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PROGRESSION OF TEACHING THE SHOT – THE SPIN

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Abstract

The purpose of this paper is to illustrate the progression of teaching the Spin technique of shotputin a simplified and effective way. Now a day, the knowledge of technique and implementation of tool to improve technique, teaching stages and the familiarization exercises for the desire technique are quite complicated especially in the developing and under developed countries. This article would be much constructive for better understanding of spin technique. The subjects who are used in this article for the figures whom are not the real throwers but tried to put the drills with the marginal error and detailed description. In order to get National or International champion, he or she should strive more than 10 to 15 years of scientific and systematic training. Such cases physical education plays a vital role in imparting not only health education and promotion but also is the base for all performance sports and games. The education (PE) undergoing primary, elementary and high school are the real stages/ foundation for budding talents. PE teachers in the school are the backbone of the champions. They must educate proper technique (basics) at right time. For these, PE teachers must be strong enough to compete, to acquire current knowledge, to demonstrate a skill, to categorize the people based on the varied talents and to explain all in a precise way. Hoping and wishing that this paper would fulfill the basic requisite for teaching a spin technique especially for PE teachers and this article would be the base for developing and under developing countries in the International arena to produce strongest contestant for European and Western developed counties. .

Keywords: Shot, Glide, Spin, Scientific and Systematic, PE, Competent.

Introduction

Throwing heavy objects is one of the oldest forms of competitive sport. In fact, Homer makes mention of rock throwing between soldiers during the siege of Troy (Homer, 1984). In *The Iliad*, Homer documents that throwing stones and rocks were an integral part of Achaean sport. From Homer's use of the term meaning "thrown from the shoulder," Gardiner (1910) suggests that the Achaeans may have been practicing an early form of shot putting. This may be the earliest documentation of a shot put competition. In addition to the Greeks, Quercetani (1964) reports of shot put–like events being practiced in ancient Scotland and Ireland as tests of strength. The invention of the cannon in the 14th century revolutionized the sport of heavy object throwing as the cast iron ball, the precursor to today's shot, became the implement of choice (Quercetani, 1964). In fact, Oxford and Cambridge Universities adopted this type of ball for intercollegiate competitions in the middle of the 19th century (Quercetani, 1964). Shortly after this time, the implement weight and size were standardized and competition rules began appearing for the first time (Encyclopedia of Track & Field, 1986). In the 1904 Olympics, the square platform that was previously used for a surface in shot put competitions was replaced by a circular ring Quercetani, 1964); and in 1909, a wooden toe-board was added to the front edge of the throwing circle.

Throwing is one of the natural modes of human locomotion. An elementary throwing skill is acquired very early and therefore the task of a coach is not to teach a runner to run, but to improve above all his throwing technique. At the same time, there is a common opinion that it is virtually impossible to change an established technique. However, practical experience has proven that it is possible to change both develop and an existing technique. The first prerequisite in this case is that the athlete is sufficiently motivated to change his technique and has the physical and coordinative capacities to do it. The coach naturally must have the knowledge and skills to achieve this.

There are two basic approaches in contemporary teaching. The first is based on demonstration, during which the external kinetic structure of the technique is explained and followed by attempted trials. In this case the coach has some

kind of an "ideal model" of the technique he attempts to pass on to his charges. This method can be effective in the early stages of teaching when it is not necessary to consider all the concrete individual features of an athlete. In principle, it is possible to find a different approach which is based on the laws of activity dynamics. This method also makes in the beginning use of explained demonstrations, but to this are added explanations on the effort perception and ways and means to acquire it. The approach to this method is rather complicated because there is no sufficiently precise dynamic model available and the teaching of muscular perception requires a high level of professionalism from the coach. A competent teacher of technique must have a good knowledge of muscular conception. This is equally important for the athlete, as well as the coach.

Safety first

"Athletic competition has an inherent risk of injury for the competitors, as well as those involved with the competition, including officials, venue personnel, media and spectators. Some injuries are not preventable, while others are. It is almost a certainty that when an injury occurs, litigation will follow".

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 novice throwers tend to have frequent injuries while handling the shot. Even 4 or 5 kg shot is still a fairly heavy, compact metal ball. The important thing to be considering here is that the potential throwers should learn that they can be seriously injured if struck by a thrown shot. The key to avoid injury is awareness. Throwers must not release the shot when others are in the line of fire. Competitors shouldn't retrieve or walk in the field when others are throwing.

Ideally, shots should be retrieved from the field when stationary, and then carried to another thrower or to a storage area. If shots are rolled in from the field, youngsters may reflexively reach down to scoop up the moving shot. But the deceptively heavy shot can easily injure young hands. If shots must be rolled, instruct the young throwers to either wait for the shot to stop before picking it up, or to stop it with the bottom of a raised foot(The throwing officials' manual, USATF , 2007).

Progression of Teaching the Shot- The Glide

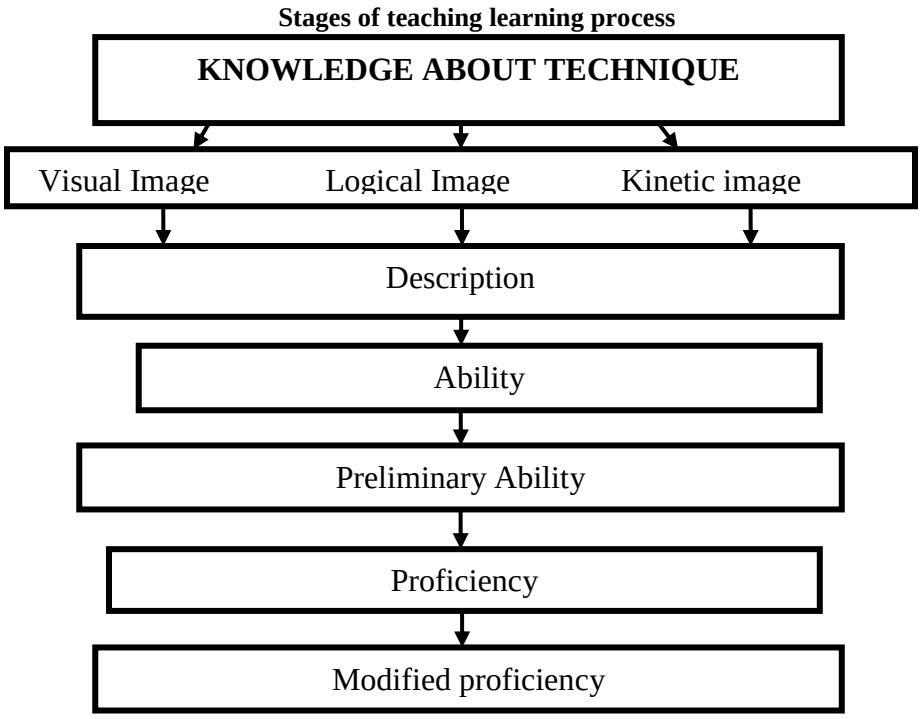


Figure 1: The transition of knowledge from the imaginary conception of modified proficiency

(**Source:** Ants Nurmekivi, Movement awareness and muscular perception in the learning and development of technique)

Image Creation

The teaching of a contemporary technique depends right from the start on the awareness and an interest of the athletes simultaneously. **Bogen (1985)** stresses the importance of the awareness of movement activity, because a movement itself is acquired from this knowledge. The creation of imagery begins from the demonstration of a technique. This can be assisted by viewing videos, films, photos and inspired elite athletes. The visual image from such observations helps to supplement the logical image developed from verbal explanation and the kinetic image that is based on previous movement experiences. This is most important aspects of learning of concept of technique. Now a day, the athlete does imagery skills before they perform in a training and competition. This is the reason why some elite athlete's images of skill/ photographs are displayed in the entrance of stadia, library, dining hall, notice board and where athletes float more(Jayaraman,2014).

Tihhonov, Papanov (1987) described the technique in to three levels.

1. Description of external picture
2. Description of the movement mechanism from a visual picture
3. Description of the movement mechanisms by muscular perception

Description of the external picture

This described about positioning of the body parts, when and in which position is a leg or arm extended etc. This can be easily achieved by viewing videos and films. E.g. the position of ankle, knee, hip and shoulder at delivery position and also how pivot movement takes place before a release.

Description of the movement mechanism from a visual picture

It should be noted here that actual reasons frequently fail to correspond with external expressions. For example, poor take off affects the distance.

Description of the movement mechanisms by muscular perception.

While this is apparently most important for an athlete, it is not easily accomplished. The coach must in learning draw particular attention to the basic elements required for an effective performance. It is important to distinguish from the basic elements those reflecting a rational action as a whole. It guarantees, above all, an appropriate body position to be followed and maintained by such elements as the position of foot placement , line of ankle to head, , and arm position at the time of power position and release.

2. Preliminary Ability

The basic pedagogical and methodical task of this stage is to acquire technical foundations and a general rhythm of the action. This pace is kept slow in order to maintain control over all basic elements (forward, backward and side throws). At the same time the athlete should attempt to explain himself optimal solution modes for the activity. This is assisted by an imaginary orientation guidance of the technique. Such an imaginary guidance contains mental emphases that help to orientate the thrower's conscious, as well as subconscious, movement activity. Mental perceptions make it easier to distinguish between exertion and relaxation. Therefore, specific throwing exercises are effective training means at this stage.

3. Ability

A rational temporal, spatial and dynamics structure of movement is formed at this stage. The thrower's mind accepts movements more completely and at the same time less in detail. You can apt and introduce complex and dynamic drills of a technique because the thrower is matured enough to understand and demonstrate in a comfort manner. Single movement phases stabilize as corrections take effect. Proprioceptional feedback becomes now increasingly more important. Essential at this stage is to learn the execution of the correct action as a whole (full), proceeding from its dynamic structure (standing throw to full technique). However, attention should still be paid to the single basic elements and phases of the technique. If the action in some basic elements is correct, it becomes automatic and no conscious control is necessary. This allows tackling new elements in the aim to improve movement ability. The thrower not only apprehends the quality of the activity and learns to correct it, but also endeavors to deviate as little as possible from optimal parameters.

It is essential for the athlete to be aware of and regulate the level of exertion because conditions change regularly in the real activity. This can be best developed by using various implement and contrasting situation, such as lighter, standard, heavy implements and a variety of contrasting tempo perceptions.

4. Proficiency

This stage aims to achieve:

1. An optimal freedom and economy of movements.

2. A reduction in energy expenditure.

3. An automation of movements.

The control of movements now takes place more under subconscious control and becomes automatic and stabilized. It is essential that the technical preparation is associated with the development of physical capacities, as well as tactical and psychological preparations. Keep in mind that it is possible to achieve complete proficiency only with specific activities. This means for a thrower using the standard implement with the entire technique. A change of an already established skill begins with the separation of faulty elements to bring them under conscious control. The creation of a successful relearning procedure requires that the athlete knows and after this apprehends the differences between correct and incorrect movement variations. An exercise sequence in which incorrect and correct variations are alternated until the correct variation predominates, leads to a new proficiency.

5. Modified Proficiency

Torim (1987) stated that a modified, flexible and movable proficiency is developed through the creation of supplementary coordinative connections. A complex perception, the so called "track sense", is developed at this stage. This means an all-round apprehension of throwing technique. To the most basic apprehension of muscular perception are added the sensations of the foot placement, balance, rhythm, accelerate from back of the ring to stop board and sight etc. This feel of doing the whole sequence in training and competitions should be memorized and not allowed to fade. A thrower with a good perception of throwing has several advantages in being able to adjust this technique better and faster in different conditions**.**

Progression of teaching the shot – The Spin

Teaching stages are the most important for teaching an event or technique. Because it gives clear idea or picture about the particular skill or technique. This is the ideal tool for teaching and learning processes for both coaches and athletes.

1. Teaching stages must be clear in form.
2. It should have limited steps or stages.
3. Too many steps or stages which may confuse the subjects.
4. Obligation to maintain the sequences.
5. Must Consists of less theory, more practical explanations.
6. The formation of athletes in a class is very important because a coach must have a vision of all the athletes while performing a skill or technique.
7. 360 degree observation is required and it is must for a coach to monitor each and every athlete in all the directions/ angles.
8. As a minimum 270 degree observation is required for all the throwing events because its highly technical oriented.
9. Technical corrections and rectifications could be done on throws a coach must have strong base of observation and memory power.
10. Don't insist on minor mistakes but at the same time least mistakes and most error rectification are very vital in throwing events especially novice (**Jayaraman, 2014**).

Progression of teaching Spin technique/Disco put/ Rotation

Grip: The grip of the shot is the same as gliding.

Objective: Proper placement of shot or holding the shot

Description:

1. The shot is placed at the base of the fingers (root) not the palm.

2. The fingers are slightly spread apart and thumb for just sustain the shot.

3. Gliders generally tuck the ball under the chin, forward of the point of the jaw below the ear.

4. The hand will be bends back in the cocked position when holding the shot.

5. Its look like you are carrying a pizza.

6. It seems to be shot is rest at the palm not hold (firm not rigid).

Figure2. Grip (Posterior view)

Figure 2. A (Interior view) (Source: Wikipedia)

Note: The spread of the fingers will vary with the size and strength of the athlete. Too wide a spread of the three fingers will lead to injury to the hand. If the fingers are not spread, it will make it difficult for the thrower to control the implement.

Carry

Objective: Proper placement of shot against the neck

Description:

1. The shot is placed under the chin and against the neck, above the clavicle.
2. The hand is "behind" the shot, not underneath it and palm facing throwing direction.
3. Keep your elbow parallel to the ground.
4. Don't squeeze the elbow towards your back.
5. Make sure that you should not catch (rigid) the shot ever.

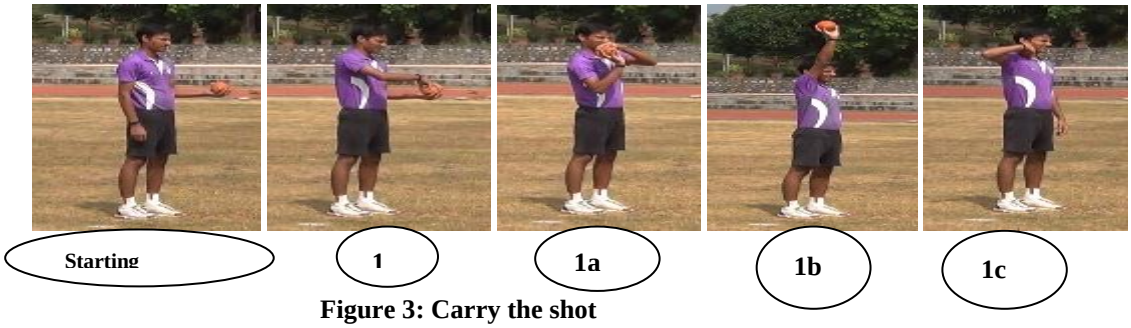


Figure 3: Carry the shot

Step 1. Wrist Flip

Objective: Use this drill for proper release of the shot and make use of throwing arm.

Description:

1. Facing throwing direction with parallel stance.
2. Non throwing arm (left arm) is kept at the shoulder level perpendicular to the ground.
3. The shot is placed under the chin and against the neck, above the clavicle.
4. The thrower will flip the shot from his hand (right) without disturbing the non throwing arm (left arm).
5. Make sure that there should not be any movement except the throwing arm.

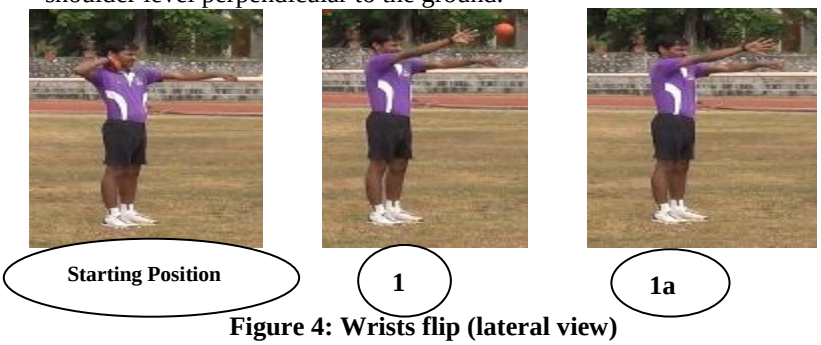


Figure 4: Wrists flip (lateral view)

Step 2. Wrist flip variations

a) Wrist flip Upper body twist with count
   1. Starting position: Same as the previous exercise. Keep the non throwing arm at shoulder level and hold it perpendicular to the ground.
   2. **Count 1**: Twist the throwing shoulder towards your right side with proper alignment of shot. The shot should not move up and down.
   3. **Count 2**: Come to your original position and put the shot without disturbing and abrupt stop of non throwing arm (left arm).

Note: Make sure that no movements from your legs and hips while putting. Keep erect of the entire body and eyes are at straight.

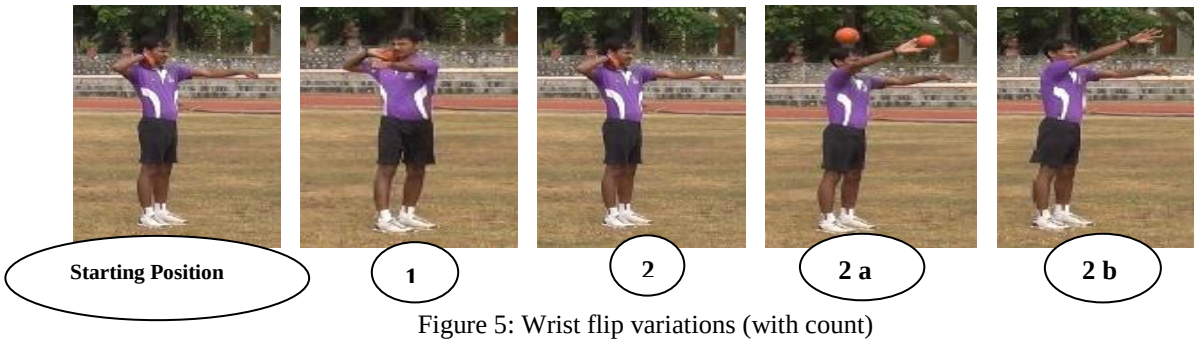


Figure 5: Wrist flip variations (with count)

b) **Wrist flip upper body twist without count**
Perform same as the previous exercise without count.

Figure 6: wrist flip variations (without count)

Step 3. Twist drill

Objectives: Purpose of the drill to abrupt stop of non throwing arm and to increase the bus.

Description:

1. Use this drill for warm up and to emphasize the importance of the legs.

2. The athlete faces the sector with toes pointed straight. Place the shot against your neck.

Count 1: Bend the knees, twist the body to the right and bend down.

Count 2: Come back to starting position

Count 3: Extend legs and hips sequentially and then put the shot. Throw is explained from the bent knee drill. Make sure of the outward movement of throwing wrist.

Figure 7: Twist drill

Step 4. Delivery stance with count

Objective: It transforms a maximum of kinetic energy (velocity) to the shot by an optimal movement direction inside the circle.

Description:

This is the most important phase for all the throws. ¾ of the throws depend on how the thrower takes position at power position/ delivery stance.

Count 1: Facing 180 degree direction and make parallel stance. Take your right leg back for comfortable distance for heel, toe relation by keeping the left leg (Knee) straight. Make sure that heel; toe relation is vital in this phase.

Note: The line of left toe and right heel must be in a line. The proper feet alignment for the power position of the shot is a Toe-Heel or Toe-Instep Position (**Gary Aldrich, M-F Athletic Company**).

Count 2: At this position, shift your body weight to your right leg and come up on your toes. Keep it in mind that left leg is placed just for support.

Count 3: Keep your both arms on the shoulder joint and turns the upper body on your right side with forward leaning of facing 10- 15 meters back of non throwing direction. Make sure of no strain at the neck region.

Count 4: Make sure that the positions of ankle, hip, knee, shoulder and head must be in s single line. Lift your elbow ahead (non throwing- left) and must be parallel to the floor. There should not be any sort of tension in your neck and rest of your body except right toe.

Count 5: Now, lift the throwing arm with shot and push it towards neck.

Count 6: Bring the non throwing arm that is left arm for right arm thrower ahead of chest and make square shape in front of chest.

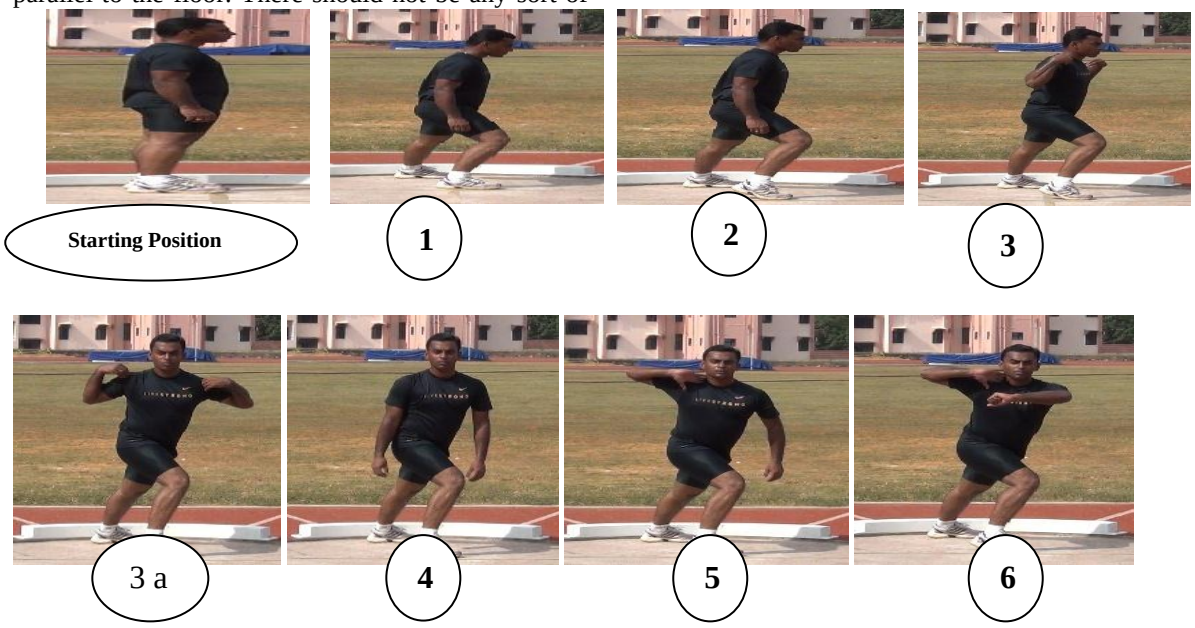
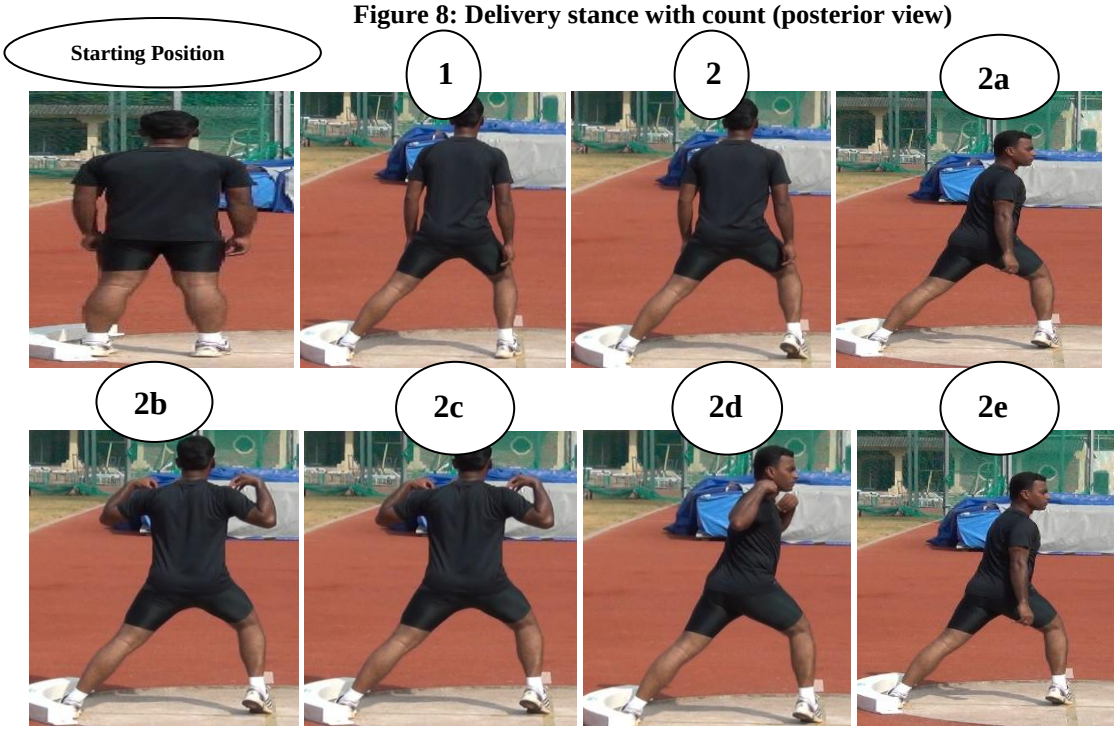


Figure 8: Delivery stance with count (posterior view)



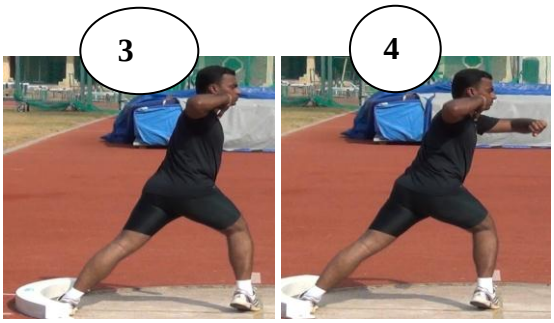


Figure 9: Delivery stance with count (Lateral view)

Step 4 (i)

Delivery stance with shot

Objective: It transforms a maximum of kinetic energy (velocity) to the shot by an optimal movement direction inside the circle.

Description:

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Facing 180 degree direction with shot. Come to delivery stance or power position by keeping left toe and right heel in one line. Make sure that throwing elbow should not fall at any cost. Follow the same instructions as previous

Figure 10: Delivery stance with shot

Step 5. Delivery stance and throw without shot

Objective: It transforms a maximum of kinetic energy (velocity) to the shot by an optimal movement direction inside the circle.

Description:

Stand 90 degrees to the right of the throwing direction with the shot and place against the neck and non throwing arm extended.

Count 1:Turn the right foot (toe) inward which will cause the right hip to face towards the throwing direction without opening of non throwing arm (left).

Count 2: Follows by hip thrust

Count 3: Put the shot with outward movement of the wrist.

Figure 11: Delivery and throw without shot

Follow through: Reversing finish involves an aggressive jumping action with both legs driving up into the throw. The shot is delivered as a result of your side driving forward. Up and around into the lifting, blocking left side, where the summation of forces is directed into the implement. Your right foot comes down near to the stop board with your left leg reaching up and back toward the center of the ring for balance (**Jay Silvester, 2003**).

Step 6. Delivery stance and throw with shot

Stand in delivery stance or power position with shot. Now, turn your right toe, till it faces the throwing direction by keeping weight on your right toe. Throwing arm should not open and maintain a good torque. Do hip thrust and bring your right leg front and put the shot.

Figure 12: Delivery and throw with shot

The teaching steps and procedures are the same as glide up to step 6. Here a coach can focus more on teaching a technique either glide or spin as he desires.

Step7. Facing throwing direction and come to delivery (with count)

Objective: To learn spin technique as well as balance, transferring from first double support phase to delivery stance (Second double support phase).

Description: Stand near to ring from back of ring facing throwing direction. Keep your left foot front without an implement or shot.

Count 1: Place the right foot (toe) centre of circle (facing 6 o'clock) and firmly swift your body weight to your right toe.

Count 2: Take the left leg clockwise direction and place it to the front edge of the ring by pivoting the right toe and keep turning your right toe till it reaches 270^{o} degree direction. Keep the throwing arm high in line with the shoulder or just above and bring the non throwing arm in front of the chest and make square shape of your shoulder and non throwing arm.

Note: Maintain your balance and heel toe relation. Once the thrower is learnt then fasten the movement and make sure that the thrower should not be over turn of right leg (at single support phase) and conscious of maintaining balance and good torque at power position.

Figure 13 Facing 6'O Clock and delivery stance

Step7 (a). Facing throwing direction and come to delivery with shot

Perform the same as previous with shot

Figure 13.1 Figure 13 Facing 6'O Clock and delivery stance

Step7 (b).Facing throwing direction and throw with shot (without reverse)

Do the same as previous exercise with shot and then throw. Make sure that the alignment between ankle and shoulder (non throwing arm) should not disturb at the time of delivery stance or position.

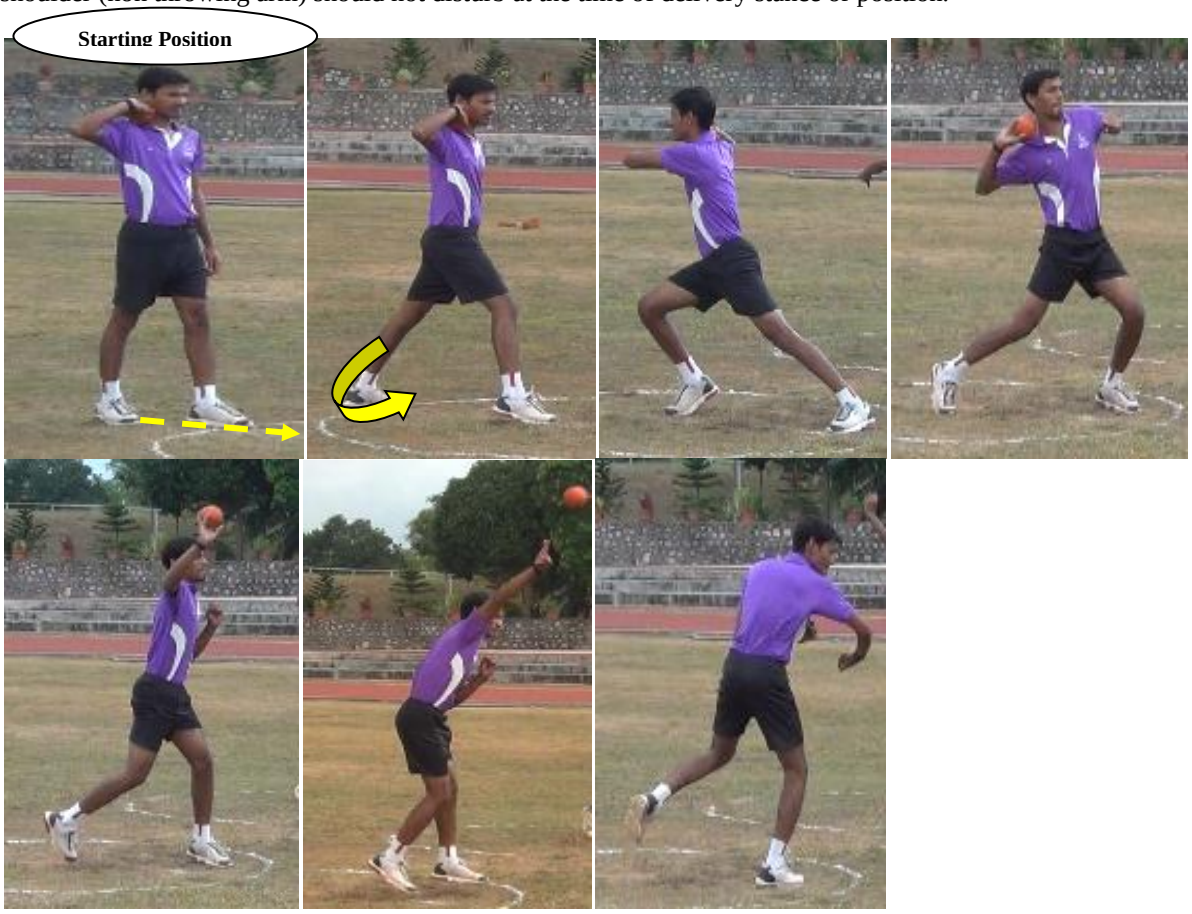

Figure 14 Facing 6'O Clock and throw with shot (Lateral view)

Note: Once the thrower is familiar with this step, he or she shall move to facing throwing direction and throw with shot (with reverse).

Step 8: Facing 270 degree direction and come to delivery with count without shot

Objective: To learn spin technique (movement rhythm) as well as balance, transferring from first double support phase to delivery stance (Second double support phase).

Description: Stand at the centre of ring from rear end. Feet apart, facing 270 degree direction without shot.

Count 1: Keep throwing arm in the position of shot. Firmly shift the body weight from right to left leg. Start turning left foot (toe) till it reaches or faces (6 0' Clock) the throwing direction.

Count 2: Take the right leg wider clock wise direction around the circle and place your right toe at centre of the circle and now you feel that whole body weight is on your right leg.

Count 3: Simultaneously take your left leg back to the front ring and come to delivery stance or position. Make sure that the throwing arm should not drop down and not to lose the balance at any cost.

Note: Heel, toe relations are vital here. Perform the turn slowly till you familiar of control of movement. Gradually increase the speed of movement.

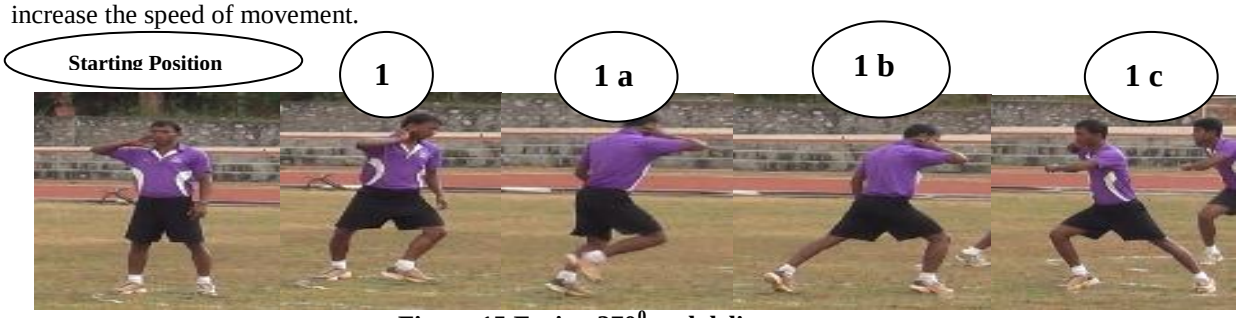

Figure 15 Facing 270^0 and delivery stance

Step 8 (a) Facing 270 degree direction and come to delivery with shot

Follow the same instruction as previous step (step 8). But here perform with shot. Lighter implements (weight of the shot) are always advisable to learn a technique at the early stage of learning. Once you are familiar or learnt the technique partially or completely must use standard implement (weight of the shot).

Figure 16 Facing 270^0 and delivery stance with shot

a) **Facing 270^0 direction and throw with shot**

Perform the same sequences of previous step (step 8), throw shot with reverse. Distance is least consideration while teaching learning processes takes place. Distance could be improved or increased once you familiarize or mastery over the technique.

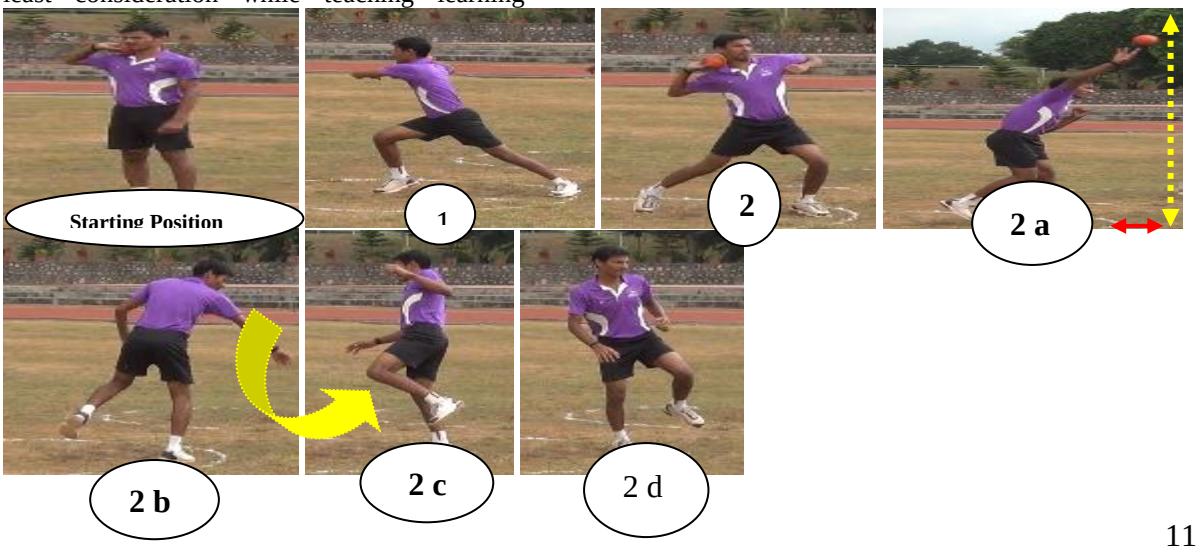

Figure 17 Throw from 270^0 direction

Follow through: Reversing finish involves an aggressive jumping action with both legs driving up into the throw. The shot is delivered as a result of your side driving forward. Up and around into the lifting, blocking left side, where the summation of forces is directed into the implement. Your right foot comes down near to the stop board with your left leg reaching up and back toward the center of the ring for balance (**Jay Silvester, 2003**).

Step 9. Whole sequence with count

Starting Position: Facing non throwing direction (180^0) and place your feet at the comfortable position and make sure that the weights are evenly distributed to the legs. The left foot is kept 5 to 8 cm away from the rim of the circle in order to avoid brushing it as the turn is taken **(Ken.O.Bosen).**

Figure 18 Starting Stance

Description: Facing non throwing direction and throwing arm rest at the neck without shot.

Count 1: Take preliminary swing from left to right side with the help of non throwing arm (left arm)

Count 2: Once body weight is shifted from left to right foot then flex your both knees.

Count 3: Start turning your left toe till it faces 270 degree, simultaneously take your right leg. Keep turning the left toe till faces 6 0' clock direction. Maintain backward lean of your upper body in order to maintain balance and to avoid the foul.

Count 4: Right legs leads low, over centre of the circle with a small kicking movement, right foot (toe) land at the centre of the ring (6 0' clock direction) with a gentle amortization phase and continue to rotate on ball of the foot.

Count 5: Now bring the left foot closely past right leg and place it at the front edge of the ring (closer to stop board).

Note: Both legs are slightly bent at the knee. Relatively upright position, particularly strong blocking of left side of the body against rotational velocity. Increase of tension by swinging left elbow front or forward.

Count 6: Start the throw by turning the right hip (thrust) to the front of ring. Once hip start moving, the push the leg upward and release the shot by the flipping action of throwing arm. (Flip outward). Reverse with both legs and continue rotation of upper body.

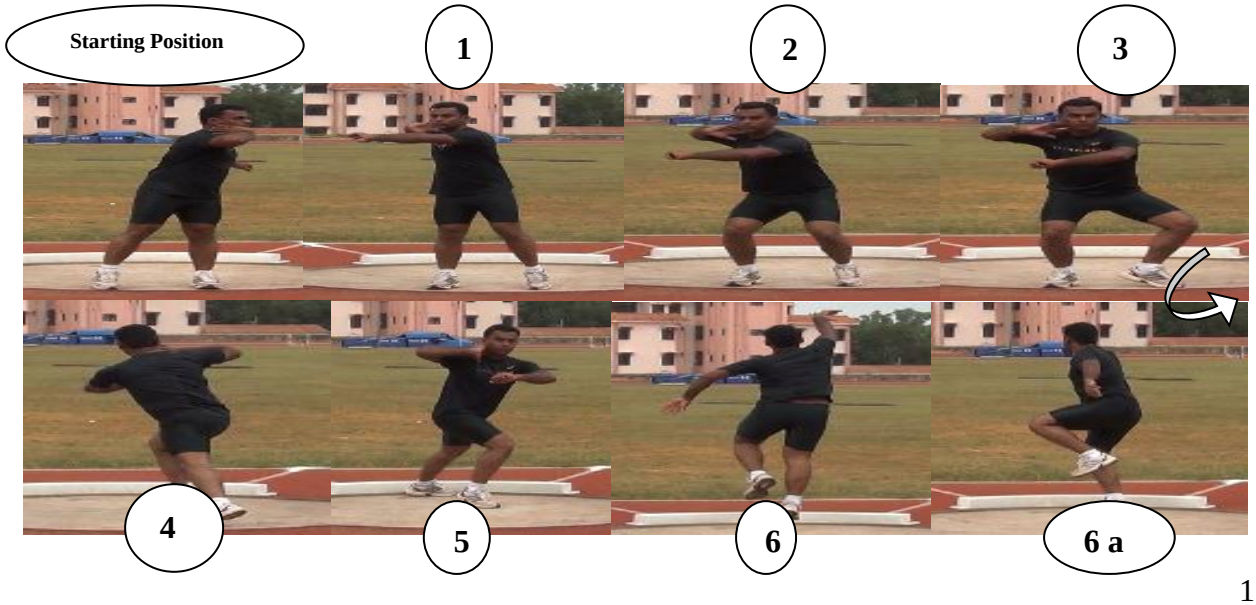

Figure 18.1 Whole sequence with count

a) Whole sequence with shot

Perform the same exercise as previous with shot. Speed is not a main criteria while learning the skill/ sequence of technique. Once the thrower can able to maintain his/her balance at delivery stance or position, recommend speedy movements.

Note: Rehearsing of skill is most important when you teach complex movements. The athletes himself have an interest to acquire the skill. Don't insist ever or never. 50 % of learning gets over if an athlete is interested on skill or technique.

Figure 19. Whole sequence with shot

b) Whole sequence and throw with shot (Disco put)

Perform the same exercise as previous and here throw with shot. Speed is not a main criteria while learning the skill. Once the thrower could able to maintain his balance at delivery stance or power position, focus on speedy movements. Distance is least bothered while teaching and learning a process

takes place. Focus on the perfection of a technique from stage to stage or sequence to sequence.

Points to remember

1. Don't emphasize on very minor fault.
2. Understand the psychology (Interest) of the athlete.
3. Motivate frequently.
4. Don't focus on the perfection of technique very often or soon.
5. Don't emphasize too many teaching steps in a day or session.
6. There must be continuity in teaching and learning processes.
7. Relatively close relation from one session to another session.
8. Keep it in mind that never teach the new teaching step or skill when athlete in fatigue situation.
9. New skill must be taught when athlete is fresh or start of the training session.
10. The weight of the implement is most important for effective learning a technique. Use lighter implement to teach basics, for technique progression and perfection and to familiar with the movements. It is recommended to start without implement, adding weights then increase it as your wish.

Conclusion:

Teaching the highly technical oriented event is not complicated. It's an issue of how a coach could handle, how he explains, how he motivates and develops the interest of the athlete. Perceptibly, throwers nature interests are most imperative while acquiring the course of action. Most importantly, teaching an individual or a group it has its own nature of learning processes and implications. Most importantly, coach must focus on the synchronization, sequence, consistent and transparency of the technique in which the thrower adopts and applies on it. Let the throwers have a rehearsal of technique by showing the images, videos, picture and etc. Instead of vague explanation and demonstration.

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References

1. Altmeyer, L., *proceedings of the Wisconsin Track Coaches Association 4th Annual Coaches Clinic, February, 12 & 13, 1993***).**
2. Encyclopedia of Track & Field, 1986 © 2011 Coaches Choice.
3. Gerhardt Schmolinsky "Track and Field" Text book for coaches and Sports Teachers, Sportverlag Berlin, 1978.
4. Jayaraman.S, "The Comprehensive teaching of all throws in Athletics" SSUS Publication, Allahabad (DVD), 2014.
5. Jay Silvester, "The complete book of throws" Human kinetics, 2003.
6. J. Stepanek**, "**Comparison of the Glide and the Rotation Technique in the Shot Put**"** Laboratory of elite athletics, Service centre of the scientific-methodological department. UV CSTV, Prague, Czechoslovakia.
7. Monte Carlo: IAAF Media & Public Relations Department. 2009. pp. Pages 546, 557
8. NCAA, USATF, IAAF.(The Throwing Officials' Manual 2007).
9. Scott Cappos, Shot Put & Discus, Technique and Training, University of Iowa.
10. Shot Put – Introduction, IAAF. Retrieved on 2010-02-28.
11. The Throwing Official's Manual, USATF National Officials Committee Training Monograph Series, 2007.
12. www.athleticscoaching.ca
13. http://www.brianmac.co.uk/
14. www.coacheschoice.com
15. http://www.everythingtrackandfield.com/
16. www.mfathletic.com
17. http://trackandfield.about.com/od/techn4/