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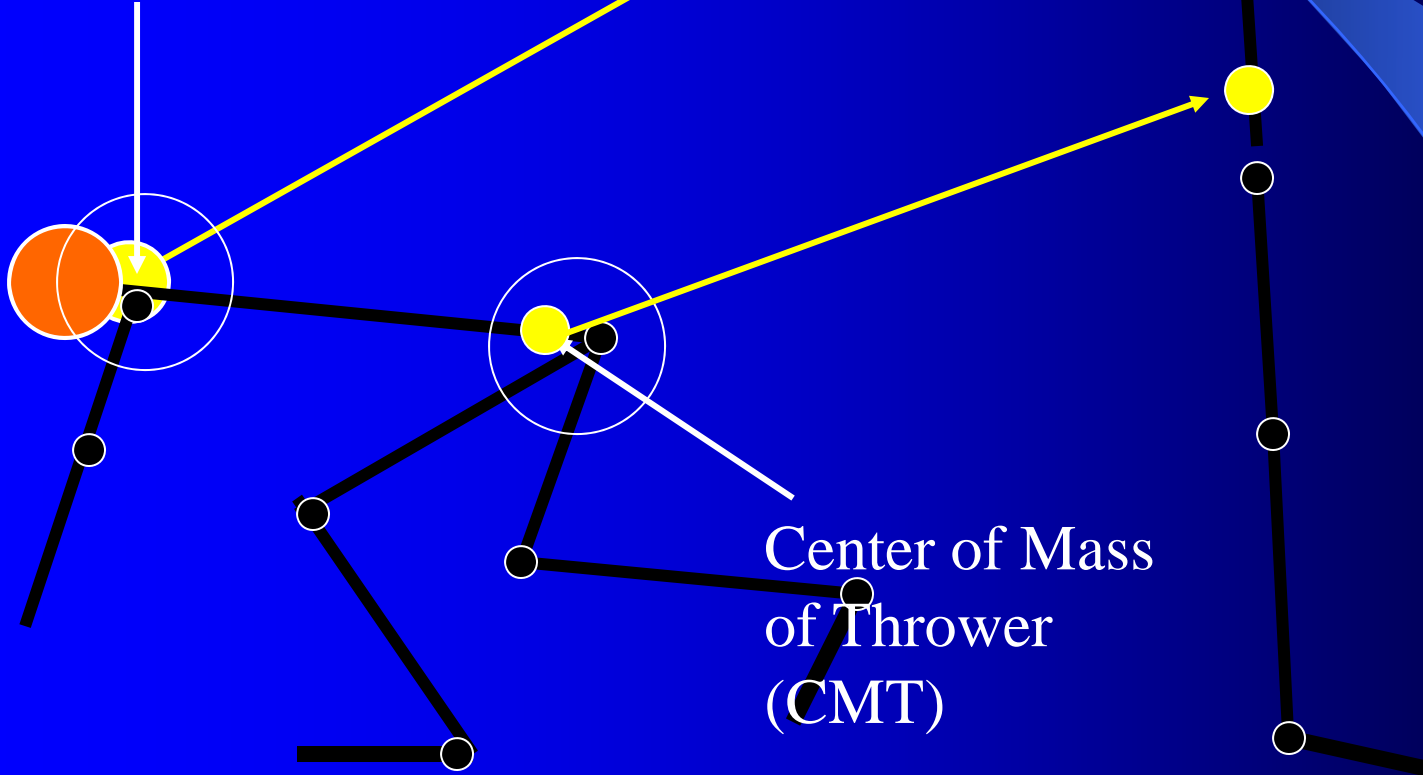
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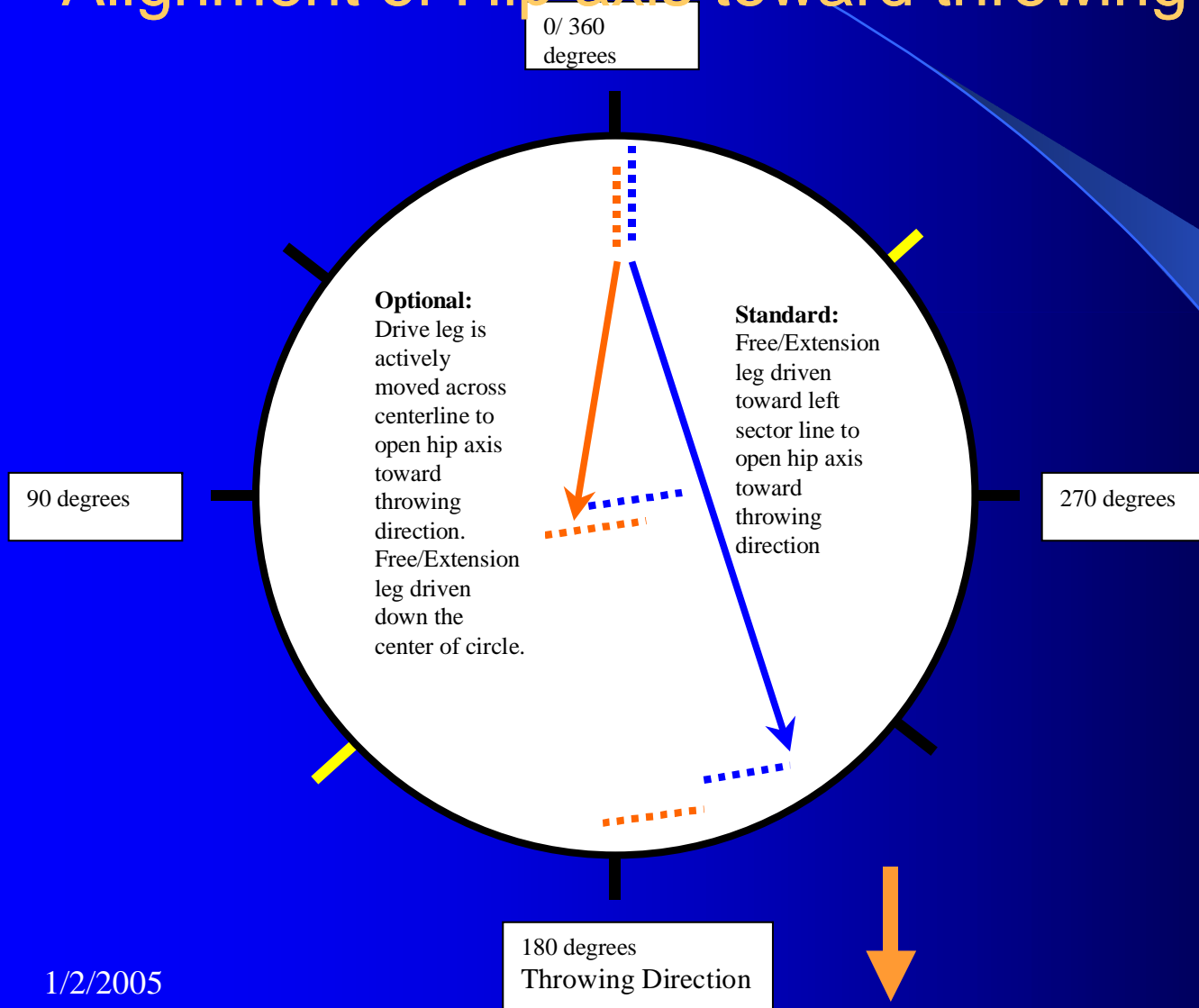
Path of CMT & CMI

Center of Mass
of Implement
(CMI)



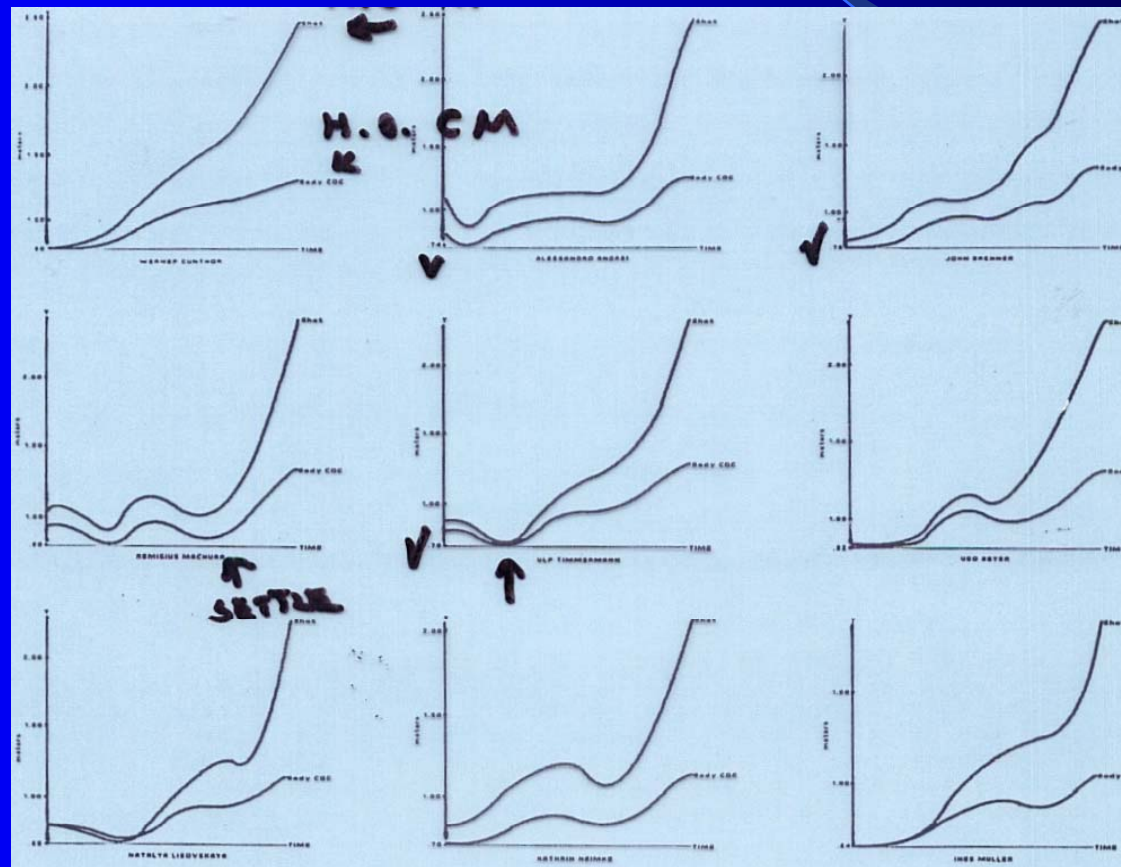
Center of Mass
of Thrower
(CMT)

Alignment of Hip axis toward throwing direction



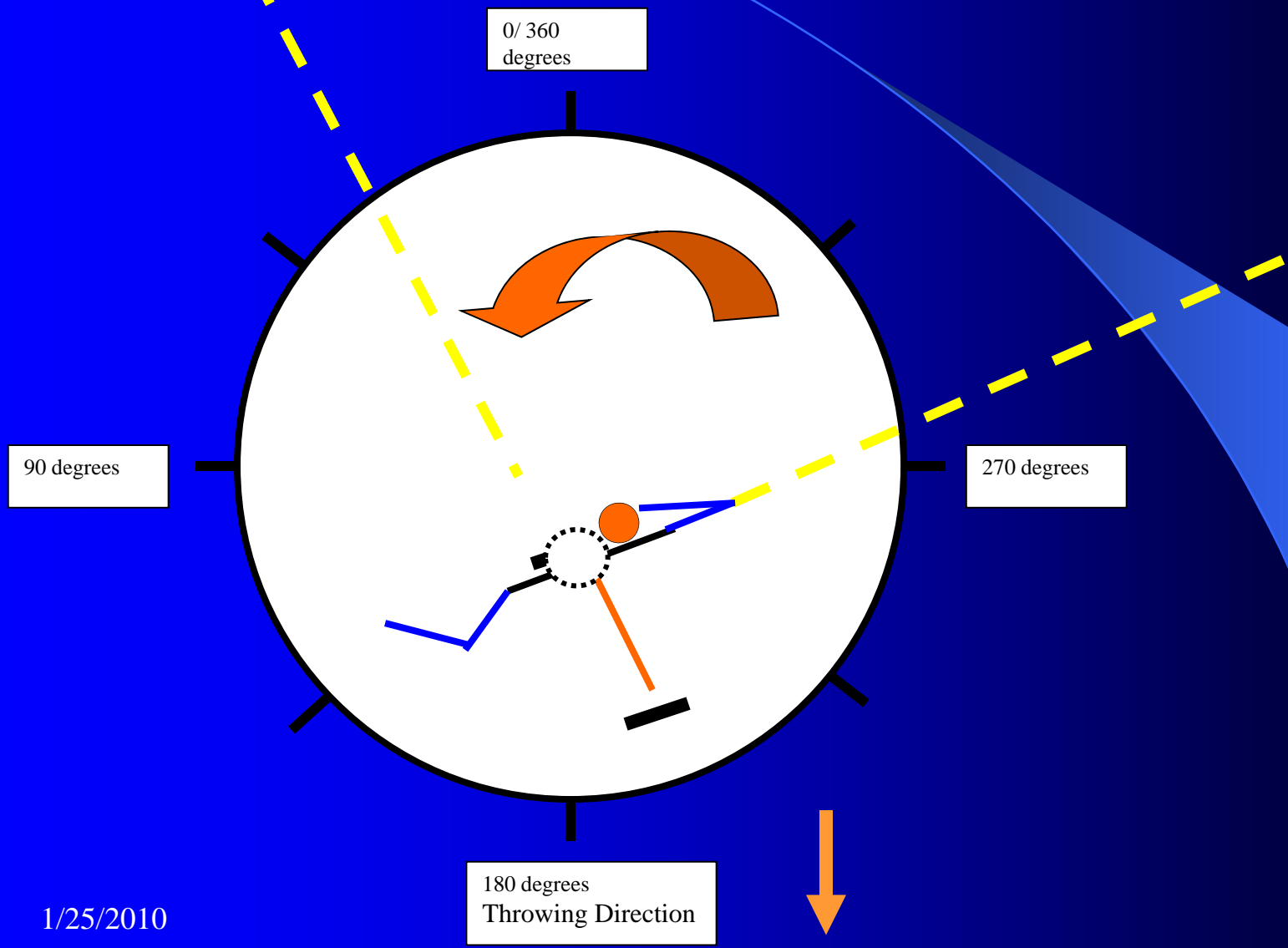
1/2/2005

Shot Path of CMI/ CMT



Torsion

Measured as angle between Hip Axis and Shoulder Axis



90 degrees

0/360
degrees

270 degrees

180 degrees
Throwing Direction

1/25/2010

Glide Style Shot Putting

- The Grip and Placement of the Implement
 - 1.Place shot on upper pad of hand
 - 2.All fingers should be placed on the shot
 - 3.Gliders generally tuck the ball under the chin, forward of the point of the jaw below the ear.

Starting Positions

1. Crouch Start

- a. Offers greater stability and consistency of performance
- b. Requires a greater level of leg strength

2. T & Slant T Start

- a. Offers an greater opportunity to convert the velocity of the mechanical potential, that exists via vertical displacement of CMT, into horizontal velocity across the ring
- b. Requires a greater level of timing and skill to gain technical consistency

The Glide Sequence

1. The Trunk should be actively, or passively as in the case of the T Start, lowered until the lower abdomen, and the upper thigh are in contact.
2. The CM should be displaced/ un-seated to initiate the glide across the circle.
3. Drive/ Support leg
 - a. The drive leg should explosively and fully extend in a direction and angle that will project the CMT upward from the lowest point, at the back of the circle, toward a relatively middle level at the center of the circle.
 - b. The thrower should seek to maintain the contact of the lower abdomen with the upper thigh throughout the full extension of both the drive leg, and the extension leg.

Extension/ Free leg

- a. The free leg should be used to balance the preliminary movements, and positions, of the thrower, during the initial single support phase.
- b. The free leg should be drawn into nearly an identical position of flexion relative to the support leg.
- c. Following the initial displacement of the CMT prior to the explosive extension of the support leg, and almost simultaneously, a full and rapid extension of free leg towards toe-board target must occur to aid in the shift of thrower across the circle.
 - i. The elastic energy stored in the groin/ hamstrings, as a result of the complete extension of both legs, aid in the recovery of the support/ drive leg under the thrower in the center of the circle.
 - ii. The height of CMT at the back of the circle, preceding the extension of the free leg, aids in determining the height of the free leg extension target.
 - iii. Target of free leg extension should generally be between the bottom of the toe-board (0") and about 18".
 - iv. The lower the CM at the bottom of the support stance in the back of the circle, the higher the extension leg target.

Extension Cont.

The direction of extension leg determines throwing line of direction.

- i. Standard treatment of the extension/ free leg includes an extension in line with the left sector line (*left as the thrower faces the throwing impact area*).
- ii. An optional treatment of the extension/ free leg includes driving the free leg straight across the circle, while moving the support/ drive leg foot across the centerline of the circle toward the right side of the circle (*right as the thrower faces the throwing impact area*).
- iii. Hip axis alignment, relative to the shoulder axis, and foot axis, remains identical although the foot placement is slightly different in the circle for each of the techniques.
- iv. In the standard technique the heel of the extension leg foot is aligned with left sector line (*for standard alignment*)
- v. In the modified technique the toe of the extension leg foot is aligned with centerline of circle (*for non-standard alignment*).

Rotational Style Shot

Putting:

- The Grip and Placement of the Implement

- 1.Place shot on upper pad of hand.

- 2.All fingers should be placed on the shot

- 3.Spinner generally place the ball into the neck behind the point of the jaw below the ear.

This shot position counteracts the effect of centrifugal forces that tends to pull the shot away from the neck of the thrower.

Double Support/ Starting Position

- The initial position of double support in the rotational style shot put is much like the initial position in the discus.
 - The goal should be to initiate the single support phase from a viable double support posture.
 - Requires a shift of CM over the single support base of support to create dynamic balance.
- Shoulder and hip axis should remain horizontal throughout single support phase.

First Single Support phase

- Drive/ Support leg actions
 - As the thrower lines up in the throwing direction an abbreviated, but explosive, drive phase off the support leg should be initiated.
 - This drive phase push off is markedly shorter than that of the discus technique.
- Swing/ Free leg actions
 - An aggressive, and dominant, swing leg action should be initiated at the outset of single support (i.e. once the swing leg foot clears the ring).
 - The rotational shot put relies to a greater extent on the impulse provided by the swing leg to create force, as well as torsion, in the throw.

Non Support Phase

- The athlete should actively “heel tuck” and adduct the drive leg as the push off is completed.
- The Swing leg side should be actively inverted at the conclusion of the free leg swing/ kick in.
- The free arm should be shortened to aid in the rotation of the athlete in no support.
- Otherwise the position achieved at the conclusion of the single support phase should be maintained throughout the non-support phase and the re-contact of the second single support, and double support phase.

Re-contact Second Single Support Phase

- Re-contact of the swing leg foot axis in single support is earlier than the corresponding phase in the discus. The foot axis should generally be about 270- 315 degrees.
- A soft turning re-contact of the swing leg reduces friction, and sets up an short duration of second single support.
- This soft pivot also aids in the development of a stretch reflex action in the swing/ free leg for use in the delivery phase.
- The free arm should move out an away from the body to slow the upper-body to aid in maintaining the torsion between hip axis and shoulder axis.

Second Double Support Phase

- - The double support is the initiation of the Power position
 - Power Position comparison between the glide and rotational techniques
 - The glide technique power position in the middle of the circle is relatively the same as that of the rotational technique.
 - The glide technique tends to have a less vertical posture of the trunk relative to the rotational technique posture of the trunk.
 - The glide technique has many different expressions; however they each tend to utilize a broader base than the spin style of shot put in the power position.
 - The rotational technique generally uses a long drive phase out of the back coupled with a shorter base in the power position.

Delivery Sequence

- Thrower should turn in the direction of throw while maintaining torsion between the hip and shoulder axis
- When the hip axis is near perpendicular with the throwing direction the thrower should actively unwind the torsion, while still maintaining the position on the implement.
- The final movement is an active turning/ jumping from the legs, followed by the slapping action once the ball has been lifted to above the head from this action of the legs.
- Keep the hand moving behind the shot, and try to maintain pressure/ contact as long as possible

Free Arm Actions Cont.

- Generally the novice to intermediate thrower should be instructed to keep the free arm long, relaxed, and away from the body through throw. This aids in maintaining torsion during the throw.
- The exceptions to this would be the non-support phase of the throw, and the delivery sequence.
- Shortening the free arm lever during non-support, while maintaining shoulder axis torsion, aids in angular/ rotational velocity.
- Free Arm axis should not be “broken” to a large extent at shoulder axis to maintain torsion (i.e. dragging a left arm).

Skill identification, and support

- Via drills, and parallel movements should be primary in coaching technical introduction, and instruction of Shot Put
 - Teaching Considerations
 - Seek to create specific learning periods with objective emphasis
 - Introduction (*skill, drill, instill*)
 - Stabilization- occurs through repetition of learned movements
 - Habituation - through repetition of stabilized movements

Skill Development & Support

- Create general to specific motor learning
- Utilize visual aids early
- Still frame, or digitized figures offer a simpler input than video for beginners
- Video aids in creating spatial/ rhythmic awareness
- Advanced level training partners
- Control outside input during teaching, and introduction period
- Pick appropriate technical models for throwers
- Limit outside coaching (includes other athletes)
- Duration of Non-Support phase/ Second Single Support