing the wrestlers to recover. One technique is to apply the **principle of hard/easy**. Within the weekly cycle there can be a variation of intensity and volume, so that hard workouts are followed by an easier day, allowing for recovery from the breakdown that accompanies high intensity training and subsequent adaptation. Another training concept is that of **tapering**. This is part of the process discussed earlier, where volume is reduced and intensity is increased, but it is employed a bit closer to the actual important competitions. During a taper, practices can still be intense, but they are shorter. The morning workout may not be held. Recovery therapies, while always important, are now emphasized. These may include ice, massages, relaxation activities, more post-practice stretching, increased sleep, and optimal nutrition and hydration schedules. The need to make weight for wrestlers, makes the more dramatic pre-competition resting, seen in some runners and swimmers, more difficult to employ.

The **transitional phase** follows the competition and in an annual cycle where there is only one peak, or mesocycle, might be called the off-season. In a plan where there is to be another mesocycle or peak, this period is highlighted by less intense training, a higher volume of general training, and “active rest.” Active rest could include playing other sports, light lifting, and rehabilitation from any nagging injuries.

An important note when discussing the cycling of intensities and the volume of the training load in a periodized scheme is that even though the plan may call for an easier period following one of high intensity, training does not return to the level of the previous cycle. It is more of a staircase model, where the training load builds on the previous level of adaptation, and goes to a higher level.

The final training principle, which makes us come back to the realization that coaching is still as much an art, as a science, is the **Principle of Individuality**. Because of our genetic make ups, not every person responds to training in exactly the same way. The adaptation response to a particular training regimen will not always be the same. Scientists have identified the concept of “responders” and non-responders” in an athlete’s adaptation to particular training programs. Ultimately, coaches must take into account the specific needs and abilities of their wrestlers as they plan their training programs.