

Training Shot Putters and Discus Throwers

The shot put and discus throw are the strength events of track and field. More than any other events, the shot put and discus rely on the direct application of power.

In physics, power is defined as work divided by time. In other words, if an athlete does more work in the same amount of time, power output increases. Likewise, if an athlete does the same amount of work in less time, then power output also is increased. In both throwing events, power is the critical component.

The shot put is usually considered a *pushing* event while the discus is regarded as a *slinging* event. Because both the shot put and discus throws require athletes to generate and effectively apply great power, they are arguably the most technically complex events in track and field.

A Philosophy for Coaching Throws

The shot put and discus, commonly called the **throws** in high school track and field, are intricate and complex events requiring great power. Unlike what happens in other events, throwers either spin or move backward (i.e. glide) in order to create power and propel the implement into a defined area. These multiple demands require throwers to possess a wide range of athletic skills: explosiveness, strength, balance, coordination, timing, kinesthetic awareness, concentration and the ability to relax while exerting maximum effort. Training for the throwing events involves a great deal of technical work, weightlifting, running and plyometrics.

Often, coaches shuttle their least-able athletes into the throwing events. This is a mistake. In fact, the throws are significantly more demanding than most other field events. Though the shot put and discus do not require tremendous aerobic conditioning or blazing sprint speed, they require numerous dynamic skills to be performed in concert. High school throwers should be good athletes to start. Less fit or less mature athletes should begin in other events, where their athletic capacity can be developed and rewarded.

As with the other track events, throwers should be trained to be athletes first. For the beginning thrower, the entire season will be a learning experience emphasizing general fitness and technical improvement. Strength, coordination, balance and fundamental technique should be the focus of training. For the experienced thrower, the focus is on rhythm and explosiveness blended with refined technique.

Safety Considerations in Events

The primary consideration in coaching the throwing events is *safety*. Before any throwing or training occurs, a discussion of safety for both throwing and weight training is crucial for all athletes on the team, not just the throwers.

The landing area for the throwing areas should be *flagged off* (*this would include a safety "buffer" zone outside the sector lines*), a *safety cage* should surround the throwing rings and a fence should guard the end of the throwing area to stop the shot or discus from escaping and causing injury.

Shots and discus should not be rolled back to the throwing area; they should be *carried back* to avoid injuries. Athletes and coaches who are not throwing should

stand behind the caged throwing area to avoid being hit by a stray implement.

Coaches should always take caution! Both the shot and discus become dangerous and potentially lethal once in flight.

When dealing with groups of throwers, make sure the athletes know how to retrieve implements. NEVER allow an athlete to retrieve an implement when there is another athlete in the ring. In addition, no athlete (or coach, or spectator, or official!) should ever turn his or her back to an active ring. Errant throws are impossible to predict. One way to make a throwing sector a little safer when dealing with large groups is to have athletes throw in groups of three, four, or five where one group is designated as the throwing group, the other is the retrieving group, and other groups can be doing drills in a designated safe area. Each group gets a chance to go through two rounds of throws then all groups rotate places.

Ultimately safety is the responsibility of EVERYONE in the throwing area. One moment of inattention can lead to a tragedy.

Principles of Training

As with all other track and field events the universal principles of training apply to the throws.

PROGRESSIVE OVERLOAD

In order for the physical capacity of the athlete to increase, the athlete's system must be subjected to stress or overload. The body, then, adapts to that stress, which results in increased capacity. This cycle of stress and adaptation is the foundation of training. It is also known as the **SAID** principle, the *specific adaptation to imposed demands*.

SPECIFICITY

The body adapts to specific demands placed upon it. Therefore, training for the throws must specifically address the requirements, strengths and skills needed for those events.

REPETITION

This principle is an outgrowth of the specificity requirement. Especially with a technical event, the neuromuscular patterns of technique must be reinforced through repetition of movement. This usually entails isolating the throwing process into components and performing them repeatedly with sound technique. Drill repetitions are the heart of throw training.

RECOVERY

In order for the body to adapt to progressive overload, it must rest and recover from the applied stress. Throwers cannot throw and weight train every day and expect to perform explosively in competition.

INDIVIDUALITY

Respecting the principle of individuality is most important to the coach of high school throwers. Differences in physical maturity and strength are great among high school athletes. Coaches should not expect less mature athletes to do the same volume of work that is demanded from upperclassmen.

In addition, there are principles of training that are specific to the throwing events.

Rotational Acceleration

Both the shot put and the discus throw use the rotation of the body to accelerate the implement to its point of release. Even the conventional glide technique of shot putting uses the rotation of the hips, trunk, shoulders and free arm to drive the shot outward. A coach must understand the mechanics of rotary motion and inertia to properly train his or her athletes.

Balance

Balance is essential to good execution in the throws. The athlete needs to maintain balance in order to apply power effectively. This fact is especially true for the shot put spin technique as well as the discus. Without balance, the application of power is negated. Think of the throwing events as dances of explosive effort.

Rhythm

Rhythm is essential to the proper acceleration of the weighted implement in the throwing events. Just as in the jumps, rhythm provides a framework for the application of power; furthermore, just as dancers are graceful and fluid, so must throwers be too.

Body Control

Throwers need to possess excellent kinesthetic awareness. In the discus, for example, the body moves forward, backward, spins and is airborne all at the same time. Throwers must develop the capacity to sense and control their body positions while moving powerfully.

Relaxation

Throwers must be able to relax while exerting absolute effort. The throwing events require the greatest single exertion of power, yet are completed in the briefest amount of time of any track and field event. The complicated sequence of execution in both throws demands relaxed effort. Lack of relaxation keeps the athlete from achieving the necessary positions from which to apply power. Intensity is not the same as tension.

The Mechanics of Throws

The aim of both the shot put and discus throw is to propel the implement as far as possible to land within the designated sector. Quite simply, the distance covered by any projectile is a function of five factors:

1. The implement's speed at release
2. The angle of release
3. The height of of the implement at release (relative to the landing area)
4. The angle of attack (the difference between the angle of release and the discus' horizontal axis)
5. Atmospheric conditions (including humidity, wind, temperature etc.)

The most influential of these five factors for most throwers is "speed of release." The angle of release is easily adjusted by the thrower. The height of release is largely limited by the stature of the athlete and may vary only a few inches. The angle of attack is critical to discus throwers, but throwing a "flat" discus (and not a "full moon") is quite easily corrected, even in beginning throwers. And, finally, atmospheric conditions are completely out of the control of the thrower, so that is not as much of a concern as a coaching point.

Coaching the throws boils down to understanding how to best optimize the angle and height of release while maximizing the speed of release. Every drill and repetition should have this as its ultimate goal. Contradictory as it may seem, this doesn't mean that every drill, throw or exercise needs to be done fast because, "Sometimes you have to slow down now to speed up later!"

Acceleration of the shot or discus results from the application of horizontal, vertical and rotational force of the body to the ground and the implement.

In the glide shot put style, a combination of horizontal and vertical force accelerates the body from the back to the front of the throwing circle. As the thrower lands in the middle position, the legs drive forward and up and the hips and torso rotate to the front of the circle. Simultaneously, the throwing arm further accelerates the shot as it pushes away from the body. The spin shot put style adds horizontal rotation at the beginning of the throw in order to create greater velocity at the point of release.

In the discus throw, the thrower attempts to perform a long acceleration of the implement by applying rotational and linear horizontal force at the rear of the throwing circle. When the thrower reaches the power position, vertical force is also applied to create an optimum angle of release. As the hips turn to the front, the free arm pulls in to shorten the axis of rotation and the front leg blocks. This transfer of momentum further accelerates the throwing arm. The final acceleration of the discus results from the pull of the throwing arm through the point of release.

The optimum angle of release for the shot put is roughly 40-degrees, depending on the height of the release. For the discus throw, the best angle of release varies between 34- and 40-degrees depending on the wind and height of release. The angle of attack (the difference between the angle of release and the discus' horizontal axis) should be 5- to 10-degrees. Distance is also aided by the construction of the discus itself. A hollow discus with weight distributed away from the center will hold its spin better and increase the aerodynamic stability of the implement.

Understanding the Techniques

SHOT PUT TECHNIQUE

The two most common techniques of shot putting are the **glide** and the **spin**. The glide technique is an easier technique for high school athletes to learn, but the spin technique may have more advantages for certain athletes.

Smaller throwers may benefit from the spin technique, which compensates for the lack of long levers with superior speed generated by the spinning motion. Throwers who are adept at pivoting or spinning may be candidates for the spin technique; however, for high school throwers, the glide is a more consistent technique.

The glide technique is usually favored by larger throwers who have trouble spinning within the small shot circle. They also benefit from the longer pull gained from the

power position of the glide technique. Long throws have been achieved with both styles, but all beginning throwers should learn a little about the glide before even attempting the spin. This is so a young thrower can learn and understand the concept of the proper power position.

Note: Discussion of all technique refers to *right-handed* throwers.

The Glide

Standing at the rear of the ring with his or her back to the throwing area, the glide begins with the thrower's weight solidly over the right foot (the toes of the right foot are pointed directly opposite of the landing area) and the left arm dangling and relaxed (see Figs. 15-1 and 2). Just before the left leg is to be driven toward the board, the athlete should lean backwards and start to gently fall back into the ring. This procedure is called **unseating** and provides momentum for the shift across the ring.

The left leg is extended, or actually driven, towards the toe board, and should not be lifted too far off the ground as it extends (see Fig. 15-3).

The upper body should remain **closed** ("closed" refers to the position of the thrower's

GLIDE SHOT PUT POSITIONS

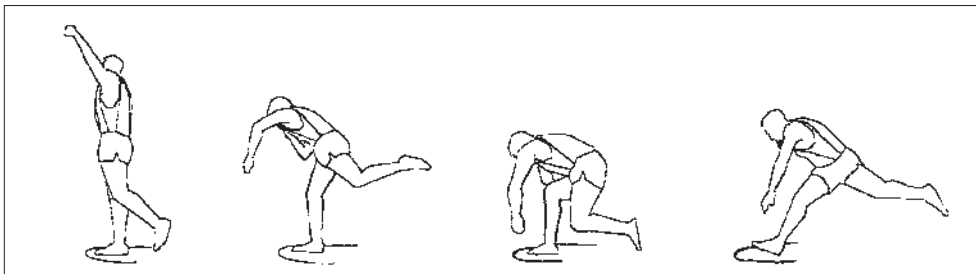


Fig. 15-1.

Fig. 15-2.

Fig. 15-3.

Fig. 15-4.

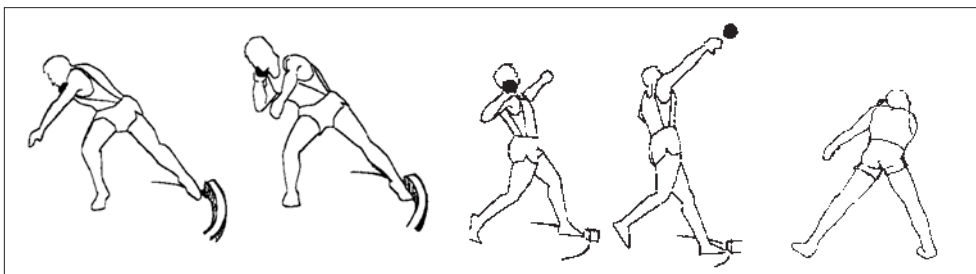


Fig. 15-5.

Fig. 15-6.

Fig. 15-7.

Fig. 15-8.

Fig. 15-9.

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shoulders, which should be square to the rear of the ring, with the thrower's back facing the throwing sector), and the left hand should reach back towards the rear of the circle. While the left leg is driving toward the toe board, the right leg extends as well, so a split position is attained. The split position will look like the thrower is actually trying to perform the splits (see Fig. 15-4).

Immediately after the split position is hit, the right foot is pulled underneath the body as it turns 90-degrees counter-clockwise. The shoulders remain closed, with the thrower's back still facing the throwing area.

When the right foot is fully recovered beneath the upper body, the center of mass should be over the ball of the right foot. The center of mass is then immediately shifted forward onto the left leg to generate more linear momentum (see Fig. 15-5). This completes the **glide** phase of the throw. The position of the thrower should at this point resemble that of the start of a stand-throw.

From the stand-throw position, the thrower drives up with the right leg and begins to shift the body weight forward onto the left leg. At this point, timing between the upper and lower body is essential to ensure the body weight is not shifted forward too soon, causing a low line-drive throw. If the body weight is shifted forward too late, a higher throw with little linear momentum will result (see Fig. 15-6).

Before continuing, one note should be made about the action of the right foot as the thrower moves from the glide phase to the **throwing** phase. As the right foot is recovered underneath the upper body, the thrower should spend as little time as possible in transition to the throwing phase. Body weight should be shifted off the right foot as soon as it hits the ground beneath the upper body. When the transition is done properly, the only part of the right foot that touches the ground is the *ball of the foot*.

The upper body will begin **opening up** at this stage, in preparation for the arm strike at the end of the throw. This happens in conjunction with the legs driving the center of mass up and across the ring. This portion of the throw should receive the most attention and involves complex body coordination that requires many hours of practice.

As the shot is thrown, the concept of **extension** should be practiced. The shot will be pushed outward as the center of the mass is shifted from the right to the left foot. At the same time, the legs extend upward to lift the shot. This leg extension is coupled

with the extension of the throwing arm. The position reached when the shot is delivered by the arm is called the **power position**. It should be noted that when the shot is being released, the head should be thrown back to allow an upward delivery—at this point the thrower's entire body will resemble the shape of the letter "C" after it has been turned inside out—throwers refer to this position as the "inverted C." (see Figs. 15-7 and 8.)

A follow-through, called the **reverse**, is applied to the end of the throw. This allows for a long pull while avoiding fouling. The athlete should not watch the shot as he or she reverses but, rather, look off to the side of the sector. Watching the shot usually causes the center of mass to move out of the front of the ring, resulting in a foul throw (see Fig. 15-9).

The left foot is forced out of its position next to the toe board and is replaced with the right foot, which should land flat to ensure better balance. The right arm which has been extended to throw the shot should immediately be brought back over the top of the body to a position pointing to the center of the ring.

The Spin

Compared to the glide, the spin technique allows for longer acceleration of the shot before the power position is reached. However, this technique is more intricate than the glide and requires the thrower to spin $1\frac{1}{4}$ times around within a 7-foot circle before the shot is released. While it is true this style can produce some very long throws, it is sometimes harder for the beginner to master.

The spin (or rotational) technique begins with the thrower balancing his or her weight on both feet in the rear of the ring with the back to the landing area. The shot may be held a little *higher on the cheek* for the spinner. This allows the hand to release the shot easier.

As the thrower initiates the spin, there should be a shift of weight from the right foot over to the left foot. The center of mass should be directly over the ball of the left foot to allow a smooth pivot as the thrower turns in the back of the ring (see Figs. 15-10 and 15-11).

While pivoting, the thrower should be looking straight ahead, not at the ground. Once the thrower has completed the first 90-degrees of the turn, the right foot sweeps

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outside of the ring and then drives forward toward the right sector line.

The beginning thrower will want to drive his or her right leg toward the center of the ring, but this is incorrect. Rotational forces must be taken into account. As the right leg drives toward the right sector line, the pivoting action will cause the right leg to move to the left as it is driven out. If the right leg is driven toward the center of the ring, rotational forces will cause it to land far to the left of center of the shot ring. The right leg must compensate for the rotational forces pulling the thrower around.

A second component of the initiation from the back of the ring is the push of the left leg. The left leg thrust across the ring, coupled with the right leg drive toward the right sector line, causes the thrower to move across the ring. When the right foot lands in the center of the ring, it should begin pivoting immediately.

This is a hard task for beginners because it requires good balance on the ball of the right foot as it makes contact with the ground. While the right foot pivots, the left foot should be picked up and set down against the toe board. The toe of the left foot should align roughly with the heel of the right foot. As the left foot makes contact

SPIN SHOT PUT POSITIONS

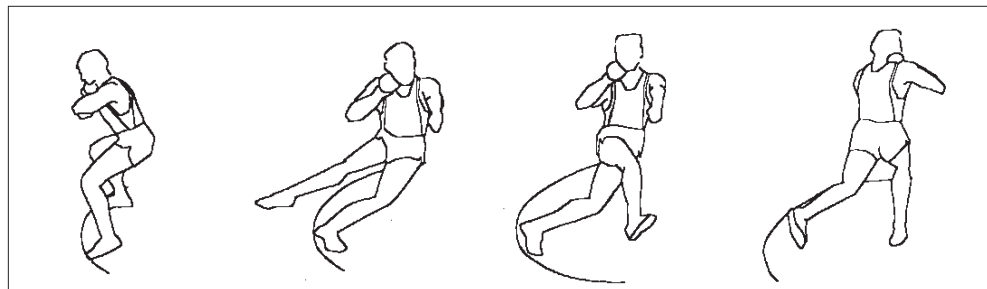


Fig. 15-10.

Fig. 15-11.

Fig. 15-12.

Fig. 15-13.

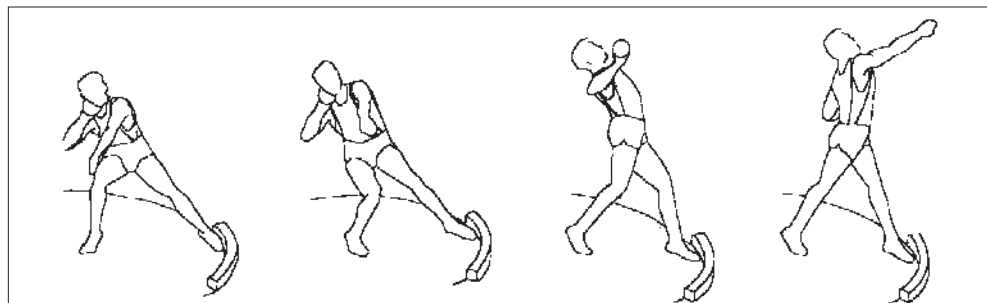


Fig. 15-14.

Fig. 15-15.

Fig. 15-16.

Fig. 15-17.

with the ground, the center of mass should still be balanced over the ball of the right foot, with the shoulders closed to the front. This position should resemble the beginning of the stand-throw (See Figs. 15-12 to 17).

From the time the left foot pushes off the ground to when it is set down by the toe board, the right foot should continue to pivot. Once the stand-throw position is reached, the hips begin to rotate along with the right foot. Simultaneously, the right leg begins to extend, or straighten. This causes the body to **corkscrew**. As the body sets to shift weight from the right leg to the left leg, the shoulders start to open up.

The final phase of the spin technique involves the release and the **reverse**. When the center of mass is shifted forward over the block leg (i.e., the left leg), the hips and shoulders pivot around until the shoulders are square to the throwing area. The release of the shot is followed by a reverse similar to the steps described at the end of the glide technique (see Fig. 15-9). Throwers will find it easier to reverse at the end of the spin because they already possess quite a bit of rotational momentum. On the other hand, it is easier to **pull away** or **spin out** from the finish of a throw, making the spin a more inconsistent technique for beginners.

Coach's Viewing Angles

When watching the shot put, a coach should view from three different angles: from the back of the shot ring, from the side of the ring facing the throwing arm of the shot putter and from the front of the ring. Each viewing angle allows the coach to evaluate different components of the overall throw.

The view from the rear of the ring provides a good look at the line of power established as the thrower glides or drives across the ring. This view is also ideal for seeing if the shoulders are open or closed as the thrower hits the middle of the ring.

Viewing from the side of the shot ring is the most common position used by coaches. This view gives a good look at the left leg drive to the board and the push off of the right leg out of the back of the ring. The opening of the shoulders and length of pull on the shot can also be seen well from this angle.

Watching the throw from the front of the ring provides a different view of the opening of the shoulders and the left leg drive to the front of the ring. This angle allows the coach to see how well the thrower **squares up** to the throw or if the spin-

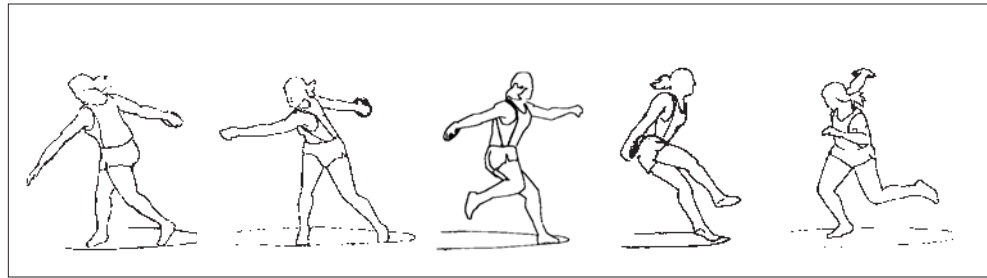
DISCUS TECHNIQUE POSITIONS

Fig. 15-20.

Fig. 15-21.

Fig. 15-22.

Fig. 15-23.

Fig. 15-24.

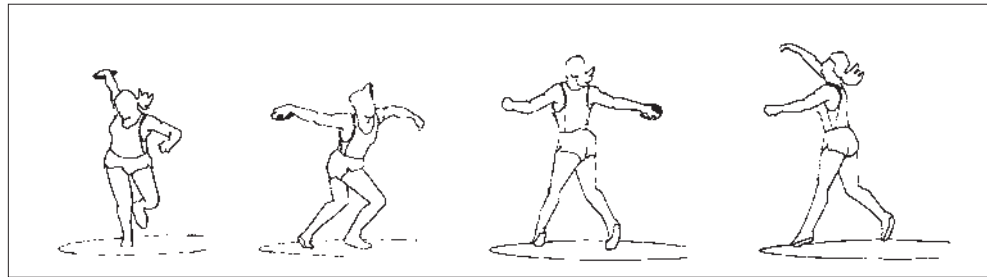


Fig. 15-25.

Fig. 15-26.

Fig. 15-27.

Fig. 15-28.

ner over-rotates out of the back.

The choice of angles from which to view depends on the particular skills the thrower is perfecting and the coach's preference.

DISCUS THROW TECHNIQUE

The primary body movements of discus technique are essentially the same as the rotational technique for the shot put. The ideal athlete for discus throwing is tall with long arms and legs and quick feet. Successful discus throwers have come in all shapes and sizes, but this body-type seems to have the most success in the event.

The complete discus throw should have a distinct rhythm, building from slow to fast. The discus thrower should start in the back of the ring with a nice, relaxed wind of the discus to start the rhythm as the weight stays evenly distributed over both feet (see Figs. 15-20 and 21). The wind should not be too fast or dramatic.

As the thrower "unwinds," the legs should bend and the center of mass should be

shifted over the ball of the left foot (see Fig. 15-22). The shoulders should remain parallel to the ground with the left arm extended straight in front of the body.

As the center of mass moves over the left foot, the thrower should drive off that foot immediately. This movement is referred to as **drop and go**. As the left foot pushes, the right foot sweeps around underneath the left armpit and the thrower rotates out of the back of the ring (Fig. 15-23). The combination of the left leg drive and the right leg sweep gives the thrower good linear impulse across the ring.

Hip-shoulder separation is also established at this point, as the right leg sweeps underneath the armpit to get ahead of the upper body. The head should look straight away from the chest, as the discus is wound, and then turned to look at the left arm as the thrower comes out of the back of the ring.

Once linear drive has been established across the ring, the thrower should actually be airborne. At this point, the right leg will be tucked in, beneath the upper body, and the knees brought together to increase the speed of the left foot coming back to the ground. After the initial drive out of the back, the right leg will be the first to contact the ground at the center of the ring (see Fig. 15-24). The left leg should touch down as soon after the right as possible to create the longest arm pull possible on the discus (see Fig. 15-25).

As the thrower reaches the stand-throw position, the shoulders should remain parallel to the ground with no dipping whatsoever. The right foot should also continue to pivot and should continue to do so until the discus is released.

When the athlete is pulling the discus around to the release point, the right foot must continue to pivot in order to maintain the hip-shoulder separation attained at the initial turn (see Fig. 15-26). If separation is not maintained, an **arm throw** will result — and much power lost. The discus throw is actually a sling, aided by a stretch-reflex reaction prior to release. The left side of the body should remain firm, with the left leg (the **block leg**) blocking as the right side rotates through release. At release, the head should be thrown back allowing the chest and hip to rise and give lift to the discus (see Fig. 15-27). After the discus is released, a reverse can be added to avoid fouling (see Fig. 15-28).

Viewing Angles for the Discus

The same angles should be used for watching the spin shot put and the discus. The side view provides a good look at the arm strike, as well as a good look at the hip drive during the release. This is also the best view to see the linear drive generated out of the back of the ring. Viewing from the back and front of the ring, a coach can see if the athlete over- or under-rotates when leaving the back of the circle. This view is also ideal to see if the shoulders are open or closed as the thrower reaches the front of the ring and whether the shoulders become square to the throw.

Introducing the Throws to Beginners

TEACHING THE SHOT PUT

The difference in technique training between beginners and experienced throwers is substantial. Advanced throwers should use the preseason to refine weak aspects of their technique and reinforce sound fundamentals.

Beginning throwers need to learn the basics of throwing the shot. A simple teaching progression follows. Each step should be mastered before the next step is undertaken.

- The beginning thrower first needs to learn the proper manner in which to hold the shot. The shot should be balanced on the hand between the fingers and the palm.
- The athlete stands in the shot ring facing the throwing area with the toes of both feet touching the toeboard. The thrower places the shot under the jaw with the elbow up away from the body. Many young throwers will let the shot fall into their palm when they try to place it under their jaw. It is important to correct this flaw immediately. The athlete then pushes the shot straight out from the body into the landing area.
- After the athlete is comfortable releasing the shot, the thrower repeats the same steps, but this time before he or she throws, the athlete twists 90-degrees at the waist in the direction of the throwing arm, so the upper body will unwind to gain momentum.
- The same steps are repeated, but this time the legs should bend as the trunk is twisted in the direction of the throwing arm. As the thrower initiates the turn of the trunk back toward the landing area to begin the throw, the legs should straighten up to produce lift on the shot.

- Once this step is mastered, the thrower should take one step back with the right foot. As he or she steps back the right foot will turn 90-degrees from the landing area. The athlete then pivots the right foot toward the landing area and twists at the waist to perform a regular stand-throw.
- From this point, the throwing drills described later can be used to develop either the glide or the spin techniques.

TEACHING THE DISCUS THROW

- Have the athlete place the discus in the palm of his or her non-throwing hand with the arm extended chest high. Have the athlete place the throwing hand flat on top of the discus and slide it forward until the last joint of each of the four fingers slides over the edge and grips the discus. The fingers should be spread apart with the thumb on top of the discus for control (see Fig. 15-30).
- To teach the proper release of the discus, have the thrower hold the discus with the throwing arm at his or her side and the palm facing the leg. Using a bowling action, have the thrower release the discus on its edge, so it will roll along the ground. The thrower should feel the discus roll off each finger. This movement is similar to the release of the throw. Make sure that the thrower keeps the arm straight and does not cock, bend, or flex the wrist upon releasing the discus (see Fig. 15-31).
- Throwing the discus straight up in the air for height also helps teach the proper release of the discus. In this drill, the thrower stands with the feet shoulder-width apart and begins by tossing the discus a few feet overhead. Emphasize keeping the arm and wrist absolutely straight, with the discus retaining a vertical position as it is released. As skill in handling the discus improves, have the thrower toss it higher, bending the wrist and knees to generate more power for throwing (see Fig. 15-32).

GRIPPING THE DISCUS

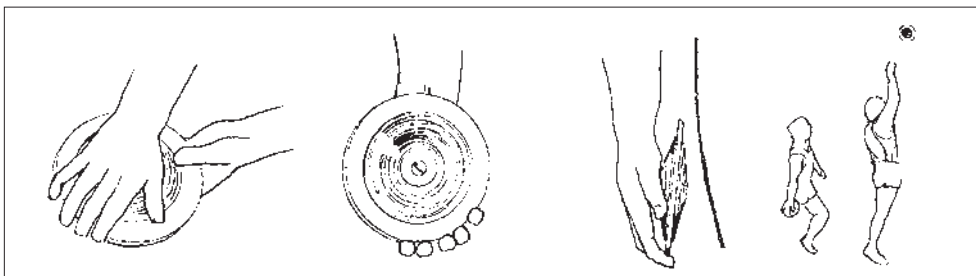


Fig. 15-30.

Fig. 15-31.

Fig. 15-32.

- The next step in the learning sequence is to demonstrate throwing the discus from a standing position at the front of the circle. The athlete should stand at a 90-degree angle from the landing area with the throwing arm facing the rear of the ring. The left foot should be near the front of the ring and the toes of the left foot lined up with heel of the right foot so there is a slightly opened stance. The discus should be wound back, taking care not to **cup** the discus. Only the upper body should be used to throw the discus at this stage. Concentrate on a proper release.
- Once the proper release is mastered, a full stand-throw can be attempted. The stand-throw position for the discus is very similar to that of the shot put except the throwing arm is relaxed, extended and wound back so the discus aligns over the left heel. (see Fig. 15-11). Stand-throws should be done without a reverse until proper timing is achieved.
- After the stand-throw becomes comfortable, the "half-turn" drill should be used to give the thrower a sense of pivoting on the right foot and throwing. This drill begins with the right foot placed in the middle of the discus ring with the left foot at the back of the circle and the thrower facing the front of the ring. The thrower then pivots 180-degrees on the ball of the right foot ending in the stand-throw position. Once this position is reached, the athlete throws. Pay special attention to completing the drill as one movement.
- The "step-in" drill begins with the athlete standing just outside the back of the ring facing the landing area. The thrower's left foot is placed just inside the back of the ring. The thrower then steps with the right foot into the middle of the ring. Once the right foot touches down, the rest of the drill follows the pattern of the half-turn drill. Again, this drill should not be done in parts but, rather, as one movement.
- The "South African" drill is basically the same as the step-in drill, except there is a stronger push off the left foot in the back of the ring, so a little more speed is generated when traveling across the ring. This drill simulates the action of the full throw without the first 90-degree turn at the back of the ring.
- The "360-degree turn" drill should be used to introduce the 180-degree turn out of the back of the ring. This particular drill can be done either in or out of the ring and involves a 360-degree pivot on the ball of the left foot. During this drill, the shoulders should remain parallel, and the right leg should remain straight, sweeping out away from the body to help the athlete maintain balance.

When this sequence of drills can be performed successfully, a full throw should be attempted.

The Equipment

Throwing equipment, particularly the discus, is a source of great debate. Does a school need to spend \$300 for one boy's discus? Will a \$300 discus really fly significantly farther than a \$60 model? The answer is that the beginning to average high school athlete will not see longer throws with a more expensive discus; however, an elite high school thrower will see greater distance with the better discus. Each school will formulate its own policy, but a general guideline to follow might be to not buy a more expensive discus for a thrower until a male athlete has thrown consistently more than 160' or a female athlete has thrown more than 120'.

Discuses are rated (and often priced) according to their rim weight, that is, the percentage of the total weight of the implement that is located on the outer ring of the discus. Too much rim weight (generally over 82%) will be very difficult for a beginning athlete to release smoothly. A more important characteristic when looking at discuses is the durability of the plates. Discuses have to survive years of high school abuse, and the part that fails most often is the plate.

Stainless steel shots are nice but come with a hefty price and some athletes actually find them too slippery. Cast iron or turned iron shots are perfectly fine for the vast majority of throwers.

Occasionally, a coach may have an athlete with small hands who feels the iron and stainless shots are too big. For these small athletes a coach might consider a brass shot which has a smaller diameter. Brass shots are not recommended for most throwers as their smaller size puts more pressure in a smaller spot on the hand (smaller diameter = more PSI) and can lead to pain in the throwing hand.

However, each school should check the rules for its section and state regarding both the size and type of shot allowed. In some cases, the governing body may provide a shot for championship competition and not allow personal shots. This is important if an athlete uses a smaller brass shot all year and then is required to throw a larger shot in section or state competition.

Emotionally, an athlete may feel better about throwing expensive equipment and believe that it will go farther, but if the expensive implement is flying farther for the average athlete, it has more to do with the faith and comfort in the implement than the implement itself.

Many shot putters like to use chalk (magnesium carbonate) to help them achieve a good grip on their implement. In the discus, it is critically important the implement and the athlete's hands stay dry. Keep towels handy to keep the implements clean and dry during meets and practices.

Methods of Training

WEIGHT TRAINING AND CONDITIONING

Both beginners and more advanced throwers can use a similar approach to general conditioning and weight training, although intensity will differ.

Weight training should concentrate on five basic lifts. First are the Olympic lifts (clean, jerk, and snatch), which are the most important — and most neglected by American high school coaches. The Olympic lifts are extremely important in building explosive strength in the athlete. The lifts are too often ignored in favor of the power lifts, which don't do much for explosion. The power clean and snatch simulate aspects of the throws, requiring upper and lower body coordination. If a thrower has to pick just one lift to do, it should be the snatch because it conditions the total body and develops explosiveness. Second are the power lifts (bench press and squat). Other supplementary lifts can be added to condition specific body parts, but these five core lifts should take precedence.

Conditioning should also include running, plyometrics and medicine ball drills. Hill runs or sprint repeats should be part of general conditioning. The plyometric exercises can be found in Chapter 5.

The intensity of conditioning and weight training should be geared to the fitness level of the athlete. Higher volume should be done early in the season and reduced as the competitive season begins. Proper conditioning enhances performance and reduces the risk of injury. When the thrower gains strength, he or she will find that good technique will be easier along with greater control.

More advanced explanations of lifting techniques and workouts are included in the strength training chapter of this manual.

COACHING GROUPS OF THROWERS

It may be a daunting proposition to have to teach 30 or more throwers of widely varying ability levels at the same time. This problem is compounded by the fact that most schools only have one or two rings for practice.

Throws coaches must be creative in their use of space and time. The key to coaching a large number of throwers is the use of stations or areas where athletes can practice a specific skill or drill. The more throwers a team has, the more stations that are needed.

There can be stations for all the different drills including footwork, balance, release points and position work. If there are six athletes per station, three athletes can drill and three can be “teaching” and looking for cues. The activities at each station should be short and simple in order to keep the athlete’s attention focused on the task at hand.

It is important that the coach continue to move around to as many stations and groups as possible; however, the coach must always be near and diligently supervising the areas where throwing is taking place.

For the shot put, if there is a very large field, the throwers can spread out with partners and warm-up by throwing back and forth to one another. There has to be at least 35 feet between pairs and the athletes should be at least 30 feet apart depending on how far they throw.

If there is a smaller group of shot putters (<10 athletes) with a large field, athletes can spread out in a line (10 feet apart) and all throw in the same direction.

With groups, the discus flies too far and too unpredictably to be safely thrown by more than one person at a time. This is where throwing rubber training balls in handball courts can be a great training idea. Generally, handball courts provide a level, clean throwing surface to on which to drill and a nice wall against which to throw.

DRILLS FOR THE SHOT PUT

The Overhead. While standing on the toeboard with the back to the throwing area, the athlete squats and throws the shot with two hands, back over the head. This drill is designed as a prelude to throwing. (Also, the forward two-handed shot toss.)

Stand-Throw. (Reverse/Non-Reverse) The stand-throw is an integral part of the warm-up for the shot. The stand-throw is the last half of the full throwing motion. The basics of the stand-throw must be mastered before the full technique is attempted. This drill should be performed without the reverse. This helps to avoid shifting the body weight onto the left leg too soon.

Stand-Throw From a Stretch. Start in the stand-throw position with a very wide base. Then, pull the right leg in underneath the body and perform the throw. This drill develops an **active** right leg by forcing the leg to push from the ground immediately after it is pulled underneath the body. Throwing from a stretch also develops leg action for gliders.

Double-Pivot Non-Reverse Throws. The double-pivot non-reverse can be used at the finish of either the stand-throw or a full throw. The purpose of this drill is to avoid the premature shift of weight onto the block leg. This error is otherwise known as **lunging**. Body weight must remain on the right leg as both feet pivot throughout the throw. The power produced from this type of throwing is generated by the rotation of the hips and body around the block leg and the extension of the right leg.

Step-Overs. These can be performed from either a stand or a full glide. This drill works on the concept of **chasing** the shot and establishing a long pull. The thrower who has a hard time shifting his or her body weight forward should use this drill. It involves stepping over the toeboard with the right leg while releasing the shot. The aim is to get as much body weight behind the shot as possible.

Right Leg Hop Drills. While holding the left foot with the left hand, the athlete pushes backward off the right foot and lands with the toes pointing 90-degrees to the left. This drill isolates the right leg drive out of the back of the ring for the glide technique.

Medicine Ball Drill for Left Leg Drive. A medicine ball is placed at the front of the shot ring. The athlete should drive the left foot backwards and kick at the medicine ball. This drill isolates the left leg drive in the glide technique.

Towel Drill. This drill works on keeping the shoulders closed as the athlete drives across the shot ring. The athlete stands in the back of the ring in a position that simulates the athlete is ready to begin a full throw. The right handed thrower holds on to a towel with his or her left hand. Another person stands behind the ring and holds the

other end of the towel or the towel can be tied to a fence or a pole. The thrower then drives across the ring while holding on to the towel.

Another towel drill can be used to work on a lazy right foot out of the back. A towel is placed behind the right foot at a distance of a few inches to assure that the right leg is being driven and pulled instead of dragged across the ring.

Half-Turns for Spinners. This drill starts with the athlete facing the toeboard with the pivot foot placed in the center of the ring. The right foot pivots, and the left foot swings around so the athlete comes to the stand-throw position. Then the shot is thrown. This drill can be done in two parts or at a faster pace so one smooth movement is attained. The half-turn is the first drill that the athletes using the spin should do to learn pivoting with the shot underneath the chin.

Step-Ins for Spinners: The step-in begins with the thrower's left foot placed in the back of the ring and the right foot outside the ring. The thrower should have his or her weight entirely on the ball of the left foot. The right foot steps into the center of the ring, followed by a basic half-turn throw. The step-in drill eliminates the first half-turn out of the back, emphasizes pivoting the right foot and establishing a throwing rhythm for the spin technique.

360-Degree Turn at the Back of the Ring. This drill develops balance. Without the shot, the athlete stands in the back of the ring in the position to begin throwing. The athlete then pivots 360-degrees on the left foot. This movement then can be repeated with a shot. Done properly, the athlete's center of balance will remain over the ball of the left foot. Balance out of the back is essential for a good throw, and this drill isolates the balance point on the left leg.

Cone Drill. To maintain balance out of the back and generate momentum, the right leg must sweep out and around. Place a cone a few feet from the back of the ring. As the athlete pivots on the left foot, the right foot sweeps out in an attempt to touch the cone.

DRILLS FOR THE DISCUS THROW

Cone Throws. This drill is for the thrower who **scoops** the discus (e.g., dipping the throwing shoulder). The athlete does stand-throws, but instead of throwing the discus, the athlete throws a traffic cone. By throwing a cone, the thrower will be aware of

where the implement is held and will pay special attention to avoid scooping. This is a drill that can be done indoors in a gym on rainy days.

Towel Drill. Place a towel across the center width of the discus ring. Have the athlete drive from the back hard enough so both feet land on the other side of the towel. This drill develops strong drive out of the back.

Taped Discus Line Drill. Tape the discus to the hand. Using the lines on the track, perform a South African drill. When doing the drill, avoid over-rotation by making sure the feet always end up on the line. Keep the discus in the proper position at all times.

180-Degree Drill. Line up with the pivot foot in the center of the discus ring and the opposite foot in the back of the ring with the discus wound back. Pivot on the right foot and bring the left foot around 180-degrees to the front of the ring into the stand-throw position. This drill is good for a thrower who has trouble pivoting.

90-Degree Turn Drill. This is an introductory drill which demonstrates the basic movements of the full discus throw. The drill begins with the thrower in the back of the ring in the normal starting position. A series of 90-degree pivots will be made involving the right foot for three turns, and then the left foot for the last two 90-degree turns until the stand-throw position is reached.

Weight Ball Throws. Small, weighted, plastic balls can be thrown into a wall from the stand-throw position. This allows a high volume of throws in a short amount of time. Certain technical flaws can be isolated easily with this drill, and corrections can be made without much difficulty.

A Periodization Plan for the Season

A coach's personal philosophy and the athletes' individual needs will determine the methods of technical training and conditioning used. It is up to each coach to implement his or her own system.

Every strength conditioning program begins slowly. As the thrower increases fitness, the number of repetitions should be decreased and the amount of weight increased. The weightlifting program should be designed so the athlete reaches peak strength just before the most competitive part of the season.

During peak competition (league, section, or state meets), the thrower should rest and back off the weights. Technical training should begin in the preseason – when throwers work on specific weaknesses. Problems should be addressed throughout the season. As important meets approach, practice should focus on timing, rhythm and the overall throw, rather than minor technical problems.

As with other events, training for the throws should be periodized over the course of the year or season. Periodization is the division of training into phases, or periods, emphasizing different goals and types of training. Periodized training frames the progress of training and skill development.

Generally, three to four weeks is the period over which athletes sustain improvement with any single type of training. After that time, training results diminish. Accordingly, different types of training need to be implemented.

In a two- to four-week training phase, primary emphasis should be given to one type of training, secondary emphasis to another, and less emphasis (maintenance training) to a third type. Within any training plan it is not recommended to have more than three quality, or hard training days per week, including competitions. The other days should consist of easy training or recovery days.

The goal of periodization is to manage the stress of training in order to produce improvement. Recovery is part of that management.

TRAINING THROWERS SYSTEMATICALLY

A system of training uses several methods and types of training within a seasonal training cycle. The following is a recommended shot put and discus throwing training plan.

CHAPTER 17

Training Shot Putters and Discus Throwers

	WEEKS	PRIMARY EMPHASIS	SECONDARY EMPHASIS	MAINTENANCE
Preseason	2	General Training	Weight Training	
	3	Weight Training	Technique	General Training
Early Season	3	Weight Training	Technique	Plyos
	3	Technique Drills	Plyos	Weight Training
Mid-Season	2	Technique Drills & Throws	Plyos	Weight Training
	2	Technique Throws	Plyos	Weight Training
Late Season	2-4	Special Training Full Throws	Light Plyos	Weight Training

SAMPLE THROWING TRAINING PLAN, APRIL 1-28

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
1 Tech Drills Plyometrics Weights Power	2 Warm-Up 5 x 30 Sprints Weights Olympic	3 Warm-Up 10 Easy Throws Strides	4 Home Meet vs Sullivan HS	5 Rest Day	6 Oerter Relays	7 Rest Day
8 Tech Drills Plyometrics Weights Olympic	9 Warm-Up 5 x 40 Sprints Tech Throws	10 Warm-Up 10 Easy Throws Easy Plyometrics	11 Away Meet vs Wilkins HS	12 Warm-Up Tech Drills Easy Weights	13 O'Brien Invitational	14 Rest Day
15 Tech Drills Plyometrics Weights	16 Warm-Up 2 x 120 + 80 + 40 Throwing Drills	17 Warm-Up Easy Weights	18 Home Meet vs Long HS	19 Warm-Up Plyometrics Weights	20 Throws Strides 6 x 100	21 Rest Day
22 Tech Throws Plyometrics	23 Warm-Up 6 x 30m Sprints Weights	24 Warm-Up Easy Weights Easy Throws	25 Away Meet vs Sylvester HS	26 Rest Day	27 Outfield Invitational	28 Rest Day

SHOT PUT AND DISCUS WORKOUT

Sequence _____

Date: _____

RUNNING WARM-UP:

Pre-stretch Plus:
.....

FLEXIBILITY/MOBILITY EXERCISES:
.....

PLYOMETRICS:
.....

TECHNIQUE DRILLS:
.....

THROWS:
.....

RUNNING AND CONDITIONING:
.....

WEIGHT TRAINING:
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NOTES:
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SHOT PUT AND DISCUS WORKOUT

Sequence

Date: Mon April 9

1 RUNNING WARM-UP:

Pre-stretch Plus: 600m

2 FLEXIBILITY/MOBILITY EXERCISES:

3 PLYOMETRICS: 2 x 30m: High Knees, Power Skips, Skipping Kicks,
Single Leg hops (1x30m each leg)

4 TECHNIQUE DRILLS: w/Medic Ball: 2-hand underhand,
overhand, pivots, rotational throws

5 THROWS: Shot Put Gliders: 5x standing, 5x stop and throw, 30x full cross
ring, 5x standing, 5x So. African Drill
Discus and Rotational Putters: 5x standing, 5x 360 pivot and
throw, 5x So. African Drill, 30x full cross ring, 5x standing

RUNNING AND CONDITIONING:

6 WEIGHT TRAINING:

Upper Body Series

NOTES: