
11

The Discus

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Nature of the Event

Because of the numerous diverse qualities necessary for success, the discus throw is one of the most complex events in all of track and field. Discus throwers must be:

- Strong
- Fast
- Explosive
- Coordinated
- Very flexible

Furthermore, discus throwers need to possess:

- Grace of movement
- Balance
- An acute kinesthetic awareness

In addition, great throwers have to have the rare ability to generate tremendous force, while channeling that force through good technique into the implement at release.

Biomechanical Review

The distance achieved in a discus throw is a result of four factors:

- Velocity** of the implement at release
- Angle** of the implement at release
- Height** of the implement at release

- ❑ **Aerodynamic Factors** that influence the implement during flight. Among the ways that these factors affect the discus are the following:
 - To maximize velocity at release, the athlete needs to generate maximum force by increasing the time and space over which force can be applied.
 - For force to be increased, double support must be established as soon as possible and maintained as long as possible throughout the throw.
 - Forces must be applied in a certain sequence, with the slower, larger, more powerful muscles initiating movement, followed by smaller faster muscles. This sequential recruitment of proper muscle fibers is a natural reaction to repeated execution of proper technique.
 - Much of the complexity of the discus throw results from the combination of rotational and linear movements. Both types of movement need to be stressed during technique development to allow for the summation of maximum force.

Once the grip and basic release of the discus is mastered, the technique of the events can be broken down into the following five components:

1. The Wind-Up

This phase is an important aspect of the throw because it initiates movement and establishes separation between body parts. The wind-up involves the following steps:

- Begin from a motionless position, with the back facing the direction of the throw.
- Position the feet shoulder-width apart, with slight flexion in the knees and the weight balanced between both legs.
- Take only one preliminary swing in the counter direction of the throw, pivoting the post foot and twisting at the waist.
- Look down the near sector line.
- Prevent overdoing the wind-up, as loss of balance will often take place.
- Keep the weight balanced between both legs.
- Note that the wind-up concludes when the athlete begins to rotate in the direction of the throw.

Common Mistakes:

- Too many preliminary swings
- Too much speed. The wind-up should be controlled and relaxed.
- Loss of balance will effect all remaining phases of the throw.
- Over-rotating during wind-up
- Inverting the hand to hold the discus
- Shifting the weight over the power leg.

2. The Transition

This aspect might be the most critical phase of the entire event. This point in the throw is when movement and force are generated in the ultimate direction of the throw, and the athlete moves from double support to single support.

Mistakes made in this critical component are always manifested in problems later in the throw. The ultimate objective of this phase is to begin the rotational movement of the body, while maintaining balance during single support. Once wind-up has been completed, the transition involves the following steps:

- Begin the rotation out of the back of the circle by pivoting on the ball of the post foot.
- Rotate the entire post side together to form the axis of rotation from which the rest of the body will revolve.
- Make sure that the post shoulder, knee, and foot all rotate together. The power leg will assist the transfer of weight over the post side by pushing slightly before leaving the ground.
- Once the power foot leaves the ground, sweep it wide and long around the post side.
- Point the knee and foot of the power leg to the outside of the arc created by the wide sweep.

Common Mistakes:

- Initiating the movement too fast.
- Failing to move weight adequately over the post side
- Loss of balance.
- Allowing the knees to be close together during single support.
- Leading with the post arm into the center of the circle.
- Allowing the throwing arm to unwind and catch up to the rest of the body.

3. Linear Engagement

This phase is also a very critical segment of the entire throw, given that it marks the beginning of the combination of rotary and linear forces. This aspect begins once the athlete has rotated sufficiently out of the back of the circle to allow the sweeping power leg an unobstructed movement to the center of the circle. Support in the “power position” is achieved in the following manner:

- With a long, wide, extended, and sweeping of the knee as the leg continues to sweep. This has the effect of shortening the radius of rotation, which in turn acts to increase the speed of rotation of the body.
- This rotational movement is combined with an extension of the post leg as it continues to rotate. This post-leg extension propels the athlete into a rotating airborne position.

- While airborne, all body parts should rotate at the same rate. This action allows continuity to be maintained between body parts.
- The power leg will then ground in the center of the circle.
- The athlete should remain very high on the ball of the foot to facilitate rotation of the entire body, while in single support.
- No attention should be given to forcing the foot to land with any specific degree of this rotation.

If the transition phase and initial portion of this phase are done properly, all rotation of the body will take place naturally. The body will continue to rotate over the power leg until the post leg makes contact with the ground.

Common Mistakes:

- Landing flat-footed on the power leg in the center of the circle
- Moving different body segments independently of each other (loss of continuity of movement)
- Being off-balance, due to a poor transition phase
- Allowing too much weight to slide forward before grounding the post leg
- Failing to use the inside of the thigh when rotating the sweeping power leg into the center
- Floating the post leg
- Losing separation between the hips and shoulder

4. Power Generation

This phase of the throw involves the point where all the forces generated throughout the throw are summated and transferred into the implement. It begins in the "power position," when the athlete re-establishes double support and continues through the release of the discus. If the athlete has completed the previous stages as prescribed, a power position with the throwing arm back three-fourths of a turn, and weight back on the power leg will result. Once the power leg is grounded in the center of the circle, it should continue to rotate throughout this entire phase. At no time should there be any disruption to this rotation.

- The feet will assume an open position in the power position to allow for full hip rotation and mobility.
- The throwing arm, at all times, should be delayed and the power hip should remain one-quarter turn ahead of the throwing arm.
- The post arm will begin to pull wide at the same rate as the rotation of the power hip.
- As the plane of the shoulders approaches perpendicular to the direction of the throw, the elbow of the post arm will bend to approximately 90°. This factor will result in increased rotation of the upper body.

- The post arm is then decelerated abruptly, causing a transfer of rotation to the power side.

This combination of power leg rotation forward and the post leg pushing backwards causes a tremendous acceleration of hip rotation, which can be referred to as "*dynamic hip rotation*." This dynamic action will cause the power hip to rotate well past the position of the decelerated post hip, a position which can be referred to as "*closed off*." This closed off position is characterized by the end location of the feet. If done properly, the toe of the power foot will point behind the heel of the post foot at release.

Common Mistakes:

- Allowing the heel of the power leg to contact the ground
- Allowing the upper body to unwind, lose separation
- Failing to "close off" or complete proper hip rotation
- Scooping the throwing arm
- Bending out on the post leg
- Failing to block the post arm
- Failing to maintain double support throughout release

5. The Follow-Through

This phase allows for the deceleration of the body after the release of the discus. When the event is executed properly, it is a natural reaction to the forces generated. Problems with fouling usually can be traced back to errors in previous segments of the throw. After release of the discus, the thrower should:

- Complete an additional full turn to absorb all remaining force.
- Try to not watch the discus. The athlete has plenty of time to complete the follow-through and still see the discus in flight.

Common Mistakes:

- Falling in love with the throw
- Excessive bouncing after a full turn
- Reversing foot position prematurely (prior to release)