Discus Throw
Jon Tipton

- Training Planning
- Principles of the Discus
- Positions
- Application
Training Plan

Progression of Training - Periodization
General to Specific
Slow to Fast
Strength to Speed
Residual Training Effects

Training is Testing
What needs to be done now to get better?
Specificity in Training
Training Component Compatibility
Macrocycle

GPP - Summer/Fall
Emphasis on General Abilities and/or
General Weaknesses

SPP - Fall/Winter
Focus on Similar Demands and/or
Specific Weaknesses

SDP/Pre-Comp - Winter/Spring
Focus on Specific Needs and Specific
Strength

Comp - Spring/Summer
What do we need to do to compete well
and/or what do we do well?
Training Plan

Progression of Training - Periodization
General to Specific
Slow to Fast
Strength to Speed
Residual Training Effects

Training is Testing
What needs to be done now to get better?
Specificity in Training
Training Component Compatibility
Mesocycle

Week 1 - Base
Week 2 - Accumulate
Week 3 - Intensify
Week 4 - Recovery
Base Week

Establish the baseline for the training period. Volume/Intensity/Frequency

Should blend the previous training period with the current training period.

Teach the progression.
Base Week

Volume: Throws - 20-25 throws/day
  S.S. - 2 sets/day
Lifting - 5x5 (Full ROM)
  Athletic Dev. - 1-2 sets/day
Intensity: Throws - Light/Moderate
  S.S. - Moderate
Lifting - Auto-regulated
  Athletic Dev. - Auto-regulated
Frequency: Throws - 3 Days
  S.S. - 2 Days
Lifting - 2 Days
  Athletic Dev. - 3 Days
Base Week

Establish the baseline for the training period. Volume/Intensity/Frequency

Should blend the previous training period with the current training period.

Teach the progression.
Mesocycle

Week 1 - Base
Week 2 - Accumulate
Week 3 - Intensify
Week 4 - Recovery
Accumulation Week

Increase the volume of training to desired levels within the training period.

Less teaching and more observations.

Adjust training accordingly.
Accumulation Week

Volume: Throws - 25-30 throws/day
        S.S. - 3 sets/day
        Lifting - 5/4/3/5/4/3 (Specific ROM)
        Athletic Dev. - 2 sets/day

Intensity: Throws - Moderate
          S.S. - Moderate
          Lifting - Auto-regulated
          Athletic Dev. - Auto-regulated

Frequency: Throws - 3 Days
           S.S. - 2 Days
           Lifting - 2 Days
           Athletic Dev. - 3 Days
Accumulation Week

Increase the volume of training to desired levels within the training period.

Less teaching and more observations.

Adjust training accordingly.
Mesocycle

Week 1 - Base
Week 2 - Accumulate
Week 3 - Intensify
Week 4 - Recovery
Intensify Week

The training intensity should be higher this week.

Volume may decrease slightly to accommodate the increase in intensity.

Performances matter this week for all training components.
Intensify Week

Volume: Throws - 25-30 throws/day
  S.S. - 2-3 sets/day
  Athletic Dev. - 2 sets/day

Intensity: Throws - Hard
  S.S. - Hard
  Lifting - Auto-regulated
  Athletic Dev. - Auto-regulated

Frequency: Throws - 3 Days
  S.S. - 2 Days
  Lifting - 2 Days
  Athletic Dev. - 3 Days
Intensify Week

The training intensity should be higher this week.

Volume may decrease slightly to accommodate the increase in intensity.

Performances matter this week for all training components.
**Mesocycle**

Week 1 - Base

Week 2 - Accumulate

Week 3 - Intensify

Week 4 - Recovery
Recovery Week

During a recovery week one or more of the training elements may be reduced. (Volume/Intensity/Frequency)

Recovery may occur through adaptation.
Recovery Week

Volume: Throws - 25 throws/day
  S.S. - 2-3 sets
  Lifting - 6x3 - Unilateral Variation
  Athletic Dev. - 1-2 sets/day

Intensity: Throws - Moderate/Hard
  S.S. - Moderate/Hard
  Lifting - Auto-regulated
  Athletic Dev. - Auto-regulated

Frequency: Throws - 3 Days
  S.S. - 2 Days
  Lifting - 2 Days
  Athletic Dev. - 3 Days
Recovery Week

During a recovery week one or more of the training elements may be reduced. (Volume/Intensity/Frequency)

Recovery may occur through adaptation.
Mesocycle

Week 1 - Base
Week 2 - Accumulate
Week 3 - Intensify
Week 4 - Recovery
Training Plan

Progression of Training - Periodization
General to Specific
Slow to Fast
Strength to Speed
Residual Training Effects

Training is Testing
What needs to be done now to get better?
Specificity in Training
Training Component Compatibility
Microcycle

Day 1 - Speed (Light/Comp Implements and Sprints)
Day 2 - Special Strength and Lift
Day 3 - Technique (Light/Comp/Heavy Implements and Multi Throws)
Day 4 - Strength (Comp/Heavy Implements and Multi Jumps or Plyos)
Day 5 - Special Strength and Lift
Day 6 - OYO Feel or Active Recovery
Day 7 - OFF
Training Plan

Progression of Training - Periodization
General to Specific
Slow to Fast
Strength to Speed
Residual Training Effects

Training is Testing
What needs to be done now to get better?
Specificity in Training
Training Component Compatibility
Daily Plan

Daily Brief
General Warm-Up
Specific Warm-Up or Special Strength
Throw Primary or Movement Prep
Throw Secondary or Lift
Athletic Development or Post Work
Daily Debrief
Common Practices

Stands NR
Giant Steps or Step-Ins NR
Walking Fulls NR
Static Fulls NR (Pre-turned or Centered)
Fulls NR
Fulls
Daily Plan

Daily Brief
General Warm-Up
Specific Warm-Up or Special Strength
Throw Primary or Movement Prep
Throw Secondary or Lift
Athletic Development or Post Work
Daily Debrief
Training Plan

Progression of Training - Periodization
General to Specific
Slow to Fast
Strength to Speed
Residual Training Effects

Training is Testing
What needs to be done now to get better?
Specificity in Training
Training Component Compatibility
Discus Throw
Jon Tipton

Training Planning
Principles of the Discus
Positions
Application
5 Principles

Simplify the process

What really matters?

Focus on movement rather than positions

When competent in movement then look at positions.
Balance

Center of Mass and the relationship between angular momentum and linear locomotion.

Rotational Balance = Center of mass in line with the axis of rotation in single support (sternum, knee, toe)

As angular momentum transitions into linear locomotion the COM should transfer into the direction of movement.
Balance

Center of Mass and the relationship between angular momentum and linear locomotion.

Rotational Balance = Center of mass in line with the axis of rotation in single support (sternum, knee, toe)

As angular momentum transitions into linear locomotion the COM should transfer into the direction of movement.
5 Principles

Simplify the process

What really matters?

Focus on movement rather than positions

When competent in movement then look at positions.
Direction

Sum of Force Vectors = Direction of Movement

Assuming the thrower is balanced on entry, direction is established by the "sprint." The summation of the force vectors of the sweep and the shin angle will determine the initial direction of the throw.

The upper body (shoulder axis, chest, head, eyes) plays an important role in the overall direction of movement.
Rotational Momentum to Linear Translation to Angular Acceleration
Direction

Sum of Force Vectors = Direction of Movement

Assuming the thrower is balanced on entry, direction is established by the "sprint." The summation of the force vectors of the sweep and the shin angle will determine the initial direction of the throw.

The upper body (shoulder axis, chest, head, eyes) plays an important role in the overall direction of movement.
5 Principles

Simplify the process

What really matters?

Focus on movement rather than positions

When competent in movement then look at positions.
Rhythm

Rhythm is a product of: relaxed tension, the acceleration of the system, the tempo of the throw, and the style of the thrower.

Slow to Fast
Down-up, Down-Out
Left, Right-Left
1, 2-3, 4
See 2017 IAAF World Championships Biomechanical Report:
Temporal characteristics of the athletes’ movement
Rhythm

Rhythm is a product of: relaxed tension, the acceleration of the system, the tempo of the throw, and the style of the thrower.

Slow to Fast
Down-up, Down-Out
Left, Right-Left
1, 2-3, 4
5 Principles

Simplify the process

What really matters?

Focus on movement rather than positions

When competent in movement then look at positions.
Orbit

Tangential Velocity is directly proportionate to the radius.

Angular Acceleration and the role it plays in Tangential Velocity.

Action of the block arm throughout the throw and the effect it has on the orbit.

Path of Orbit and the skew perpendicular to the direction of the throw during the delivery phase. (How separation affects this)

Orbit should only move approximately 2 feet on the vertical plane for most throwers.
Orbit

Tangential Velocity is directly proportionate to the radius.

Angular Acceleration and the role it plays in Tangential Velocity.

Action of the block arm throughout the throw and the effect it has on the orbit.

Path of Orbit and the skew perpendicular to the direction of the throw during the delivery phase. (How separation affects this)

 Orbit should only move approximately 2 feet on the vertical plane for most throwers.
5 Principles

Simplify the process

What really matters?

Focus on movement rather than positions

When competent in movement then look at positions.
Patience

Active - Dig on the Right Leg
Sweep the Back of the Circle
Passive - Let the throw happen
Wait - More Time

Ground Up and/or Center Out
Hip/Shoulder/Discus Separation
Double Support on Release
Non-Reverse-Reverse
5 Principles

Simplify the process

What really matters?

Focus on movement rather than positions

When competent in movement then look at positions.
Discus Throw
Jon Tipton

Training Planning
Principles of the Discus
Positions
Application
Positions

Positions Create Power

What Shapes do we see?

Where is the center of mass of the system?

Where is the discus?
Wind-up

Pre-Wind Up:
   Load The Legs - Set Left Leg Axis

Use the shoulder axis to create the wind and set the Orbit - Thoracic Spine Rotation and Scapular Retraction to set up separation and balance
   Advanced athletes will use more full wind up
   Novice athletes will restrict wind up and keep more weight on left leg.

Right Foot should be fixed and flat
Weight on inside of ball of left foot with the heel high up

Head and Left Arm stays in line with the sternum
Wind-up

Pre-Wind Up:
Load The Legs - Set Left Leg Axis

Use the shoulder axis to create the wind and set the Orbit - Thoracic Spine Rotation and Scapular Retraction to set up separation and balance
Advanced athletes will use more full wind up
Novice athletes will restrict wind up and keep more weight on left leg.

Right Foot should be fixed and flat
Weight on inside of ball of left foot with the heel high up

Head and Left Arm stays in line with the sternum
Wind Ups

Wind Up w/ Jump
Wind-up

Pre-Wind Up:
Load The Legs - Set Left Leg Axis

Use the shoulder axis to create the wind and set the Orbit - Thoracic Spine Rotation and Scapular Retraction to set up separation and balance
Advanced athletes will use more full wind up
Novice athletes will restrict wind up and keep more weight on left leg.

Right Foot should be fixed and flat
Weight on inside of ball of left foot with the heel high up

Head and Left Arm stays in line with the sternum
Positions

Positions Create Power

What Shapes do we see?

Where is the center of mass of the system?

Where is the discus?
Unwind

Use the left leg to initiate the unwind
Heel rotates in and down to 9:00
Maintain pivot inside of left foot

Long reach with out with left arm
Left Arm inside of Left Knee

Tension between the knees
Right Knee pushes forward to 12:00
Build the House

Head stays neutral
See the Horizon
Unwind

Use the left leg to initiate the unwind
   Heel rotates in and down to 9:00
   Maintain pivot inside of left foot

Long reach with out with left arm
   Left Arm inside of Left Knee

Tension between the knees
   Right Knee pushes forward to 12:00
   Build the House

Head stays neutral
   See the Horizon
3 Circle Pivots
Wilkins Stretch
Stretch to Paw
Unwind

Use the left leg to initiate the unwind
Heel rotates in and down to 9:00
Maintain pivot inside of left foot

Long reach with out with left arm
Left Arm inside of Left Knee

Tension between the knees
Right Knee pushes forward to 12:00
Build the House

Head stays neutral
See the Horizon
Positions

Positions Create Power

What Shapes do we see?

Where is the center of mass of the system?

Where is the discus?
Sprint

9 o'clock drop - Around and Down
As Right Foot leaves contact with the ground the Left Knee breaks and drops towards the front of the circle

Get on the horse
Right foot dorsi-flexes (Paw and Kick Mud) and Right Leg leads with inside of thigh

Maintain Posture
Vertical Left Thigh and Sternum over Knee, Shoulders should stay level, See the horizon

Hold the "X"
Left knee right sector, Right knee left armpit

Wide sweep is a counter balance to the Left Knee drop and will allow an athlete more time for the left foot to rotate to the center of the sector

Face the throw
Lower Body leads the throw
Sprint

9 o'clock drop - Around and Down
   As Right Foot leaves contact with the ground the Left Knee breaks and drops towards the front of the circle

Get on the horse
   Right foot dorsi-flexes (Paw and Kick Mud) and Right Leg leads with inside of thigh

Maintain Posture
   Vertical Left Thigh and Sternum over Knee, Shoulders should stay level, See the horizon

Hold the "X"
   Left knee right sector, Right knee left armpit

Wide sweep is a counter balance to the Left Knee drop and will allow an athlete more time for the left foot to rotate to the center of the sector

Face the throw
   Lower Body leads the throw
Wall Drill #1
Puppet Drill
Pivot to South African
Giant Steps
Sprint

9 o'clock drop - Around and Down
   As Right Foot leaves contact with the ground the Left Knee breaks and drops towards the front of the circle

Get on the horse
   Right foot dorsi-flexes (Paw and Kick Mud) and Right Leg leads with inside of thigh

Maintain Posture
   Vertical Left Thigh and Sternum over Knee, Shoulders should stay level, See the horizon

Hold the "X"
   Left knee right sector, Right knee left armpit

Wide sweep is a counter balance to the Left Knee drop and will allow an athlete more time for the left foot to rotate to the center of the sector

Face the throw
   Lower Body leads the throw
Positions

Positions Create Power

What Shapes do we see?

Where is the center of mass of the system?

Where is the discus?
Transition

Switches Rotational Axis

Face the throw and Pull/Skip/Squeeze
Left Knee to Right Knee

Maintain Separation and Rotation
Do NOTHING / Allow the system to work into power position

Set Orbit - Implement rises with hip
Set it on a shelf

Let the ground come to you and absorb
Transition

Switches Rotational Axis

Face the throw and Pull/Skip/Squeeze
Left Knee to Right Knee

Maintain Separation and Rotation
Do NOTHING / Allow the system to
work into power position

Set Orbit - Implement rises with hip
Set it on a shelf

Let the ground come to you and absorb
Patty Cake

Transition Drill
Transition

Switches Rotational Axis

Face the throw and Pull/Skip/Squeeze
Left Knee to Right Knee

Maintain Separation and Rotation
Do NOTHING / Allow the system to work into power position

Set Orbit - Implement rises with hip
Set it on a shelf

Let the ground come to you and absorb
Positions

Positions Create Power

What Shapes do we see?

Where is the center of mass of the system?

Where is the discus?
Right Leg Touchdown

Establishes Rotational Axis
Right Foot touches down between 2:30 and 12:30

Center of Mass holds on top of Right Leg
Sternum-Knee-Toe

Engage Right Hip
Knee to 12:00
Bent Leg, High Heel, and Eyes Back
"Settle" through the left leg

Discus Up and Back
High Point of Orbit should be about head height

Left arm low-ish/shoulder holds

Left foot follows similar path as sweep
Right Leg Touchdown

Establishes Rotational Axis
Right Foot touches down between 2:30 and 12:30

Center of Mass holds on top of Right Leg
Sternum-Knee-Toe

Engage Right Hip
Knee to 12:00
Bent Leg, High Heel, and Eyes Back
"Settle" through the left leg

Discus Up and Back
High Point of Orbit should be about head height

Left arm low-ish/shoulder holds

Left foot follows similar path as sweep
Continuous Half Turns
Wall Drill #2
Flamingo Drill
Step-Ins
Right Leg Touchdown

Establishes Rotational Axis
   Right Foot touches down between 2:30 and 12:30

Center of Mass holds on top of Right Leg
   Sternum-Knee-Toe

Engage Right Hip
   Knee to 12:00
   Bent Leg, High Heel, and Eyes Back
   "Settle" through the left leg

Discus Up and Back
   High Point of Orbit should be about head height

Left arm low-ish/shoulder holds

Left foot follows similar path as sweep
Positions

Positions Create Power

What Shapes do we see?

Where is the center of mass of the system?

Where is the discus?
Power Position

Maintains Rotational Axis
  Pressure down on Right Leg
  POSTURE
  Hips Under

Position of the left foot relative to the right foot is dependent on anthropometrics, rhythm and style
  Left foot touchdown rotates from toe to heel

Separation
  Left Arm First and levels
  Eyes Back
Power Position

Maintains Rotational Axis
  Pressure down on Right Leg
  POSTURE
  Hips Under

Position of the left foot relative to the right foot is dependent on anthropometrics, rhythm and style
  Left foot touchdown rotates from toe to heel

Separation
  Left Arm First and levels
  Eyes Back
Half Turns
Power Throws
Drop Step Power Position
Walking Stands
MB/Dowel Drills
Power Position

Maintains Rotational Axis
  Pressure down on Right Leg
  POSTURE
  Hips Under

Position of the left foot relative to the right foot is dependent on anthropometrics, rhythm and style.
  Left foot touchdown rotates from toe to heel

Separation
  Left Arm First and levels
  Eyes Back
Positions

Positions Create Power

What Shapes do we see?

Where is the center of mass of the system?

Where is the discus?
Delivery

Transfers Angular Momentum to Linear
Center of Mass Shift from Right leg to between the feet

Long Radius
Shoulder Axis turns around the Spine
Sweep implement through 12:00 and reach to 9:00

Double Support
Bent Right leg "Digging" into the ground
Hold the ground and see the release

Block Firm
Left Arm shortens and Left Side Stops
Keep Left Hip Up

Slight deviation off axis towards the right.

Height of Release should be about shoulder height or slightly above

Pitch of Discus (~15°), Angle of Release (~35°), Release Velocity (up to 25m/sec), Effects of Wind (M-Right Quarter Wind, W-Right Crosswind [Hildebrand et al. 2009])
Delivery

Transfers Angular Momentum to Linear
Center of Mass Shift from Right leg to between the feet

Long Radius
Shoulder Axis turns around the Spine
Sweep implement through 12:00 and reach to 9:00

Double Support
Bent Right leg "Digging" into the ground
Hold the ground and see the release

Block Firm
Left Arm shortens and Left Side Stops
Keep Left Hip Up

Slight deviation off axis towards the right.

Height of Release should be about shoulder height or slightly above

Pitch of Discus (~15°), Angle of Release (~35°), Release Velocity (up to 25m/sec), Effects of Wind (M-Right Quarter Wind, W-Right Crosswind [Hildebrand et al. 2009])
Towel Sweeps

Seated/Kneeling Throws

Inverted "C"

Restricted Stands
Delivery

Transfers Angular Momentum to Linear
Center of Mass Shift from Right leg to between the feet

Long Radius
Shoulder Axis turns around the Spine
Sweep implement through 12:00 and reach to 9:00

Double Support
Bent Right leg "Digging" into the ground
Hold the ground and see the release

Block Firm
Left Arm shortens and Left Side Stops
Keep Left Hip Up

Slight deviation off axis towards the right.

Height of Release should be about shoulder height or slightly above

Pitch of Discus (~15°), Angle of Release (~35°), Release Velocity (up to 25m/sec), Effects of Wind (M-Right Quarter Wind, W-Right Crosswind [Hildebrand et al. 2009])
Positions

Positions Create Power

What Shapes do we see?

Where is the center of mass of the system?

Where is the discus?
Recovery

Non Reverse vs. Reverse

Jump Reverse vs. Non-Reverse-Reverse

Finish out into the direction of the throw

Right arm back into circle
  Find the Back of the Circle

3:00 Right foot placement on reverse
Hands on Hips
Mimic throws
Band Drills
Trashcan Method
Recovery

Non Reverse vs. Reverse

Jump Reverse vs. Non-Reverse-Reverse

Finish out into the direction of the throw

Right arm back into circle
   Find the Back of the Circle

3:00 Right foot placement on reverse
Positions

Positions Create Power

What Shapes do we see?

Where is the center of mass of the system?

Where is the discus?
Discus Throw
Jon Tipton

Training Planning

Principles of the Discus

Positions

Application
Application

Observe
Hypothesize
Intervention
Observe

Trial and Error
Progression - Dreyfus Model

Novice - Broad Strokes
Get them doing and gaining confidence, "let 'em play"
Rhythm and Separation

Beginner - Shape the Art
Start teaching them fundamentals
Balance and Direction

Competent - Detail Work
Break down the throw into skills
Orbit

Proficient - Clean it up
Fix smaller issues
Patience

Expert - Frame it and protect it
Sell out on what they're good at while eliminating risks
Rhythm, Orbit, and Patience
Application
Observe
Hypothesize
Intervention
Observe
Trial and Error

Progression
Common Errors
Individualization
Thank You
Common Errors

- Going Up out of the back
- Left arm or eyes lead the throw
- Over or Under Rotating out of the Back
- Poor Posture and disengaged hips
- Jumping at release or reversing too soon
- No focus on orbit
- Professional Drillers
Application

Observe
Hypothesize
Intervention
Observe

Trial and Error
Individualization

Athlete Profiling
Anthropometrics
Flexibility
Mobility
Strength
Injury History
Movement Analysis
Application

Observe
Hypothesize
Intervention
Observe

Trial and Error
Thank You!!!

Jon Tipton
Sam Houston State University
jontipton@shsu.edu

Jon Tipton - Youtube Drills & Progressions
Application

Observe
Hypothesize
Intervention
Observe

Trial and Error
Discus Throw
Jon Tipton

Training Planning

Principles of the Discus

Positions

Application