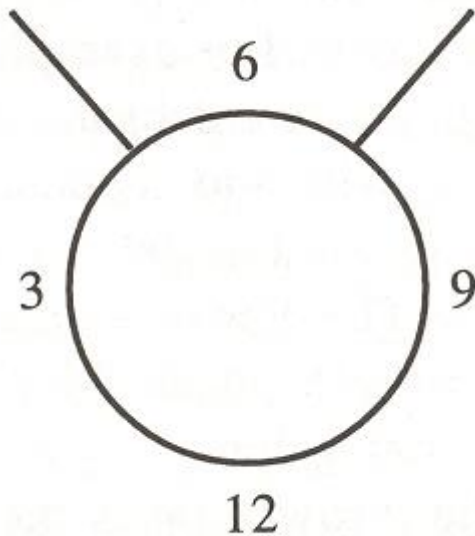


STEP-BY-STEP TEACHING OF DISCUS TECHNIQUE

Training The High School Discus Thrower

by Bill Pendleton, Esperanza High School, Anaheim, CA

Developing a skilled top-level discus thrower requires patience but has many rewards. To begin with, the discus is an event that requires a high level of skill. Unlike the sprints or jumps, a decent thrower is almost never beaten by a superior athlete who walks over and dabbles in the event. By becoming technically proficient, a thrower of very modest athletic ability will defeat the great majority of his competitors, and a truly gifted athlete will dominate most meets short of the prestigious invitational's. In discussing the training of the discus thrower, I will emphasize coaching approaches I have found successful in developing high school throwers. I will discuss everything in terms of a right-handed thrower. Reverse all directions for a left-hander. Also, in describing the ring, I will refer to the rear where the throw begins at 12 o'clock with the front of the ring 6 o'clock etc.



Selection of athletes

For most throwing coaches cutting athletes is never a requirement, so the real question is to whom do I devote the greatest coaching effort. If the coach only has one or two athletes, this is simple, but with five or more throwers, the coach needs to try and spot aptitude early and nurture it. Ideally, a discus thrower is gifted with athletic ability which may be evident as he excels in other sports.

Height is also of great benefit. Height provides two indispensable qualities. First, long arms provide long levers. If two discus throwers are rotating at the same speed, the farther the discus is from the body (or axis) the greater the momentum generated. Secondly, a taller thrower has a higher release point if he/she throws correctly.

Three factors determine the distance a discus will travel:

1. velocity of discus at release;
2. angle of release;
3. height of release point.

A 6'-tall thrower throwing a discus on the exact same flight path (parabola) as a 5'9" thrower will throw farther since his flight path starts higher and reaches the ground later. Yet, since few of us are blessed with tall and skilled athletes, the best bet initially is the well coordinated athlete while the taller thrower represents longer range potential.

Introducing the discus

Ideally the training of the thrower can begin in the fall. However, if the thrower needs to begin in the spring following a winter sport, the same training principles apply. The most important factor with beginners is devote enough time to them so that they become fundamentally sound. It is very difficult to take a thrower who has been throwing with major flaws, such as diving out of the back, and correct these flaws. It takes less time overall to start them correctly.

Firstly, a thrower must walk correctly before he can run. In other words, he must know how to grip and release the discus properly before he takes standing throws. Then, he must master the standing throw before he throws from a pivot on the right foot. Lastly, he must pivot correctly before he takes complete throws.

All beginning throwers see older throwers and want to attempt full throws, but when they begin these on their own, they develop and reinforce flaws which they may never lose.

The first area of importance is the grip. The beginner may either spread his fingers or place the index and middle finger together with the joint of the first knuckle on the outside edge of the discus. Have the beginner stand with his arm at his side and squeeze the discus like a bar of soap so that it squirts out forward. Most beginners will release the discus out the back of their hand.

Secondly, have two beginners stand five yards apart and "bowl" the discus back and forth. This teaches them to release the discus correctly, If they do not release it correctly, it will not roll to the partner. After they can bowl it back and forth several times without either one of them having to move sideways to catch it, they should back up to 10 yards until they are successful at that distance and so on back to about 20 yards.

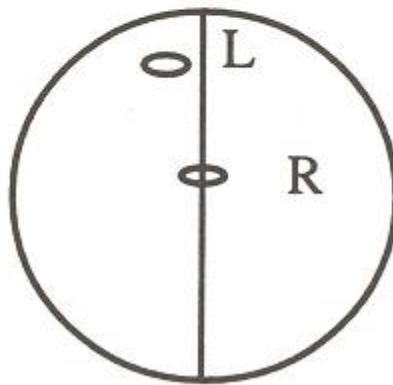
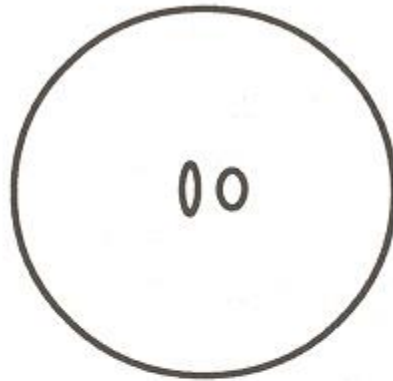
Next, the throwers move on to releasing the discus horizontally or "skimming" the discus. They stand about 20 yards apart and throw the discus back and forth releasing the discus horizontally working on level flight. They should understand that the faster a discus rotates, the farther it will travel, so a good release is vital.

The Standing Throw

In teaching the discus we break the throw into four parts: 1) exiting the rear of the ring as the throw begins over the left foot; 2) driving out of the back and landing on the right foot in the center of the ring; 3) pivoting on the right foot until the left foot touches in the power position; 4) throwing from the power position.

The teaching progression takes these four parts and works backwards. In teaching the discus, we will use a "whole-part-whole" approach. Show the beginner what a full throw looks like and explain that we will master the final step and then work backwards one step at a time before attempting the full throw.

Standing throws should not only provide a warm-up, but they should emphasize technique that will improve the full throw, not just the standing throw. For example, excessive lunging forward during the standing throw will add distance to the standing throw but detract from the full throw. The type of standing throw I prefer is seen on the Mac Wilkins instructional video.



- The thrower faces the back of the ring with the right foot in the center. The weight is centered on the right foot. To begin, the thrower holds the discus in front of him and swings it a little to his left and then draws it back keeping the right arm at full extension until the discus points up at the same angle it will be finally released at the finish of the throw.
- As the discus is drawn back, the left leg extends back about two feet until the ball of the foot contacts the ring at 7 o'clock. This puts the thrower in a "heel to toe" relationship. The right foot is on a line dividing the center of the ring from 12 to 6 o'clock. The left foot is behind this line so that the hips can be opened up as the thrower rotates to throw. The left arm stays extended in front of the body. The left arm needs to stay extended as a counterbalance to the extended right arm.
- As the right arm reaches as far back as it can, the thrower lifts his/ her left foot slightly and then drops it. This foot touch simulates what happens in the real throw as the left foot reaches the power position. This touch initiates the throw. The right foot pivots on the ball of the foot as the right arm retracts in a long U-shaped path down to a low point behind the thrower and back up to a release as near shoulder height as possible. The right foot stays on the ball of the foot as it pivots.

Ideally, the right arm will stay as near as perpendicular to the body as possible as it sweeps around the body. The left arm will also be extended as it sweeps from 12 o'clock to 6 o'clock with the thumb pointing at the body.

Once the left arm reaches the front of the circle, it should be shortened by bending the elbow until the elbow leads the arm as it passes parallel to the left shoulder at the end of the throw. This bending or "shortening" of the left arm increases its speed since it is now cutting a shorter arc. This helps the thrower to get a "stretch" across the chest as he throws. This stretch provides the proper action of pulling the discus not throwing it by leading with the left arm.

At the release point the thrower is striving to release the discus just as his knees lock out to achieve the highest possible height of release and still have the hips ahead of the discus. In a no-reverse throw the left foot will remain facing the front as the right foot pivots. No-reverse throws are a good way to develop a good block.

Blocking is a crucial concept in developing a good thrower. Blocking is a term that describes the stopping of one part of the body to accelerate another part. In the release, blocking refers to the stopping of the left side of the body at the release of the discus to accelerate the right side. Biomechanically, at the finish we have a rotating line across the shoulders. If we decelerate the left end of this line (the left shoulder, we accelerate the right end (the discus). This can be explained to young throwers by comparing it to a skateboard rider riding 10 miles an hour. If he hits a curb, his feet and the skateboard decelerate immediately to 0 mph causing his head to accelerate beyond 10 mph. A common practice is to start the throwing workout with no-reverse standing throws.

The Pivot

Once a thrower can correctly throw from a standing position, we begin to work backwards. The phase of the actual throw just before the finish in the power position is the pivot over the right foot to the power position. To work on this we do pivot throws.

In a pivot throw the thrower begins with the right foot in the center of the circle and the left at the rear of the circle at 11 o'clock. He/she should be facing 7 o'clock. Both hands and the discus are held in front of the body.

To begin, the thrower bends the right knee to a 90-degree angle (just as the knee should be where the thrower lands in the middle of the ring on a full throw) and gets up on the ball of the right foot. The thrower initiates the throw by drawing the right arm back as far as possible, while leaving the left arm facing the front. The right arm should be kept as parallel to the ground as possible, avoiding the natural tendency to scribe a vertical pendulum with the discus.

Once the discus gets as far back as possible, the thrower should pivot as fast as possible keeping the right knee bent (the head should not rise up during the pivot). The left foot should land on the ball of the foot at 5 o'clock so the thrower is in a good heel-

toe relationship just like the standing throw. When the left foot hits, the thrower should have the discus back over his right hip and his left arm slightly bent pointing at 11 o'clock; then he executes all the fundamentals of the standing throw but with the added momentum of pivoting. The two keys to a pivot throw are:

1. Keep the thrower's weight in the center of the ring instead of rocking to the front foot and lunging on the throw. This can be worked on by having the thrower stop the pivot as soon as the left foot hits the ground and immediately pick the left foot up off the ground a few inches. This is impossible unless the thrower's weight is in the center of the ring over the right foot;
2. Keep the discus back. The natural reaction of beginners is to lead the body's rotation with the discus, so the shoulders are always parallel to the hips, instead of staying "wound up" with the shoulders trailing the hips, so that when the left foot hits, the discus is facing 12 o'clock and the throw (the distance the discus will be pulled after the left foot hits) will only cover 180 degrees or half a circle instead of a minimum 3/4-of-a-circle up to a full circle pull achieved by keeping the discus back over the right hip.

To keep the discus back, the thrower must keep his left arm in front of him as he/she pivots. He must remember that the arms basically should operate at 180 degrees opposite each other. If he pulls the left arm around too fast at the start, the right arm will also rotate too soon.

One way to work on keeping the discus back is to imagine the shoulder has a "latch". Once the discus is pulled back, the "latch" clicks and the discus is locked there until the power position is reached.

A thrower can also work on keeping the discus back by momentarily pausing when the left foot hits on the pivot, to feel the discus back, then finish.

Beginners especially can benefit from three-point pivot throws. In a three-point pivot the thrower will cup the discus with his fingers over the discus so he doesn't drop it. Pivot three separate times and throw only on the third pivot. On the first pivot the left foot hits at 5 o'clock as always and the thrower pauses (he can also pick up left foot briefly here to see if the weight is back). Then they pivot again continuing to rotate counterclockwise, bringing the left foot back to 11 o'clock again. Pause again. This time, re-grip the discus, so it can be thrown. Then pivot again to 5 o'clock and throw.

The three-point pivot provides a lot of repetition and reinforcement in keeping the weight over the middle and keeping the discus back in a short time. It is very important that the thrower stay up on the ball of the foot at all times and never let the heel touch.

Once a thrower is proficient at pivoting, he can work on increasing rotation speed two ways. He can "kick" himself in the rear by bringing the left heel towards his rear during rotation. This shortens the swing (arc) of the lower leg and thus speeds it up. He can also think of "squeezing" the knees by bringing them together quickly as they rotate. This also speeds up rotation.

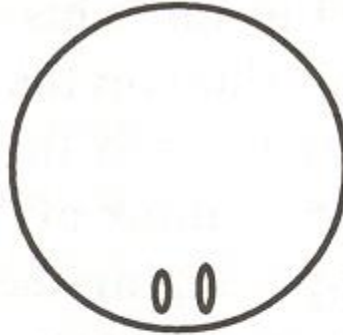
The "Step-In" or "South African"

Once a thrower can correctly pivot, we again work backwards. The next step is coming out of the back of the ring. There are two common methods of working out of the back off the left foot. Both begin with the thrower facing the front of the ring.

The *step-in* throw emphasizes rotation, while the *South African* throw emphasizes being dynamic and explosive.

The *step-in* begins with the thrower facing the front of the ring. Both feet are together with the heels against the rear of the ring. The thrower holds the discus in front and then draws the discus back parallel to the ground as far as possible. As the discus is being drawn back, the thrower leaves the left arm facing the front of the ring. Also, as the thrower draws the discus back, he steps forward with the right foot to the center of the ring. Normally, in a full cross ring throw the thrower's right foot lands facing approximately 2 o'clock.

In the *step-in*, however, we want to have the thrower work on rotation, so we make him exaggerate the rotation. He steps in and points the right foot at 6 o'clock (straight ahead). This forces the thrower to rotate 360 degrees on the right foot before throwing. He must stay on the ball of the foot and keep his weight over the right foot to complete the throw. This throw must be done a little slower than a normal throw, so the thrower can rotate completely. Once the thrower rotates and the left foot hits the power position, the coaching points are the same as the standing throw.



STEP-IN



R

SOUTH AFRICAN

(The South African is not a legal throw in many areas. It is a good method for learning how to pivot)

In the *South African* throw the thrower again faces the front of the ring with the left foot at 11 o'clock. The right foot, however, is outside the circle similar to where it will be swung when the right leg is swept wide out of the back in a full cross ring throw. Here, though, the foot is stationary. A line drawn through both feet will point at 5 o'clock. To begin the throw, the thrower again swings the discus to the front and then draws it back as far as possible, letting the body wind with it. When the discus is ready to be brought forward, the thrower drives forward off the left foot, sweeping the right leg in a wide arc. He should lead the right leg sweep with the inner thigh of the right leg, not the right knee. The thrower will exit the back of the ring with his eyes focused forward and upward. The left arm will be slightly flexed but kept long as the thrower drives forward off the ground.

As the thrower leaves the ground with his left foot, the coach should see the right leg driving forward at a right angle to the body with the knee also at a right angle to the thigh, while the discus remains held behind the shoulder.

This distance between the right knee and the trailing right shoulder is called "separation". The more separation the thrower achieves, the better. Good separation enables the thrower to land on the right foot, rotate and hit the power position with the left foot while keeping the discus held back as far as possible so the thrower gets a long "pull." A thrower who brings the discus forward at the same time as the right leg usually achieves little or no separation.

In addition, the discus should scribe a wide arc with its lowest point at 12 o'clock sweeping out and up as it is brought around past 11, 10 and 9 o'clock. The thrower should drive towards the right-center portion of the sector since the momentum created by the sweeping right leg being brought back inside will push the thrower to the left, resulting in the right foot landing in the center. A thrower who drives straight ahead will end up on the left side of the throwing circle while a thrower who drives to right center will usually end up correctly positioned.

After the thrower's left foot leaves the ground, the right leg is actively pulled underneath the body to increase rotational speed. As the right foot is pulled into the center, the discus should scribe as wide an arc as possible. Ideally, the arm carrying the discus remains perpendicular to the body.

As the thrower "unseats" (leaves the back), he turns and the discus should point upward at the same angle as the discus will be released at. The orbit of the discus will be lower in the back and higher in the front. Once the right foot hits the center, facing approximately 2 o'clock, all the coaching points of the pivot and standing throw apply.

The Full Cross-Ring throw

Once throwers master the preceding steps, they are ready to begin throwing from the back of the circle. All beginning throwers will want to move to the back very quickly, but if they are not ready, they develop bad habits that can be very hard to break. If the coach is not always with a thrower because he is working with older throwers, a young thrower throwing full cross-ring throws prematurely often develops incorrect muscle memory," i.e., patterns of movement which become difficult to correct. Try to spend the majority of time with the top throwers of any grade, then beginners (especially promising ones of any grade level), and then older throwers (sophomores, juniors, seniors) of average ability.

To begin the full throw, the thrower assumes a position with his navel aligned at 12 o'clock. the feet should be evenly distanced from that point and the knees flexed about 45 degrees. If the thrower begins with the discus in the right hand at the right side, all he should need to do to initiate the throw is swing the discus back a little and then across the body to the left beyond the chest. Then he should draw the discus back until it is behind him and almost over the left foot.

He will rotate the body as he draws the discus back. The left arm should be relaxed and slightly flexed staying 180 degrees from the throwing arm. As the discus is being drawn back, the left leg should be pivoting on the ball of the foot and maintaining the same angle at the knee.

In the interest of stability, it can be advantageous to keep the right foot flat on the ground as the arm is withdrawn and starts forward. The thrower's weight can also be shifted over the right foot as the discus is drawn back.

If a coach has all throwers utilize this simple start to the throw or any equally quick and simple start, he will avoid the waste of throwing time lost when throwers crank the discus back and forth several times. With many throwers using the same ring, this is an inexcusable waste of time. Excessive cranking the arm gains nothing.

The thrower should get mentally ready to throw before entering the ring, not step in and crank until he feels right. Once the thrower reaches the farthest point of drawing the discus back, it is important that he initiates the throw by shifting the weight towards and over the left foot and begins to rotate the left knee forward. He should not initiate the throw by starting to bring the discus forward.

Again, he can imagine a "latch" clicking when the discus is completely back, keeping it back. The left side of the body turns in unison at the start of the throw. The left foot, left knee, and left arm all point in the same direction as the thrower begins to turn.

It is important that the thrower develop a wide right leg sweep to generate power. To utilize the wide right leg, the thrower needs to pick up the right foot off the ground when his chest reaches a point about 10 o'clock. When the thrower drives out of the back, he should be driving to the right of center since the wide right leg sweeping in will pull him left of where he initially drives.

In general, if he drives just inside the right foul line, a good right leg will pull him to the center, whereas if he drives to the center, a wide right leg will pull him into the hole (left of the center line).

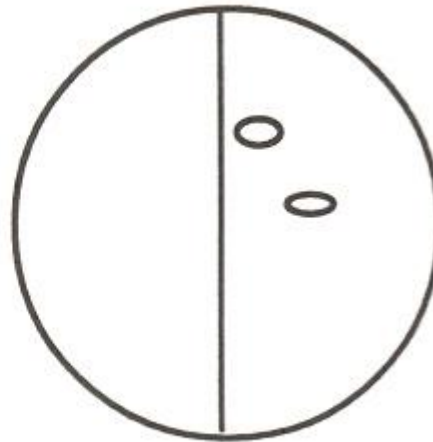
He should keep the knees apart as long as possible to avoid leading the throw with the right knee.

A common error among throwers is to pivot both feet until they are 90 degrees from the starting point and facing directly left before picking up the right foot. If a thrower does this, he will almost always swing the right foot out and back in a pendulum motion, leading the throw with the right knee. This reduces the rotary action of the right leg and reduces its power and speed, since it is now on a much smaller radius from the body. Often this is accompanied by excessive leaning and falling out of the back instead of driving up off of the left foot.

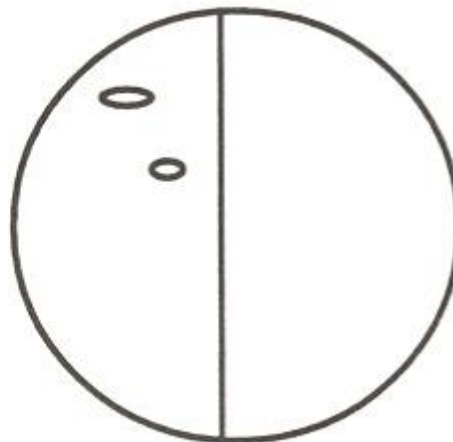
The right leg should sweep outside the circle slightly flexed and, as the thrower's foot sweeps across the back of the circle, the coach should not see the bottom of the thrower's shoe when he drives forward. If the sole is visible, he is leading with the right knee, not the thigh. The side of the shoe should be seen by the coach.

When he reaches a point where he is facing down the right foul line, the leg accelerates forward leading with the inside of the thigh instead of the knee. The thrower's eyes and left arm should be aimed just above, parallel to the ground. All this time the angle of the left knee should not change.

**Feet are right
of line. Stay
on left foot
longer.**



**Feet are left
of line, get off
left sooner.**

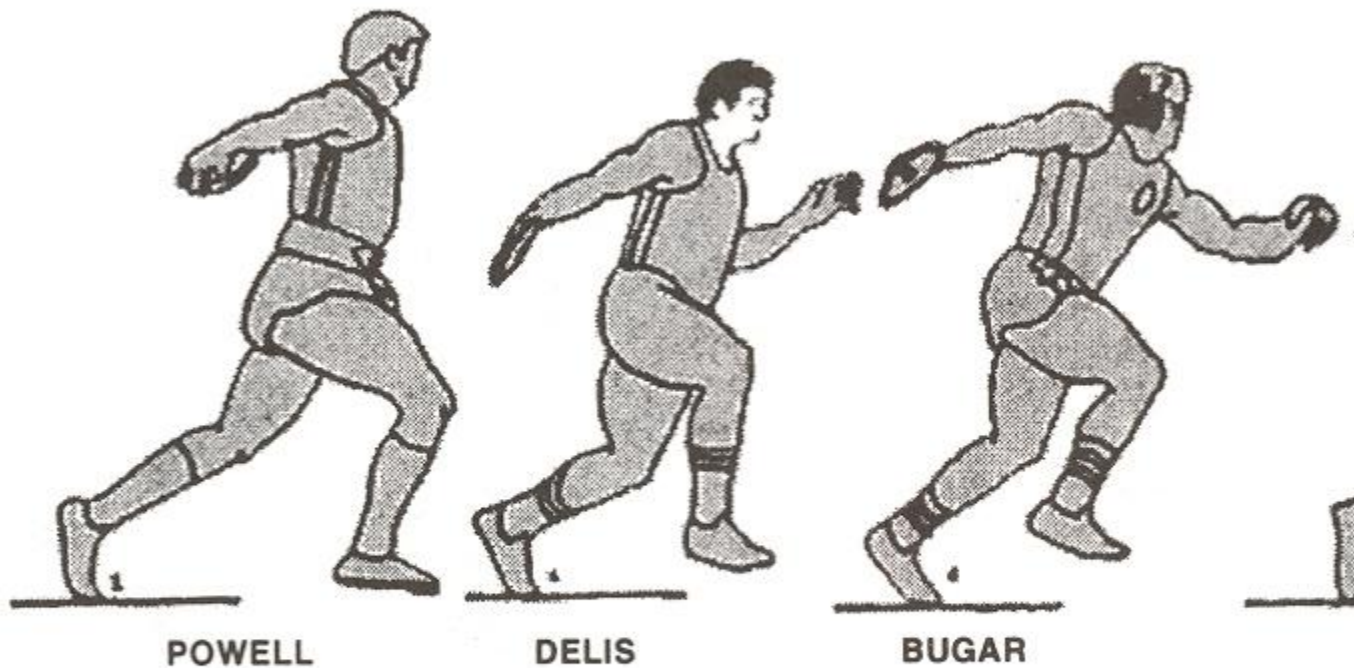


Whether he drives at the foul line or just right of center depends on the thrower. The aiming point should be adjusted by observing the thrower's feet when he hits the power position. If a line drawn between the thrower's right heel and left toe is to the right of a line drawn down the center from 12 o'clock to 6 o'clock, the thrower needs to stay on the

left leg longer, continuing to rotate before he drives out. If this "heel-toe" line is to the left of the center line, he needs to drive off the left sooner. Ideally, the "heel-toe" line will be the same as the center 12 to 6 line.

When the thrower's left foot is leaving the ground, the right hip and right knee should be as far in front of the discus as possible. As discussed in the South African section, this is "separation." Having separation insures that the thrower is keeping the discus behind him and that when he hit the power position, he will have a long pull.

Many throwers will have the discus even with the right hip as they exit the back. This leads to a short pull when the power position is reached since the discus will be around 1 o'clock when the left foot hits 4 or 5 o'clock, as it should be.



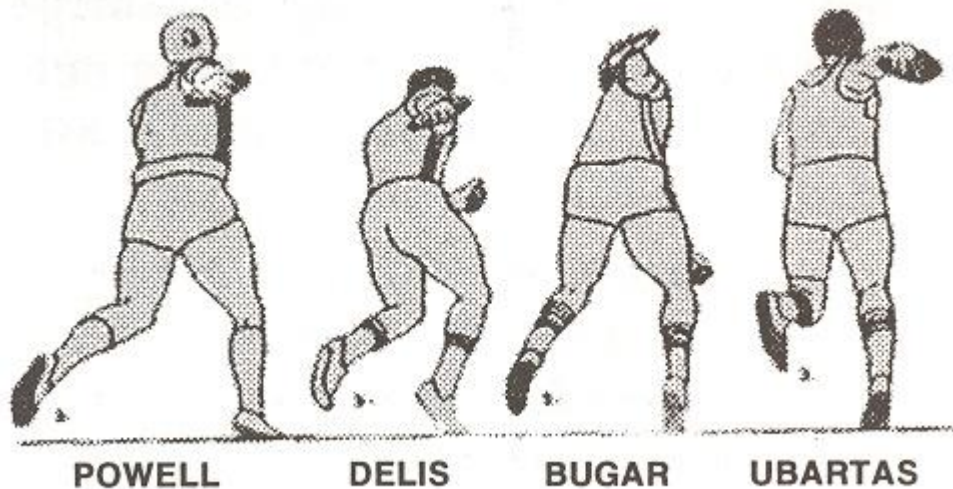
All drawings by Glenn Amundsen
Elite throwers driving to front.

The body should be upright during this "unseating" or exiting of the back. When the thrower leaves the ground, the right thigh should be actively pulled in underneath the body to increase rotational speed. The vertical axis (a line drawn through the head to the rear) of the body should go from near vertical upon unseating to tilted toward the back, as the discus is rotated toward the front of the circle.

In addition, many throwers are helped by using a "focal point." This means they lock their eyes momentarily on an object such as a tree or pole which is in the direction they wish to drive. This usually helps them drive straighter and be more linear across the ring. For many athletes seeing where they are driving helps.

It also prevents over rotation out of the back where the thrower stays on the left so long that he exits the back facing 2 o'clock, or even backwards, developing no linear speed across the ring. When they do this they will probably land well short of halfway across the ring. Ideally the chest remains erect and the head is an extension of the spine, not bent forward. Keep the knees apart to avoid leading the throw with the right knee. A common error among throwers is to pivot both feet until they are 90 degrees from the starting point and facing directly left before picking the foot up.

When the right foot makes contact with the center of the circle, the foot will be somewhere between 1 and 3 o'clock. It should also be very near the center of the ring. If the thrower lands in the back half of the ring, usually accompanied by the foot facing 12 o'clock, he is not generating the speed across the ring that he should. In this incorrect scenario he will also usually lunge forward while throwing instead of turning on a tight axis after driving to the landing position. If the thrower lands correctly, the left foot should be pointing 180 degrees away from the right at the time the right foot touches down. Pictured below are the same elite throwers viewed from the same angle as their right foot makes contact.



Beginners should not rush the right foot coming down but should rush the left coming down after the right. The rhythm of the throw is "swееееep, boom-boom" as the feet come down. If a thrower consistently fails to drive across the ring, a towel can be laid across the ring halfway across from 3 o'clock to 9 o'clock. Then make the thrower drive out of the back to clear the towel as he/she sets up to throw. To accelerate the

thrower's speed as the right foot touches down in the center, he can "squeeze the knees" or "kick the butt," as discussed in the "pivot" section.

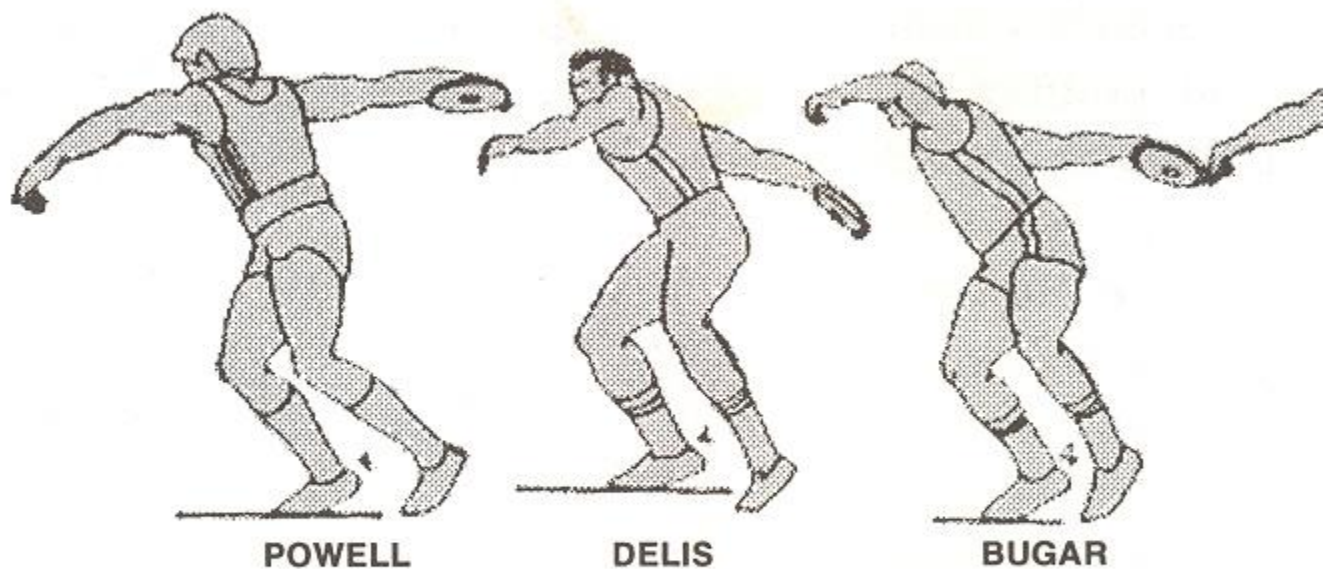
Once the thrower has hit this power position, the emphasis is now primarily on vertical lift. The coaching points are all the same as in the standing throw. The coach should check and make sure that the thrower is finishing his throw by continuing to rotate the right foot as he throws so that on a non-reverse throw, the right foot is turned past 6 o'clock, as the left foot is still at 6 o'clock. In addition, the left arm should be ripping across, finishing in a bent position at the thrower's left shoulder, creating a "stretch" across the thrower's chest as discussed earlier.

Also, the rhythm of the entire throw is constant acceleration. A beginner should be slow to fast. An accomplished thrower can be moderately fast to faster. However, the great majority of young throwers are too fast out of the back. Beginners usually leave the back too fast and then have a hesitation in the throw due to faulty technique.

For example, they may fall out of the back with a lot of speed, and then land on a flat foot or lunge forward at the finish, stopping their rotational speed and resulting in reduced speed of the discus at release.

They must understand the only speed that matters is velocity at release. Any speed that is generated must be able to be carried through to the release. The thrower must try to release the discus at shoulder level with an extended arm and a good block. Ideally, the knees should be locking out as the discus is released. A thrower, however, who generates great speed may still have the right knee bent on release.

The thrower then should "chase" the discus by attempting to extend and stay with the discus as long as possible. Upon release, the discus should be tilted slightly upwards and the outside edge should be slightly lower than the inside edge. As the discus flies, it should appear to flatten out with the outside edge rising to parallel to the ground. A thrower who reverses after the throw should execute the same coaching points mentioned in the standing throw section.



Elite throwers hitting the power position viewed from the front

TROUBLESHOOTING

FALLING OUT OF THE RING ON THE LEFT SIDE

This is probably the most common fault, especially with beginners. They finish the throw with the head pulling down to the left, the arm well above the shoulder. Usually the discus has the outside edge far higher than the left and the thrower falls out of control, out the left side. This is caused by the thrower not transferring his weight over the left foot as he begins the throw. As a result his center of gravity is not over the left foot, and his vertical axis is tilted too much toward the 3 o'clock side of the ring. He continues to rotate and throw on that axis and falls out that side. Throwers working by themselves should know this and any time they fall out of the left side, they should get over the left foot more, exiting the back on the next throw. No reverse or "stop" throws (the thrower begins a full throw but cups the discus with his hand and stops when he hits the power position) help the coach correct this fault. If the thrower is on balance, he can hold the power position when he hits it and a non-reverse lets the coach see more easily where the feet are being placed.

THROWING OFF TO THE RIGHT

This can have two causes: First, if the thrower's feet are aligned correctly, but the throw is on the right sector line or wider, the thrower is probably pulling his body away

and low to the left as he throws. Usually he is ducking the head and shoulders down to the left. The discus will go off right. To correct this, the thrower needs to stand tall at the release and chase the discus with his right shoulder.

Secondly, a common cause is the thrower is getting off the left foot too early and a line drawn through his feet will point along the right sector line. This makes it very difficult to get the disc around. The thrower needs to stay on the left foot longer and work on getting the feet correctly aligned.

ENDING UP IN THE HOLE

The "hole" is the section of the ring by 4 or 5 o'clock. If a thrower ends up in the corner but is not falling out on that side, he is on balance, but not on the desired linear path from 12 to 6 o'clock which produces maximum power. He is probably staying on his left foot too long and over rotating so that the left foot is pointing at 3 or 4 o'clock when he unseats (leaves the back). He needs to work on driving out of the back at an earlier point.

ALL OF THE ABOVE PROBLEMS CAN BE IMPROVED BY THE FOLLOWING DRILL: Throwers with balance problems can work on this by going on a large hard surface such as blacktop or cement and working on driving out of the back to set up on different lines. For example, line up with the feet on a line and then wind and drive out on a line directly to the left, instead of straight ahead to 6 o'clock to a stop.

The heel-toe line should be perpendicular to the left from where you started. Then move to driving and stopping on a 45-degree angle to where you started on the left side. Then straight as usual, then a 45-degree angle into the hole and then perpendicular to the right side. To do this you must get over the left foot and learn when to drive off it. You learn to be "on" the left foot and not fall into the throw.

THE DISCUS ITSELF IS TOO VERTICAL DURING FLIGHT

This means that as the discus leaves the thrower's hand it appears almost vertical. Several problems can cause this. First, the thrower may be driving too far into the hole (left side of the circle), so that as he rotates, trying to keep the center of gravity in the center, he is leaning back toward the center. This means as he throws the vertical axis is tilted left to right as viewed from the back of the ring, so the throwing arm is lower than it should be, even though it may be perpendicular to the body.

If the coach watches the thrower's feet, he will see the thrower's right foot come down left of the 12-6 o'clock line and the left foot also come down left of the line and also probably not get past the right into a heel-toe relationship. The thrower will usually stumble a little back to the right as he throws.

To work on this, have the thrower do no-reverse throws and stop throws. This makes him stay over the feet as he throws or stops and he can develop a feel for being over the feet correctly, which helps him get to a vertical axis.

One other reason for a vertical night may be that the thrower's orbit is reaching a high point at 3 or 4 o'clock, because he is staying on the left foot too long, so that the high and low points of the orbit are 8 and 10 o'clock instead of 6 and 12 o'clock. This means that the discus is just beginning to rise when it passes the release point at 7 o'clock and will be released too low. When the low point is this close to the release, the thrower does not have time to pull the discus back up to a correct release point near the shoulder. To correct this, the thrower needs to get off the left sooner and make sure the apex of the orbit is over the right-center portion of the sector.

THE DISCUS LOOKS ROUND LEAVING THE THROWER

As viewed from the rear, a correctly thrown discus will have the right edge a little lower than the left edge (and it will flatten during flight). The front edge will also be a little higher than the back. If the discus appear as as a "moon" (almost circular) then the discus is not very aerodynamic. With a beginner the cause may be that the thumb on the throwing hand is too vertical. With a more experienced thrower the problem is probably that he is leaning forward too much upon release, so that the head-foot axis is tilted forward. This means he cannot get into the proper arm perpendicular to the body position to throw because he would be throwing the disc into the ground. To compensate he brings the arm through a path that is 45 degrees from the head-to-waist line to get the discus up. To correct this, he needs to stay back and throw with the chest up.