DISCUS

Throwing the discus incorporates both rotational and linear momentum which is transferred to the implement during release through a sequential deceleration (blocking) of body segments initiated by the legs and hips. It is commonly accepted that increasing these momentums (or velocities) will result in longer throws. When a moving segment is abruptly stopped, its momentum is transferred and added to the following segments (e.g. the legs, hips, trunk, shoulders, and arms form the sequential "link system" in throwing events). Release parameters which determine throwing distance are: (1) velocity, (2) angle, and (3) height, and all three are affected by the technical application of force. Unlike the shot, the flight of the discus is affected by aerodynamics which may influence the angle of release (commonly 38^0 - 40^0).

For simplification, the throw is discussed through its component parts, but remember that each part is smoothly integrated with the preceding and following movements forming a continuous and rhythmical flow throughout. Delivery begins at the back of the circle with the thrower anticipating each movement and position to eliminate hesitations and maintain continuity. All explanations are for a right-handed thrower.

GRIP

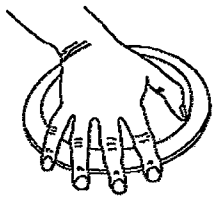

Fig. 1

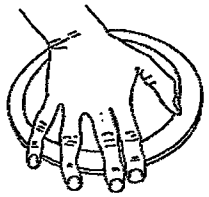

Fig. 2

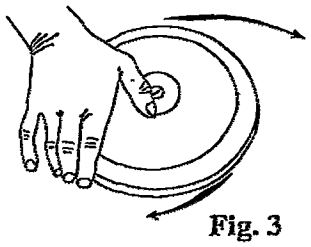

Fig. 3

Comfortably spread the fingers and lap from the last joint to the tip over the rim of the discus. Align the index finger slightly to the left of center and avoid cupping (excessively flexing) the wrist (Fig 1). Some throwers may experience better control by keeping the first two fingers together which may necessitate *slightly* shortening (flexing) the middle finger (Fig. 2). At release, the discus should rotate clockwise from the *thumb side* of the hand with the index finger making final contact (Fig. 3). Keep the hand relaxed, allowing centrifugal force to maintain proper grip and alignment of the discus throughout the throw.

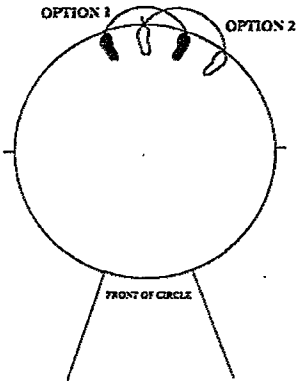

Fig. 4

Points of Emphasis

1. Maintain adequate thumb pressure to keep the discus relatively flat. Rotating the hand (thumb side up) during release produces poor flight characteristics and reduced force application to the discus.

PREPARATION (PRELIMINARY WIND)

Straddling the center-point at the back of the circle, the feet are toed out slightly and placed a little wider than shoulder width. An alternative stance places the left foot at the center-point with similar foot spacing (Fig. 4). Arguments for moving to the right claim a longer path of acceleration for the discus. While this may be true, other factors may be negatively affected resulting in a poorer performance. Each thrower and coach can determine which position (or somewhere between) is most effective. The head and trunk remain upright while the hips and legs are slightly flexed. With the arm hanging relaxed or slightly swinging on the right side of the body, the thrower swings the discus counter-clockwise to a flat (palm down) position on the left side where it is supported temporarily by the left hand

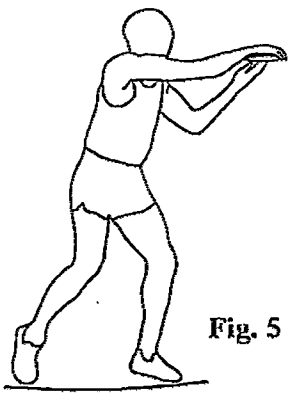

Fig. 5

(Fig. 5) or turned palm up. A slight lateral shift of body weight accompanies the movement of the discus from one side to the other. Ordinarily, one preliminary swing of the discus is sufficient. Beginning throwers often complicate their throw by performing four or five swings while thinking of what to do next.

Preparation is completed when the discus is returned to the right side of the body with a clockwise rotation of the trunk and wide sweeping movement of the arms. When taking the discus back, allow the right arm to move freely to full extension, however, do not permit the shoulders their maximum rotation (Fig. 6). Since the discus "stalls" temporarily at the end of the draw back, rotating the right hand slightly (thumb side up) provides both control and continuity in the transition from the preliminary wind to the start. Also, initiating the starting turn **slightly** before the right arm reaches full extension usually enhances control during this transition. The discus should again be relatively horizontal (flat) as the thrower rotates from the back of the circle. Beginning throwers often experience difficulty regulating and coordinating the speed of various body segments at the start. Keeping the extended left arm aligned with the shoulder plane and not allowing clockwise rotation beyond the right knee will simplify the initial turning movement.

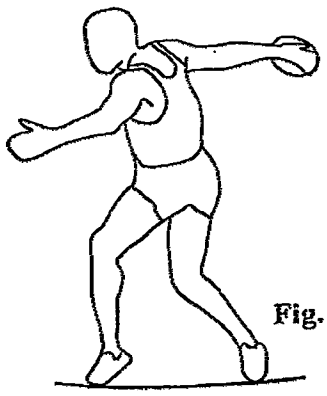

Fig. 6

Points of Emphasis

1. Preparatory movements are relaxed, rhythmical, and **never hurried.**
2. Keep the discus up. Both arms are approximately parallel to the ground as the discus is brought back.
3. Maintain an upright posture throughout the preparatory movements. Significantly bending at the waist often hinders the beginner's ability to effectively turn from the back of the circle, and throughout the throw.
4. An **excessive** lateral shift of body weight during preparation usually complicates the start. Simplify the movement by keeping the center of gravity well within the parallel boundaries of the feet.
5. Hips and knees are flexed to the degree seen at the start. Avoid up and down movements during preparation.
6. Over-rotation often creates balance problems and difficulty coordinating upper and lower body movement patterns.
7. The left arm remains relaxed and **in alignment with the shoulder plane** throughout the preparation and start.

START

The most critical part of the throw occurs as the athlete turns from the back of the circle initiating rotational and linear movement. Coordinating the magnitude and direction of these components is vital to a successful effort. During transition from double to single support, body weight is shifted toward the left bringing the left arm pit over the left foot. Simultaneously, the left foot, knee and arm/shoulder rotate outward (counter-clockwise) while the right knee is flexed and advanced forward bringing the right foot up on the toe (Fig. 7). Maintain a relaxed upper body keeping the right arm approximately perpendicular to the torso as it lags behind the body's rotation. Keeping the knees apart, the right leg swings wide across the back of the circle while the upper and lower left side of

Fig. 7

the body rotate as a unit (Fig. 8). Throwers commonly rush the start by falling or sitting backward before laterally shifting body weight, or by pulling the left arm and/or shoulder toward the center of the circle prematurely. Producing a false sense of acceleration, the upper body must hesitate in the center of the circle to allow the lower extremities to *catch up*. The sensation of being *stuck* while in single support on the left leg (back) and/or right leg (center) is characteristic of improperly accelerated body segments at the start. Displacement of the center of gravity across the circle (linear movement) occurs at the hip **not** the shoulder. The trunk remains relatively upright throughout the throw, while lean initiating linear movement is displayed from ankle to hip (Fig. 8). As the side of the left hip faces the throwing direction, the left leg provides a horizontal *impulse* which, coupled with a quick strike of the right arch and inner thigh, propels the thrower into the non-support phase (Fig. 9). The right leg strike incorporates a horizontally adducting movement (toward the body's vertical mid-line) which enables continued rotation while airborn. Attempting to move down an imaginary line extended from the left heel toward the front of the circle will help reduce over-rotation at the start. However, due to strong rotational forces, right foot placement will ' .ill be near the center of the ring (Fig. 10). Near conclusion of the single support phase the long levers of the body are shortened. The right leg flexes slightly at the hip and approximately 90^0 at the knee while the left arm is flexed at the elbow and brought closer to the trunk (Fig. 9). When properly coordinated, these movements contribute to continued rotation during the non-support (airborn) phase and throughout delivery.

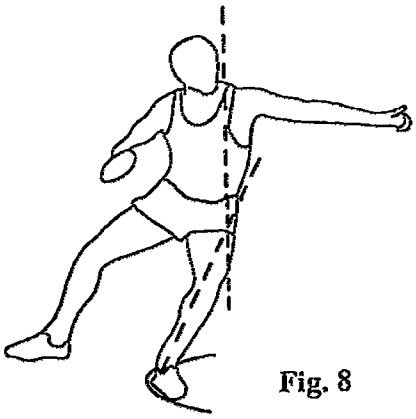

Fig. 8

Points of Emphasis

1. To ensure movement toward the left side, push the left knee over the left toe as both rotate outward.
2. Do **not** pivot the right knee and toe at the start. The knees are kept apart forming an equilateral triangle with sides established by the upper legs and the "line" between the knees (Fig. 7).
3. With the left arm acting as an extension of the shoulder plane, the upper and lower left side of the body rotate as a unit. Rushing the left arm and/or shoulder ahead of the left leg hinders effective rotational acceleration throughout the throw.
4. Look in the direction of the left hand throughout the preparation and start so the head turns at the same rate as the left side of the body.
5. Keep the head and trunk upright and relaxed. Do not bend forward at the waist or look down.
6. Get off the left foot quickly (*impulse*) while simultaneously shortening the body's extended levers (left arm & right leg) (Fig. 9).
7. Emphasize an active lower body and passive upper body until delivery.
8. Actively adduct (horizontally) the right leg to facilitate rotation in the non-support and delivery phases.

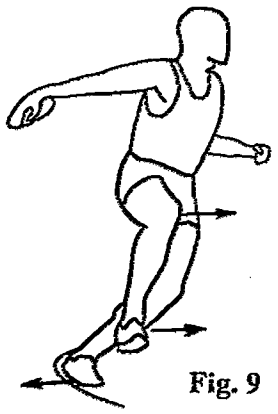

Fig. 9

NOTE: If the thrower "drives" too hard from the back, much of the linear space in the circle will be utilized for the early phases of the throw and little will remain for the finish. The result is an inhibited or restricted delivery or a foul throw. The term "*impulse*" is used to describe a **brief**, well-coordinated linear movement which **enhances** the rotational emphasis of the throw.

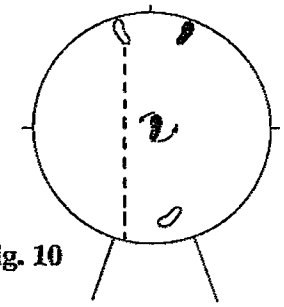

Fig. 10

Fig. 11

NON-SUPPORT (FLIGHT) PHASE

During this non-contact period, the thrower initiates a leg exchange which brings the left leg and foot from the back of the circle toward the front (Fig. 11). Rotation continues around the vertical axis as a result of the right/left leg impulse in single support. The right foot is aligned directly beneath the right knee, while the left leg is partially flexed at the knee and extended at the hip to **quickly** position the foot for support during delivery (Fig. 12 & 13). The right foot actively contacts the circle beneath the center of gravity and is pointing between 12 and 1 o'clock (Fig. 10 & 12). As the left foot is being grounded, the right foot, knee, and hip continue to rotate inward (counter-clockwise). Body weight rests primarily on the right side at touch down but shifts immediately toward the throwing direction as the thrower turns into the release.

Points of Emphasis

1. Shorten levers (left arm and right leg) at impulse to facilitate rotation while temporarily airborn.
2. Recover and ground the left foot quickly. A forceful delivery initiated by the lower body cannot begin until support from the left leg is provided.
3. The left foot is placed to slightly open the hips (Fig. 10 & 13).

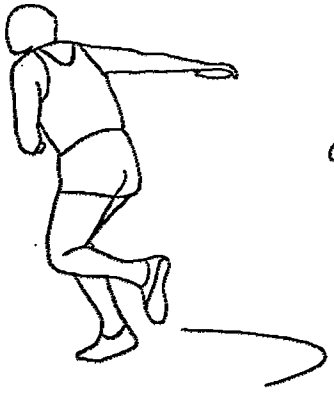

Fig. 12

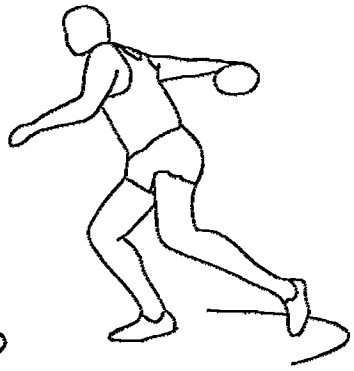

Fig. 13

4. Head up/chest up. Beginners often look down to *gain their bearing* rather than keep their head and trunk upright throughout the throw.

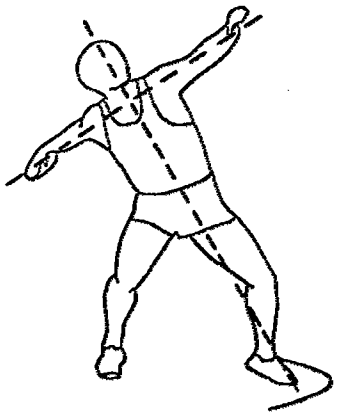

Fig. 14

DELIVERY (POWER POSITION)

When double support is re-established, weight is distributed on the balls of the feet with **both** knees flexed and turning counter-clockwise. The trunk remains relatively upright to maintain an effective axis for rotation and the left arm is again extended and sweeps laterally and upward toward the throwing direction in conjunction with the pivoting right leg (Fig. 14). Extending the left arm at the beginning of delivery establishes a long force lever and temporarily slows shoulder plane rotation during lower body advancement. As the extended left arm nears the throwing direction, it is flexed at the elbow,

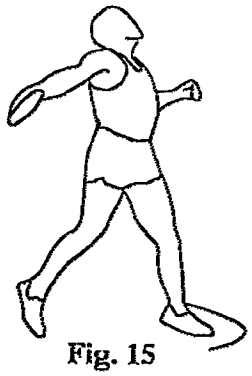

Fig. 15

brought closer to the trunk, and stopped abruptly at the left side to accelerate shoulder plane rotation (Fig. 15). The rotational advancement of the left arm and lower extremities (hips and legs) evoke a stretch reflex on the muscles that rotate the trunk and horizontally adduct the right arm (pull). The stretch reflex provides a more powerful uncoiling of the body and generates greater velocity to the discus at delivery. While rotation continues, and weight shifts **onto** and **into** the left leg, a deceleration sequence is initiated which travels upward from the lower extremities. Sequential blocking of body segments transfers and adds the linear/rotational momentum from one segment to the next, and ultimately to the implement.

Immediately following rotational advancement of the lower body, the shoulder plane is forcefully rotated and the extended right arm is pulled across the chest (Fig. 16). Lift on the discus is provided by blocking the left leg coupled with the forceful extension of the right leg. Do **not** attempt to create lift by rapidly raising the throwing arm as this reduces effective force applied to the discus and produces poor flight characteristics. The trajectory of the discus is a product of body posture during delivery and the resulting orbit (path) of the discus (Fig. 14). Lift is also influenced by the forceful extension of the legs (blocking). As the discus rotates out of the "thumb side" of the hand (Fig. 3), the thrower pulls across the back edge of the discus producing a stabilizing rotation while minimizing wobble. At release, the *outside* edge of the discus (against fingertips) is lower than the *inside* edge and the trailing edge lower than the front. A smoothly and rapidly rotating discus produces better flight characteristics, especially in favorable winds. The powerful vertical lift provided by the legs often causes both feet to leave the throwing surface (Fig. 16). During this airborn period following release, the body's continued rotation (follow-through) brings the right side forward necessitating a foot switch (reverse) (Fig. 17). A flat-footed landing and extended levers will assist balance and rotational/linear deceleration as ground support is re-established.

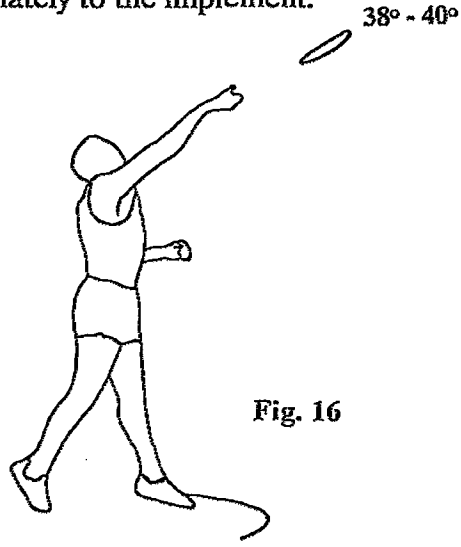

Fig. 16

Points of Emphasis

1. Stay upright - do not look down or bend forward at the waist.
2. Actively turn the feet toward the throwing direction as contact is re-established following the non-support phase.
3. The left foot is placed on the ball of the foot and aligns approximately with the right heel (Fig. 10). Attempt to minimize the time between right and left foot contacts.
4. Prevent the leading edge of the discus from raising **too** high by maintaining slight downward thumb pressure. This enables the thrower to *pull through the edge*.
5. Blocking - This term is used to describe the rapid deceleration of body segments and the subsequent transfer of momentum from these segments to other areas of the body. These forces are generally from the ground upward and occur in both the rotational and linear planes. Emphasize the blocking of the left leg (posting), right hip and left arm/shoulder.

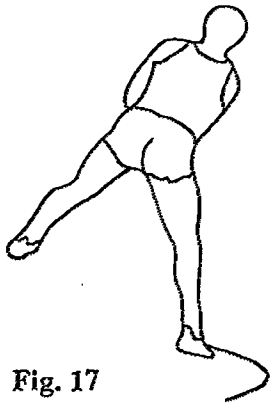

Fig. 17

6. Do **not** watch the discus following release. A forceful delivery and follow-through necessitate obtaining a focal point to the left side or rear of the circle to maintain balance and stability (Fig. 17).
7. **Avoid fouling in practice.** Throwers should practice "saving" throws during training.
8. A slightly lower angle of release often produces better results when throwing into a head or right quartering wind.

Each effort should incorporate a continuous and rhythmical flow from start to finish. While segmented for analysis, it should be emphasized that the throw begins at the back of the circle and is **one** continuously accelerated movement through release and follow-through. Anticipating each movement, and adopting this wholistic approach, reduces hesitations or breaks which often decelerate the discus and ultimately inhibit performance.