Training Explosiveness: Weightlifting and Beyond

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SUMMARY

EXPLOSIVENESS IS A DESIRABLE PHYSICAL QUALITY THAT CAN BE EFFECTIVELY TRAINED USING VARIOUS METHODS. ONE OF THE MOST EFFECTIVE WAYS OF DEVELOPING EXPLOSIVENESS IS WEIGHTLIFTING. THE USE OF THESE EXERCISES IN TRAINING HAS SUPPORT IN BOTH RESEARCH AND PRACTICE. HOWEVER, THESE LIFTS ARE FAR FROM THE ONLY METHODS AVAILABLE TO COACHES. COMBINING TRADITIONAL STRENGTH TRAINING EXERCISES, SUCH AS BACK SQUATS, WITH EXPLOSIVE MOVEMENTS, SUCH AS PLYOMETRICS, CAN OFTEN PROVE TO BE JUST AS EFFECTIVE. LIKE WEIGHTLIFTING, THIS TYPE OF TRAINING ALSO HAS SUPPORT IN RESEARCH AND PRACTICE.

INTRODUCTION

Explosiveness is a desirable athletic quality that can be effectively trained with the use of various methods. This particular quality can be defined as the ability of an athlete to exert as much force as possible in a limited amount of time (37,46). Maximum strength, in and of itself, is a highly sought-after capability in athletics, but possessing incredible strength and the ability to produce it rapidly are quite different. Merely being strong does not necessarily mean that one also is fast (46). In most sports, it is far more important to display force quickly rather that to just display as much force as possible. Athletes usually do not have enough time to develop maximum force in actual sporting movements, and success often depends on the rate at which force is developed.

A classic example is the shot put event in track and field. Shot putters tend to be large and rather strong, and an exceptional shot putter may have a bench press exceeding 180 kg. The force required to move a barbell that heavy is far more than what is required to throw a 7.26-kg shot and takes considerably more time to produce. The time it takes to produce enough force to throw the shot is significantly less, and the implement would be out of the athlete's hands long before the level of force required to bench press 180 kg would be achieved. The most critical aspect of the event is how much force is developed during the short amount of time that the shot is in the athlete's hand. This is not to say that improvements in maximal force cannot aid in the throwing of the shot, but such improvements have been shown to only increase performance up to a certain level early in an athlete's career, after which time explosiveness becomes the most important quality (46). Predictably, the coaches and athletes are very interested in finding ways to improve explosiveness. For many years, coaches and athletes have used many different approaches to training this quality. These methods have often included weightlifting, which has much support in both research and practice. However, these lifts are far from the only methods available for developing explosiveness and, depending on the circumstances, other methods can prove to be much more effective.

SUPPORT FOR TRAINING EXPLOSIVENESS WITH WEIGHTLIFTING

One of the most popular ways to develop explosiveness is to train with variations of weightlifting lifts. These include variants of the snatch and the clean and jerk, ranging from partial movements to different combinations and hybrid exercises. Many coaches and athletes have long used these lifts as part of their training to further develop explosiveness.

Hori et al. (27) found that the use of the weightlifting lifts in training had a positive effect on performance in sports such as football, basketball, volleyball, and track field. The authors found that the athletes were best trained by the use of movements involving rapid acceleration against resistance that extends throughout the entire movement with no intention to decelerate at the end. The pull phase of the clean and snatch, as well as the drive phase of the jerk, display this same sport-specific acceleration pattern. The kinetics and kinematics of the pull and drive are also quite similar to those involved in jumping other sport movements (27). It is important to note that the athlete never decelerates the barbell during the pull, as gravity does that instead, and the athlete accelerates the barbell upward until the extension is complete. This action would seem to make weightlifting movements, from a biomechanical standpoint, a useful

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way to train athletes participating in sports such as football, basketball, volleyball, and track field (27).

Other studies have found a correlation between training with weightlifting and vertical jump performance. Jump performance, such as that measured in the vertical jump test, has been shown to be related to sport performance (3,7,8,17,26,36). One such study by Canavan et al. (9) that compared the hang power snatch to the non-countermovement vertical jump found similarities in maximal power, time to maximal power, relative power, maximal force, and time to maximal force. Garhammer and Gregor (18) reported that the ground reaction force in the snatch was similar to that of countermovement vertical jumps. Stone et al. (41) found the snatch to be biomechanically similar to the vertical jump and also found that weightlifting movements improved vertical jump results. Carlock et al. (10) reported a strong correlation between weightlifting performance and jump performance, as did 2 studies by Hakkinen et al. (23,24).

In a study by Tricoli et al. (42), the authors compared programs that used weightlifting with those that used squats and plyometric training (contrast training). Measurements of strength (half squat 1 repetition), power (countermovement vertical jump and standing long jump), and speed (10-m sprint) were performed on each group. Those studies in which the contrast training method was used improved only in the countermovement jump and half squat test, whereas the weightlifting group improved in all of the tests. The weightlifting group performed better than the contrast training method group in the countermovement jump test. Interestingly, the contrast training method group performed better than the weightlifting group in the half squat test, but none of the others (42).

A study by McBride et al. (32) reported that athletes participating in weightlifting had greater peak force in unloaded vertical jumps, in jumps with an added 20 kg, and in jumps with an added 40 kg in comparison with athletes competing in powerlifting. Peak power in the vertical jump under all 3 loading conditions also was significantly greater for the weightlifters in comparison with the powerlifters. In a jump squat test (30%, 60%, and 90% of 1 repetition squat), peak force was significantly greater in weightlifters compared with powerlifters for the 30% and 60% load conditions, whereas peak power was significantly greater in the weightlifting group compared with the powerlifters in the 30% load condition.

Overall, the authors concluded that powerlifters were as strong as the weightlifters, but scored significantly lower in tests for power and explosive performance. The weightlifters had significantly greater peak velocities, power outputs, and jump heights than the powerlifters. These results would suggest that training with weightlifting is a more effective way to improve jump velocities, jump power, and jump height than strength training that does not involve such exercises.

In terms of safety, training that uses weightlifting has been shown to be relatively injury-free. Hamill (25) reported that weightlifters experienced fewer injuries than those athletes participating in basketball, football, and gymnastics (25). The snatch, along with the clean and jerk, is very safe for athletes to perform, provided proper instruction is given (11,39). The rate of injury for weightlifters has been shown to be as low as 0.0017 injuries per 100 hours of participation (40). By way of comparison, basketball has 0.3 injuries per 100 hours, and track and field has 0.57 injuries per 100 hours (40).

EXAMPLES OF TRAINING FOR EXPLOSIVENESS USING WEIGHTLIFTING

Weightlifting can be used in the training of athletes of many different disciplines. Typically, coaches will program the lifts and their variations on

Table 1
Training for explosiveness using the power snatch (week 1)

Dynamic warm up	2-3 minutes			
Weightlifting specific warm up	2-3 minutes			
Power snatch	**Week 1-Workout 1**			
	% of 1 RM	**Reps per set**	**Rest after set**	**Information**
Warm up	70	1	1:30	Use cluster sets (2 + 2) 15 sec of rest between clusters of 2 reps
	72	4	2:00	
	72	4	2:00	
	75	4	2:00	
	75	4	2:00	
	75	4	2:00	

a year-round basis, with certain times of the year dedicated to increased volume and other times emphasizing increased intensity. The actual programming for weightlifting depends on the sport and the time of year that the execution of the program is taking place. Such details are beyond the scope of this particular discussion; therefore, a more cursory overview of including weightlifting in training will be covered here. The lifts are usually done toward the beginning of the workout session, when there is the least amount of fatigue present in the neuromuscular system, to allow the athlete to complete the movements with the best technique so as to avoid injury (11,40). Similarly, it is important that these movements are done when the athlete is in the best possible condition (i.e., least amount of neuromuscular fatigue) to perform them optimally to stimulate improvements in high-load speed strength (27). Repetitions will typically be between 1 and 3 for full snatches and cleans, and up to 5 repetitions for partial snatches and cleans (46). A coach can decide to use traditional repetition planning (one repetition after another during a set) or cluster training for a superior neural response (22). An example of training for explosiveness using the power snatch can be seen in Table 1.

As far as exercise selection, the many variations of weightlifting allow coaches and athletes to keep training interesting. Whether performing the lifts in their entirety (with squat catches) or using different power–style variants (with half-squat catches), the training can fluctuate between very intense and heavy, light and fast, or even used for purposes of recovery or unloading depending on the intensity level programmed for each set. The use of squat cleans and squat snatches can allow for more loading, whereas power cleans and power snatches can be used to target speed strength performance. Pulling from different heights, from blocks, or from the hang also can create a novel training stimulus and help further develop an athlete's explosiveness while avoiding monotonous or stagnant training. Using dumbbell variations of weightlifting can have a similar effect. Examples of a select number of variations of weightlifting can be found in Tables 2–4.

Table 2
Clean variations

Clean
Split clean
Clean and Jerk
Clean from blocks above knee
Clean from blocks below knee
Clean from hang above knee
Clean from hang below knee
Muscle clean
Power clean
Power clean and jerk
Power clean from blocks above knee
Power clean from blocks above knee with front squat
Power clean from blocks below knee
Power clean from blocks below knee with front squat
Power clean from hang above knee
Power clean from hang above knee with front squat
Power clean from hang below knee
Power clean from hang below knee with front squat
Power clean with front squat
Dead hang clean
Clean pull
Clean pull from blocks above knee
Clean pull from blocks below knee
Clean pull from hang above knee

Table 3
Snatch variations

Snatch
Split snatch
Snatch from blocks above knee
Snatch from blocks below knee
Snatch from hang above knee
Snatch from hang below knee
Muscle snatch
Power snatch
Power snatch from blocks above knee
Power snatch from blocks above knee with overhead squat
Power snatch from blocks below knee
Power snatch from blocks below knee with overhead squat
Power snatch from hang above knee
Power snatch from hang above knee with overhead squat
Power snatch from hang below knee
Power snatch from hang below knee with overhead squat
Power snatch standing on a block
Power snatch with overhead squat
Pressing overhead squat
Overhead squat
Dead hang snatch
Drop snatch
Snatch pull
Snatch pull from blocks above knee
Snatch pull from blocks below knee
Snatch pull from hang above knee
Snatch pull from hang below knee

WHEN WEIGHTLIFTING MAY NOT BE APPROPRIATE

To be sure, weightlifters are some of the most impressive and powerful athletes in the world. It was only natural for athletes and coaches to try to emulate the training of these elite athletes, and many have found success in doing so. However, these lifts are far from the only way to train explosiveness.

Table 4 Jerk variations
Push press
Squat and press
Squat jerk
Power jerk
Split jerk

There are many instances in which using weightlifting may not be the best method. For example, when an athlete at the college or professional level has no background in training in weightlifting and a limited window of time in which to train, it may be far more prudent to choose an alternative means of training explosiveness. When time is a concern, methods of training that are far less complex to learn and master can be very useful and effective. It is very important for coaches to remember that athletes at the college and professional level are not competitive weightlifters. It is much more critical for coaches to train these athletes as specifically as possible for the sport that they compete in, as opposed to spending unnecessary amounts of time learning movements of an entirely different sport. If a college or professional athlete has reached an elite level without using weightlifting, chances are that taking the time and effort to learn these movements from a beginner level will not improve their sport performance that much more than any other type of explosive training.

Another example of why it may be necessary to choose an alternative method of training explosiveness is when an athlete lacks the basic flexibility, posture, and strength requirements to successfully negotiate weightlifting. Once again, if an athlete has reached an elite level of performance in his or her respective sport without meeting all of the specific physical requirements to perform a proper snatch or clean and jerk, there may be little need to rectify the situation. If the athlete has excellent strength and power specific to their sport and can maximize this through different means of explosive training, then there is no need for them to learn and master weightlifting in training.

Finally, when an athlete has absolutely no desire or interest in learning weightlifting, there is no reason for a coach to undergo unnecessary stress and frustration teaching an unwilling athlete to perform an exercise when there are alternative methods available.

ALTERNATIVE METHODS OF TRAINING EXPLOSIVENESS

There is considerable research support for explosive training methods that do not involve the use of weightlifting. Much of this information focuses on combining traditional resistance training with plyometric or power training. This type of training has been shown to improve measurements of power, such as the vertical jump, in as little as 3 weeks (34). Concerning acute responses to this type of training, studies have shown an increase in muscle twitch tension after high intensity contractions, leading to improved power performance (14,19,20). Explosiveness by the muscles is improved as the result of increased neuromuscular activation after maximal contractions (14,19,20). Loads do not necessarily have to be maximal in order for the athlete to gain benefit from this type of training (38). For example, the use of a 5-repetition maximum back squat has been shown to excite the neuromuscular system enough to dramatically improve power performance of subsequent activity using lighter or no loading (43,45). Although this effect is a viable outcome with heavy loads such as this, far lighter loads (as low as 10% of the athlete's bodyweight or bodyweight alone) have also been shown to cause enough stimulation to improve ensuing explosive performance (2,9,12). Improvements in explosive performance measurements such as maximum jump squat height and maximum jump squat power output have been produced by using jump squat training alone or by training that combines both squats and jump squat training (12). Studies concerning the chronic effects of this type of training are sparse, and more research needs to be done on this specific topic.

The types of exercises chosen, as well as their volume and load, can also effect how successful the combination training is at provoking an improved power response. For example, a study by Newton and Kraemer (35) found that when combining a countermovement jump with another power movement such as the jump squat, the optimal load for the jump squat decreased somewhere between 30% and 60% of the 1-repetition maximum for the back squat (35). This result correlates with other studies that suggest that optimum loads for power exercises such as the jump squat and ballistic bench press should be within the 15–60% range (4,5,28,44).

Cormie et al. (12) reported that combined strength and power training was as effective as power training alone for improving maximum jump height and maximum power output in the jump squat. However, the group that combined strength training along with power training showed better all-around improvements in the load–power relationship of both the loaded and unloaded jump squat than the group that relied solely on power training alone. It is interesting to note that the subjects in this study did not use loaded jump squats in training. Instead, the authors implemented bodyweight-only jump squats and still found improvements in both unloaded and loaded jump squat tests. This suggests that one does not necessarily need to load a jump squat to garner improvements in power output.

The amount of repetitions performed can also effect how much power is produced for these types of exercises. In a study by Baker and Newton (6), the authors found that the second through fifth repetitions of 10 were the most powerful of the entire set (resistance set between 35% and 45% of maximum), with power declining rapidly after the fifth repetition (6). This finding would suggest that repetitions

be prescribed in the 2 to 5 range when using power exercises. When combining a countermovement jump with a traditional back squat, however, optimum loads were found to be at or near 60% of the 1-repetition maximum of the back squat (6).

Training that combines strength and power movements is often quite simple to implement, as the motor skills involved usually are basic. The athlete frequently is able to master the necessary skills quickly, which allows the coach to increase the intensity and volume of training much earlier in the process than what may be achieved when using weightlifting with a beginner. Additionally, the simplicity of the movements involved (such as squatting and jumping) allow for the coach to create and implement many different varieties of exercise, which can make training more interesting for the athlete. It also allows for large groups to be trained efficiently and effectively at once, with less need for individual instruction for those who have yet to master the lifts. Although these methods have been referred to by many different names and defined in an array of different ways, this article will discuss 4 primary categories of these types of combined training in an attempt to standardize the nomenclature. It is also important to note that many of the studies and review articles involving training for explosiveness focus primarily on the acute effects of such training. Much more research needs to be conducted to examine the chronic effects of training for explosiveness.

TRADITIONAL COMBINATION TRAINING

The traditional way of combining strength and power training, referred to as traditional combination training, involves training power exercises at the beginning of a workout session before strength exercises (14). This may be as simple as performing several sets of plyometric jumps before performing sets of squatting exercises. This type of training has been shown to be highly effective in developing explosiveness in the short term (19,20,35,43). It has been suggested that in order for plyometric or power training to be most effective, it must be performed at the beginning of a workout or on a separate day, when the body is experiencing the least amount of fatigue and most capable of producing peak power output (35). However, although power training alone can cause improvements in explosive performance (29,30,33), its combination with strength training creates far greater improvement in this particular quality than either power or strength training on its irrespective of the level of the athlete (1,4,5,13,31,34,41). Additionally, traditional combination training and other related methods discussed later have been shown to improve measurements of strength such as the 1-repetition bench press or back squat more effectively than strength training alone (31). Traditional combination training could be effective with beginners and athletes with low levels of strength. However, although studies have indicated that this type of training can have a positive effect on explosive performance, these results can only be considered one-time or acute (14,45). Lengthy training studies need to be conducted in order to determine whether these short-term effects will improve explosiveness in the long term. An example of traditional combination training can be seen in Table 5.

COMPOUND TRAINING

Another method of combining strength and power training to increase explosiveness is by performing plyometrics on one training day and

Table 5
Traditional combination training (week 1 – day 1)

Dynamic warm up	2-3 minutes			
	Week 1-Workout 1			
	Load	**Reps per set**	**Rest after set**	
Sqat jump pause	Bodyweight	5	30 sec	
	Bodyweight	5		
Tuck jump	Bodyweight	5	30 sec	
	Bodyweight	5		
Power step up	Bodyweight	5 each leg	30 sec	
	Bodyweight	5 each leg		
Back squat	**Week 1-Workout 1**		**Rest after set**	**Information**
	% of 1 RM	**Reps per set**		
	55	5	1:30	Warm up
	72	3	1:30	
	90	1	2:30	
	82	3	3:00	Complete each rep with maximum effort to try to move the bar as fast as possible
	82	3	3:00	
	85	3	3:00	
	85	3	3:00	
	85	3	3:00	

strength training on another. This is referred to as compound training (16,27,34). The separation of the 2 different styles of training by entire days allow for ample recovery time to ensure that the neuromuscular system is experiencing the least amount of fatigue. When compared with contrast training (discussed further in following sections), compound training was found to be just as successful in improving explosiveness in a short amount of time (34). Longer studies comparing compound training to other types of combination training are scarce, as well as which type of training works best with different levels of athletes. That being said, there is support for using traditional combination and compound training with beginner athletes with lower levels of strength, and using other methods, such as contrast training, with more advanced and stronger trainees (14,43,45). An example of compound training can be seen in Table 6.

Table 6
Compound training

Week 1 – Day 1				
Dynamic warm up	2-3 minutes			
	Week 1-Workout 1		**Rest after set**	
	Load	**Reps per set**		
Sqat jump pause	Bodyweight	5	30 sec	
	Bodyweight	5		
Tuck jump	Bodyweight	5	30 sec	
	Bodyweight	5		
Power step up	Bodyweight	5 each leg	30 sec	
	Bodyweight	5 each leg		
Relaxed box jump	Bodyweight	5	30 sec	
	Bodyweight	5		
Speed skater for distance	Bodyweight	5 each leg	30 sec	
	Bodyweight	5 each leg		
Week 1 – Day 2				
Dynamic warm up	2-3 minutes			
Back squat	**Week 1-Workout 2**		**Rest after set**	**Information**
	% of 1 RM	**Reps per set**		
	55	5	1:30	Warm up
	72	3	1:30	
	90	1	2:30	
	82	3	3:00	Complete each rep with maximum effort to try to move the bar as fast as possible
	82	3	3:00	
	85	3	3:00	
	85	3	3:00	
	85	3	3:00	

COMPLEX TRAINING

Complex training is another form of combination training that involves the planning of several sets of heavy strength training repetitions, such as the back squat, followed by lighter power movements, such as jumping or jump squats (14). The term "complex training" often is used to describe training involving the combination of strength and power exercises in general, or has been used interchangeably with another form of training known as contrast training (see below). This article seeks to standardize terms such as "complex training" to refer to a specific form of combination training. Complex training, as defined here, seems to go against research suggesting that power movements should be performed before strength exercises (35).

As other, aforementioned studies have shown, the execution of power movements after traditional strength exercises leads to improved performance. Complex training, however, involves the use of several sets of strength exercise before power training, as opposed to merely a single repetition or few repetitions. This technique has been shown to be less effective for developing explosiveness than traditional combination training and contrast training, particularly in the short term with female subjects (14). This may be attributable to a fatiguing of the neuromuscular system after performing a certain number of repetitions of strength exercise before explosive performance (14). This would suggest that there is a definite amount of strength exercise to include before power training and that, once beyond, the results are significantly less than optimal.

Additionally, Gullich and Schmidtbleicher (21) reported that the time between the strength and power exercise sets may significantly affect explosive performance. This does not mean that complex training cannot be useful at all, nor does it mean that certain athletes (depending on their qualification) may benefit from this type of

training. Further study is warranted to gain a better understanding of how much strength exercise (load and repetitions) can be prescribed prior to power performance to offset any negative effects. An example of the complex training method can be seen in Table 7.

CONTRAST TRAINING

Contrast training involves alternating strength exercise with power training from set to set (14,38). This technique is sometimes referred to as complex training (34), but for the purposes of this article, it will constitute its own style of training. An example of contrast training would be performing a set of back squats, followed by a set of lighter jump squats, and then alternating between these 2 types of exercises. This back and forth sequence is performed for a prescribed amount of sets or time. Contrast training has been shown to be highly effective at improving explosiveness both in the short and long term (2,14,15,34,35,43). Specifically, advanced athletes or those possessing greater levels of strength have been shown to benefit most from this form of training (14,45). Rest intervals between the strength set and the power set can vary and have been shown to be as short as 60 seconds (34) and as long as 3 minutes without significant detrimental effect on the subsequent power movement (2). However, the effect of the strength set on exciting the neuromuscular system before power performance is thought to be transient in nature (38), and if too much rest is given before performing the power movement, the following power performance may actually be inferior than if no strength exercise were performed in the first place (38). Although an optimum rest interval range between strength and power exercises has yet to be determined, and further research is necessary to determine it, on the basis of available studies, a shorter amount of rest would seem to be more beneficial (2,38). This range could be somewhere around 60 seconds. An example of this method can be seen in Table 8.

Table 7
Complex training (week 1 – day 1)

Dynamic warm up	2-3 minutes			
Back squat	**Week 1 – Workout 1**		**Rest after set**	**Information**
	% of 1 RM	**Reps per set**		
	55	5	1:30	Warm up
	72	3	1:30	
	90	1	2:30	
	82	3	3:00	Complete each rep with maximum effort to try to move the bar as fast as possible
	82	3	3:00	
	85	3	3:00	
	85	3	3:00	
	85	3	3:00	
Sqat jump pause	Bodyweight	5	30 sec	
	Bodyweight	5		
Tuck jump	Bodyweight	5	30 sec	
	Bodyweight	5		
Power step up	Bodyweight	5 each leg	30 sec	
	Bodyweight	5 each leg		

Table 8
Contrast training (week 1 – day 1)

Dynamic warm up	2-3 minutes			
Back squat	**Week 1 – Workout 1**			
	% of 1 RM	**Reps per set**	**Rest after set**	**Information**
	55	5	1:30	Warm up
	72	3	1:30	
	90	1	2:30	
	82	3	3:00	Complete a set of back sqat followed by a set of box jumps then rest 3 minutes
	Box jump	**3**		
	82	3	3:00	
	Box jump	**3**		
	85	3	3:00	
	Box jump	**3**		
	85	3	3:00	
	Box jump	**3**		

Table 9 Exercise pairings		
Strength movement		**Power movement**
Back squat	Pair with	Box jump
Front squat	Pair with	Hurdle hops
RDL	Pair with	Good morning jump
Bench press	Pair with	Clap push up
Close grip bench press	Pair with	Close grip bench press throw

RDL = Roman dead lift.

ALTERNATIVE EXPLOSIVE TRAINING EXERCISES

As covered previously, weightlifting and associated lifts can be used to train explosiveness. When choosing not to use these exercises, coaches still have a vast arsenal of movements to use. Traditional strength training exercises such as the back squat and the bench press can be paired with explosive exercises such as box jumps and medicine ball throws. The sky is often the limit when pairing heavy and light exercises, and the variety not only keeps the athletes interested but also provides novel stimuli to the body as well. As a rule, when training for explosiveness, it is helpful to use exercises that involve multiple muscle groups and that are as specific to the athlete's respective sport as possible. For example, when training a hockey athlete, a coach could decide to pair the back squat with plyometric exercise involving skating motions or diagonal hopping from a slanted box to another slanted box. For more examples of exercise pairings, refer to Table 9.

SUMMARY

Whether a coach decides to use weightlifting, or a variation of combination training is ultimately a matter of individual preference based upon the status and needs of the athletes. Both methods clearly have support in practice and research. What is most important is that coaches approach training with an open mind and avoid a narrow and rigid view of how to train explosiveness. There are situations, as highlighted in the preceding sections, in which an athlete may benefit far more from explosiveness training that does not involve weightlifting. A coach will benefit as well, avoiding needless frustration and wasted time teaching complex exercises to athletes who either do not want or need to learn them. However, an athlete may be particularly interested and adept at weightlifting and may decide to use those movements in training. Either way, a coach does not have to pigeonhole himself or herself to one type of explosive training and should avoid doing so.

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