Programming Abdominal Training, Part II

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The first part of this article discussed the function of the abdominal muscles and why they are important for athletes. It also covered why and how progressive overload should be applied to abdominal training. This second part of this article will cover applying abdominal training in a systematic fashion and applying the principle of specificity to abdominal training.

- Periodization of Abdominal Training

Just like the other aspects of training, abdominal work should be periodized. Periodizing abdominal work allows the athlete to prepare for optimal performance improvement, to prepare for a peak or climax to the training, and to develop a muscular development base by advancing from general training to specific training (2, 8).

Through the quantification of training (volume, intensity, and load) and the steady, progressive manipulation of those variables, periodization of abdominal training prepares an athlete to improve his or her performance over time (7). Periodization allows an athlete to peak at the appropriate time and prevents overtraining. Athletes are not able to remain at peak fitness year-round. It is important to put the training together so that athletes are in their best shape when they need to be (4, 7, 8). With periodized training, the athlete advances from general, multilateral development to focus more on sports-specific training. This allows him or her to develop a fitness base in terms of strength, endurance, and motor skills before requiring more advanced exercises. This foundation is valuable both for preventing injuries from training and for laying the foundation to master new motor skills (4, 7, 8).

- Abdominal Training and the Annual Plan

Done across an annual plan, a periodized workout is designed to help an athlete peak for competition or for a series of competitions. With this in mind, training progresses through several phases:

- General preparation.
- Special preparation.
- Competition.
- Transition (8).

The general preparation phase of training is designed to provide a fitness base that the athlete will build upon as the year progresses. Generally, this phase consists of a variety of training methods (4, 7, 8). Volume is moderate to high, with moderate intensity. When it comes to abdominal work, the goal of this phase is to build the motor skill and fitness foundation that is required to participate in the more advanced training later in the season. Table 1 provides examples of some exercises that might be used in the general preparation phase of training.

Table 1 breaks down the exercises by type of exercise. It then describes which positions might be used in this phase of training. For example, sit-ups might be performed lying down or on an incline. It then describes what type of resistance might be used in this phase. Lying or incline sit-ups might be done with body weight or with a weight held on the chest. The next column describes the speed of movement for the possible exercises. The sit-ups might be performed slow and controlled, or they might be performed with a 10-sec-
ond eccentric phase followed by an explosion. Finally, the last column describes the type of stability that the exercises might use. For example, sit-ups (with or without resistance, slow or with the 10-second eccentric) can be done on a stable or unstable surface.

The special preparation phase is a bridge between general preparation and competition. The purpose is to begin moving to exercises that are more specific to the sport. This means that volume is reduced while intensity is increased. Now that a fitness and technique base has been built, the complexity of the exercises increases (4, 7, 8). The exercises in this phase should include exercises done at fast speeds. Table 2 provides examples of some exercises that might be used in the special preparation phase of training.

The competition phase is designed to get the athlete to his or her physical peak and maintain it (4, 7, 8). Generally, strength training is scaled back in terms of volume and frequency as more time is spent on sports skills (4). With this in mind, it is important to include exercises that produce the most benefit while avoiding overtraining. As a result, an abdominal program should focus on exercises that require a great deal of coordination and/or those that develop the athlete’s explosiveness. In the competition phase, volume will be low and intensity high. Table 3 provides examples of some exercises

<table>
<thead>
<tr>
<th>Exercise</th>
<th>Position</th>
<th>Resistance</th>
<th>Speed</th>
<th>Stability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crunch</td>
<td>Lying</td>
<td>Body weight</td>
<td>Slow</td>
<td>Stable</td>
</tr>
<tr>
<td></td>
<td>Sitting</td>
<td>On chest</td>
<td></td>
<td>Stable</td>
</tr>
<tr>
<td>Sit-ups</td>
<td>Lying</td>
<td>Body weight</td>
<td>Slow</td>
<td>Stable</td>
</tr>
<tr>
<td></td>
<td>Incline</td>
<td>On chest</td>
<td></td>
<td>Stable</td>
</tr>
<tr>
<td>Leg raises</td>
<td>Lying</td>
<td>Body weight</td>
<td>Slow</td>
<td>Stable</td>
</tr>
<tr>
<td></td>
<td>Hanging</td>
<td>Between feet</td>
<td>Slow</td>
<td>Stable</td>
</tr>
<tr>
<td>V-ups</td>
<td>Lying</td>
<td>Body weight</td>
<td>Slow</td>
<td>Stable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Over head</td>
<td></td>
<td>Stable</td>
</tr>
</tbody>
</table>

Table 1
Sample Exercises in a General Preparation Phase of Training

<table>
<thead>
<tr>
<th>Exercise</th>
<th>Position</th>
<th>Resistance</th>
<th>Speed</th>
<th>Stability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crunch</td>
<td>Kneeling</td>
<td>Body weight</td>
<td>Slow</td>
<td>Stable</td>
</tr>
<tr>
<td></td>
<td>Standing</td>
<td>On chest</td>
<td></td>
<td>Stable</td>
</tr>
<tr>
<td>Sit-ups</td>
<td>Lying</td>
<td>Body weight</td>
<td>Slow</td>
<td>Stable</td>
</tr>
<tr>
<td></td>
<td>Incline</td>
<td>On chest</td>
<td></td>
<td>Stable</td>
</tr>
<tr>
<td>Leg raises</td>
<td>Hanging</td>
<td>Body weight</td>
<td>Slow</td>
<td>Stable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Between feet</td>
<td>Slow</td>
<td>Stable</td>
</tr>
<tr>
<td>V-ups</td>
<td>Lying</td>
<td>Body weight</td>
<td>Slow</td>
<td>Stable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Over head</td>
<td></td>
<td>Stable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Over head and between feet</td>
<td>Slow</td>
<td>Stable</td>
</tr>
</tbody>
</table>

Table 2
Sample Exercises in a Special Preparation Phase of Training
that might be used in the competition phase of training.

The transition phase of training is meant to give the athlete a chance to recover from the previous cycles of training. In the transition phase, training is scaled back. Volume is high, intensity is low, and the exercises are generally not very complicated. This phase is designed to provide recuperation (4, 7, 8). Table 4 provides examples of some exercises that might be used in the transition phase of training.

Tables 1 through 4 are meant to illustrate how to periodize abdominal workouts using exercises that were described in part I of this paper. An unlimited number of exercises and their variations are possible with abdominal training; training should not be restricted to only those exercises listed here. In addition to the types of exercises covered in parts I and II, athletes should perform rotational exercises (e.g., twisting sit-ups) and medicine ball throws in all directions (in front, to the side, to the rear, etc.) in order to strengthen the abdominal muscles in several planes of motion.

## Specificity of Abdominal Training

For exercise to transfer to the playing field, it needs to be specific to the needs of the sport (8). This is true of abdominal training as well (5, 12). Failure to adhere to this principle will waste an athlete's time and could be counterproductive to performance.

When thinking of specificity and abdominal training, we must consider several things:

- What kinds of motions are required in the sport?
- What is the speed of movement of the sport?
- What energy systems are involved in the sport?

By analyzing the motions required by a sport, one will have an idea of what to address in a conditioning program (5). This analysis will indicate not only what muscles should be trained but also what motions should be trained. For example, does the sport require violent twisting? If it does, then exercises that seek to simulate this (such as medicine ball throws) should be included in the training program.

Speed of movement is important because exercise adaptations are velocity specific, and abdominal exercises are no exception (5). Performing exercises in a slow, controlled manner will result in strength being increased at slow speeds, but not at fast speeds (3).
If the sport is performed in an explosive manner, then the abdominal exercises should be performed explosively in order to have a maximum transfer effect.

Training should be designed to enhance the energy systems that are required in the sport. Depending on the needs of the sport, abdominal training may be designed to enhance the phosphagen energy system (low repetitions, heavy weights, full recovery in between sets), the lactic acid energy system (moderate repetitions and weights, incomplete recovery in between sets), the aerobic energy system (high repetitions, low weight), or some combination of the three (10). Abdominal training does not have to be sets of 20–100 repetitions, and in fact, this may be counterproductive in terms of the needs of the sport.

Now that the basic principles of training have been applied to abdominal training, the remainder of this article will apply these principles to an example sport, throwing the shot put.

Whether the shot put is done with a glide or rotational technique, it requires the athlete to twist the trunk violently in order to block his or her nonthrowing side to accelerate the implement (6, 9). This requires the development of strong, well-coordinated, explosive abdominal muscles. Particular emphasis should be placed on twisting motions, especially medicine ball throws (11).

The shot put is a fast, explosive movement (1, 6, 11). Because of this, the athlete should be focusing on explosive abdominal exercises. Training should be focused on laying the foundation so that the majority of the athlete’s abdominal exercises can be performed in a well-coordinated, explosive manner.

The shot put draws its fuel from the phosphagen energy system. As a result, training should focus on developing that energy system. Training should prepare the athlete’s abdominal muscles to withstand heavy, explosive exercises with a low volume. Training should also prepare the athlete’s nervous system to be able to recruit a large number of muscle fibers quickly.

To maximize the effectiveness of abdominal training, the training needs to adhere to the same principles of exercise as other modes of exercise. It needs to be progressive in nature, it needs to be applied in a systematic fashion, and it needs to be specific to the sport. Keeping these principles in mind and applying them will keep this portion of an athlete’s training interesting and effective. ▲

References

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