The Use of Interval Training to Condition for Wrestling

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WRESTLING IS A HIGH INTENSITY sport. Thus, conditioning for wrestling calls for high intensity training. In addition, wrestling not only requires high intensity power output but also sustained power output over a 5-minute period. It is critical to use the appropriate type of training program to develop the necessary energy systems. An interval running program may be the best way to do this.

Depending on the level of wrestling, whether high school or college, and also the score of the match (e.g., overtime), one needs to maintain a sound wrestling position for the entire match in order to be victorious. This requires good muscular conditioning. If wrestlers become excessively fatigued during the match, they are likely to lose proper wrestling position and could be scored on by opponents.

It is also necessary that the wrestler produce an offense. An offense requires quick, powerful movements such as an explosive attack on the opponent's legs, or a powerful movement of the hips to throw the opponent from his feet to the floor.

The wrestler must have the conditioning necessary to attack for the duration of the match. Therefore one needs the anaerobic capacity to sustain repeated, explosive attacks or offensive techniques on the opponent.

The development of a conditioning program begins with a needs analysis, which assesses the physiological and biomechanical requirements of the sport in question. This physiological analysis will assess strength, flexibility, power, endurance, and speed demands for that sport (1).

Once the needs analysis is completed, it is time to select the training activities. The more similar the training activities are to the target sport, the better they will transfer to performance (1).

Physiological analysis indicates that wrestling is predominantly an anaerobic sport (1, 4). The primary energy systems used in wrestling are the phosphagen and lactic acid systems (90%) and the oxidative system (10%). The phosphagen and lactic acid systems are considered anaerobic while the oxidative system is considered aerobic (1, 3, 5). Some have suggested that wrestling is completely anaerobic in character (4).

When training to develop the dominant energy system for a sport, one must apply the principle of sport specificity. This refers to the adaptations in the metabolic and physiologic systems according on the overload imposed (3). For example, exercises that stress power will elicit power adaptations. Thus, sport-specific exercises evoke certain adaptations that produce specific training effects.

When training wrestlers, some coaches neglect the rule of sport specificity. For example, they sometimes make use of long, slow jogging to set an aerobic base in the off-season and preseason. A training regimen of slow jogging will recruit predominantly slow-twitch (ST) motor units, which innervate slow-twitch muscle.

The muscle recruitment pattern is determined by the principle of selective recruitment, which in turn is determined by

the level of force needed to complete the movement. It has been established that ST motor units are smaller, generate less force, and reach peak tension at a slow rate compared to fast-twitch (FT) motor units (FT at 50 ms vs. ST at 110 ms).

By virtue of these qualities, ST motor units are recruited before FT units because the latter generate more force in less time (5). FT units are used for explosive movements (e.g., a double-leg technique) while ST units are recruited for lower force, repetitive activities such as continuous jogging (5).

Continuous jogging will promote certain peripheral adaptations in the ST fibers. These adaptations include: (a) increased mitochondrial density; (b) increased skeletal muscle myoglobin; (c) increased ability to mobilize and oxidize fat; (d) increased ability to mobilize and oxidize glycogen; (e) increased oxidative enzymes; and (f) increased ST muscle fiber size (1, 3–5).

These peripheral adaptations will increase the body's ability to transport and utilize oxygen more efficiently. However, there is disagreement as to whether aerobic training will improve anaerobic performance (1, 3–5).

Anaerobic sports such as endurance sprinting (e.g., 400 meters), judo, and wrestling demand high levels of force during the movements, and because of this they recruit FT motor units. As the intensity of the power output increases, the amount of FT fibers that must be recruited also increases.

In wrestling it is important to condition the FT muscle fibers and their capacity to perform extended periods of work (anaerobic capacity). This is what enables the wrestler to sustain successive, explosive attacks on the opponent.

The FT muscle fibers can best be conditioned through anaerobic training. One way to condition the anaerobic energy system, and consequently the FT fibers, is with an interval running program.

Table 1 gives an example of an interval running workout that places a substantial demand on both the phosphagen system and the lactic acid system. The interval workout starts with a 5-min warm-up followed by 12 sets of timed runs using 2 different work-to-rest ratios; it concludes with a 15-min cooldown.

Table 1
Interval Running Workout

1. 5-min warm-up (light jog)
2. Four 6-sec sprints, 18 sec rest
3. Four 20-sec sprints, 60 sec rest
4. Four 40-sec sprints, 80 sec rest
5. 15-min cooldown (light jog and stretching)

Interval running can be undertaken after wrestling practice or on another day depending on the time of year (i.e., off-season or in-season). Interval training is used primarily to help develop anaerobic capacity.

It is possible to accomplish more work through interval training than if the work were performed continuously. Interval training requires repeated bouts of work, from seconds to minutes in duration, interrupted by rest intervals.

By adjusting the duration of exercise, the rest intervals, the number of work intervals or repetitions, and the number of repetition blocks or sets, one can alter the specific effect of the workout (3). This allows flexibility in developing the anaerobic system.

Manipulating the work-to-rest ratio can be very effective in developing the FT muscle fibers (1, 2, 4). Interval training increases resting levels of ATP, PC, glycogen, and anaerobic enzymes as well as increasing the buffering capacity of blood during intense exercise (3–5).

Full recovery between bouts of exercise is avoided during interval training. This requires the body to repeatedly produce maximal and near maximal muscle contractions (efforts) while not fully recovered (1, 3). In this way one develops anaerobic power and capacity.

Employing a work-to-rest ratio of 1:3 and 1:2 will develop the FT muscle fibers. Applying work intervals of 6 to 30 sec requires a work-to-rest ratio of 1:3, while work intervals of 30 to 120 sec require work-to-rest ratios of 1:2 (1). For example, a 30-sec sprint would require a 90-sec rest interval before the next bout of exercise. Adjusting the work-to-rest ratio allows the trainer or coach to vary the intensity, work the desired energy systems, and recruit the appropriate fiber types.

Adaptations such as a 35% increase in anaerobic enzymes, a 50% increase in ATP, a 40% increase in CP, and a 100% increase in glycolytic capacity can be expected with high intensity interval training (3). Increasing these substrates will result in a larger anaerobic capacity, augmenting the ability to carry out a greater amount of high intensity work.

Since wrestling involves high intensity work outputs, it follows that interval training would be highly applicable to the specific conditioning needs of wrestling.

The explosive muscular contractions one employs when attacking the opponent are similar to the explosive muscular contractions required during interval training. Moreover, interval training also incorporates contraction modes and speeds similar to those in wrestling.

Because interval training conditions the anaerobic energy system, it enhances the ability to sustain high power outputs. As noted above, this is accomplished by permitting the working muscle to tolerate increased metabolic waste (lactic acid) and by expanding the availability of anaerobic substrates. These substrates help supply the body with more instantly available energy, in turn permitting the wrestler a higher degree of success.

References

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