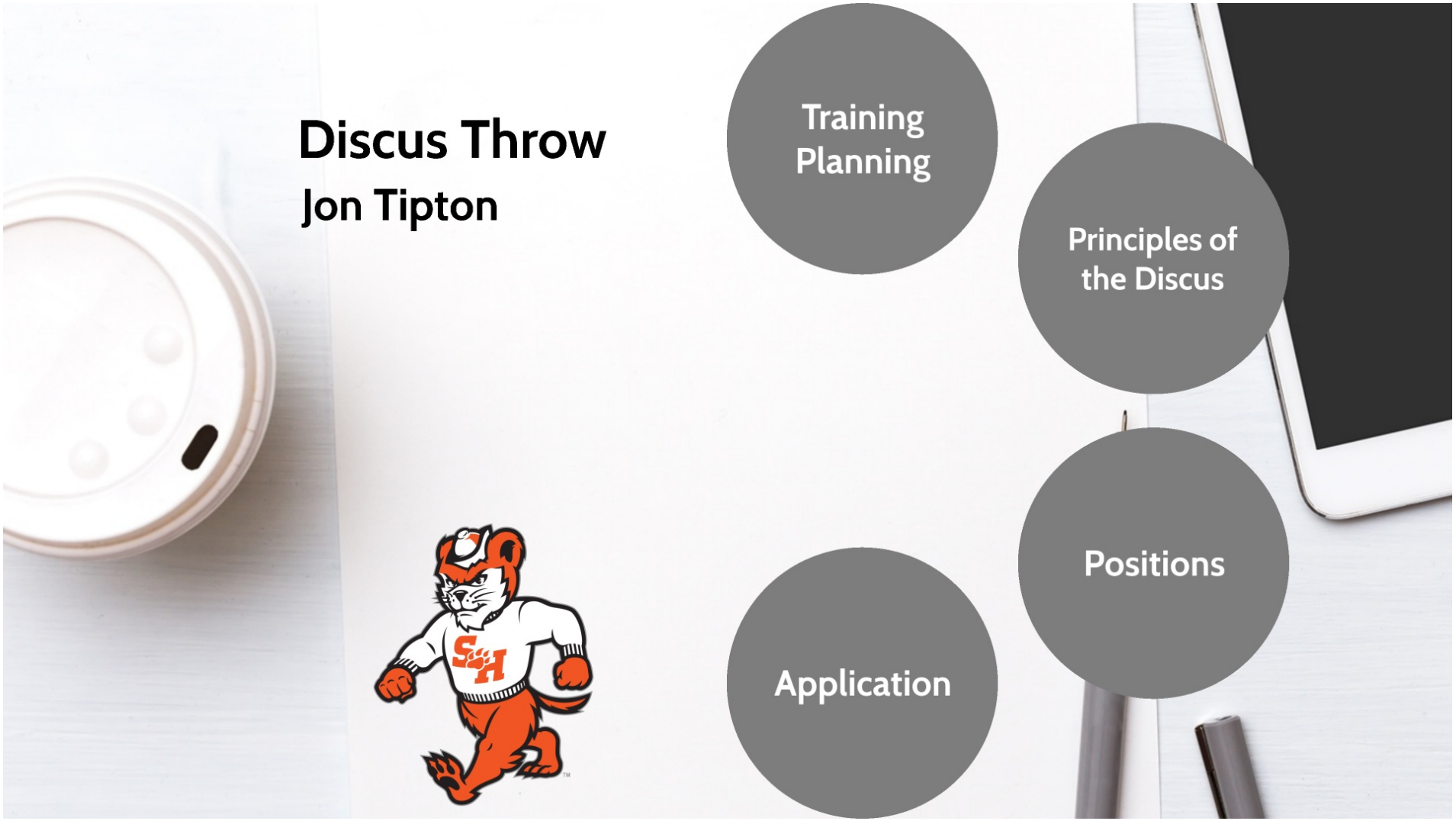
Discus Throw

Jon Tipton



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

Residual Training Effects

Motor Ability	Retention	Physiological
Oxidative Energy System	30±5	Increased number of aerobic enzymes, mitochondria, capillary density, hemoglobin capacity, glycogen storage, higher rate of fat metabolism
Strength	30±5	Improvement of neural mechanism, muscle hypertrophy
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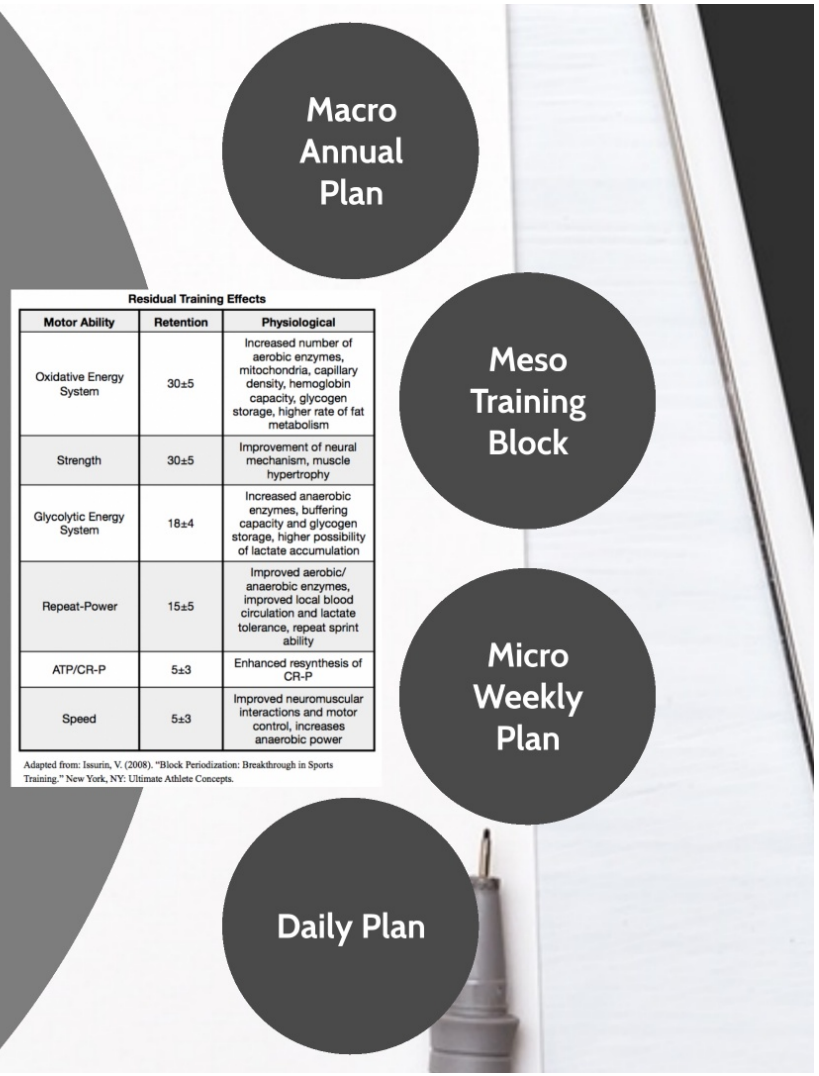

Macrocycle

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?

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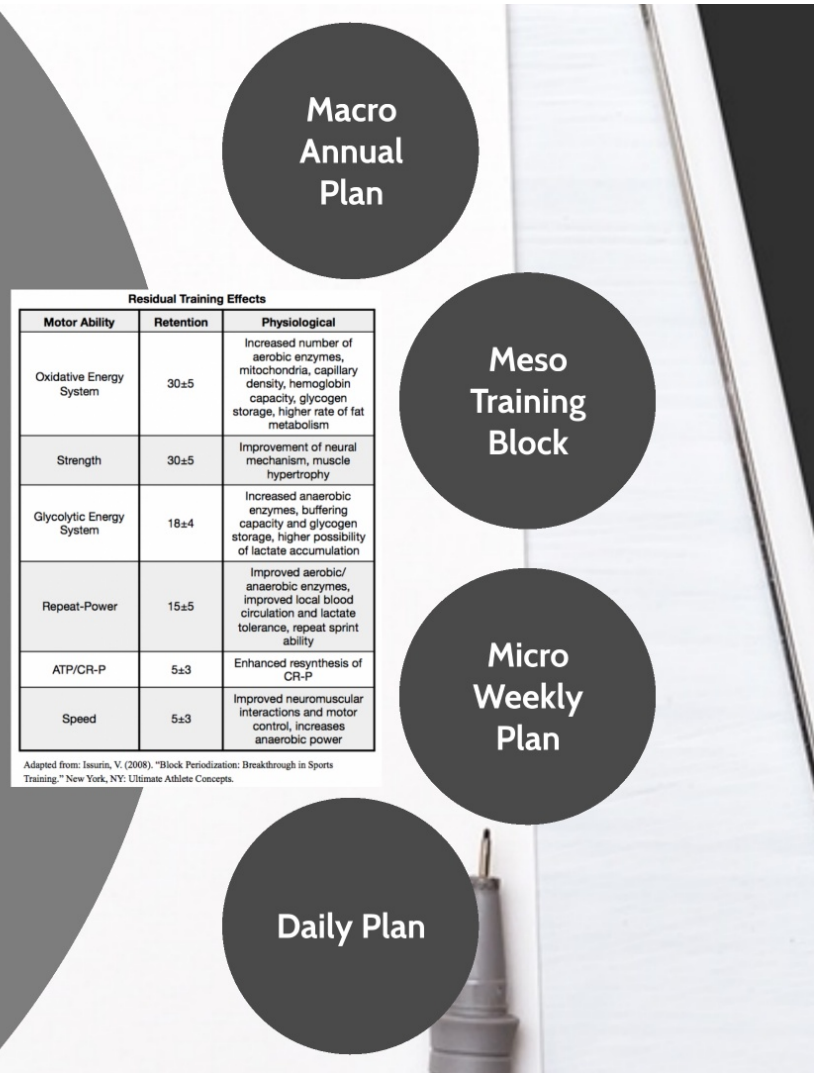


Mesocycle

Week 1 - Base

Week 2 - Accumulate

Week 3 - Intensify

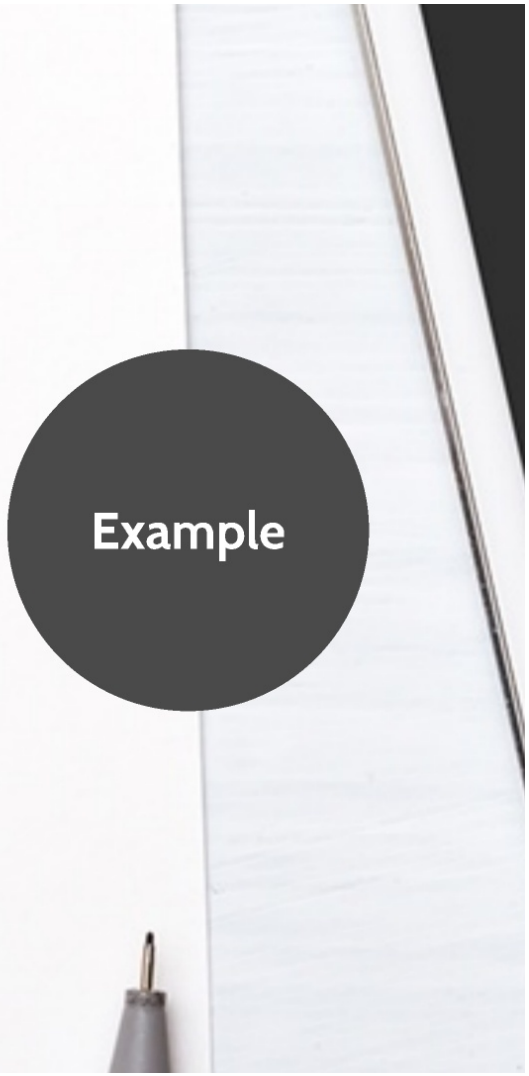
Week 4 - Recovery

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

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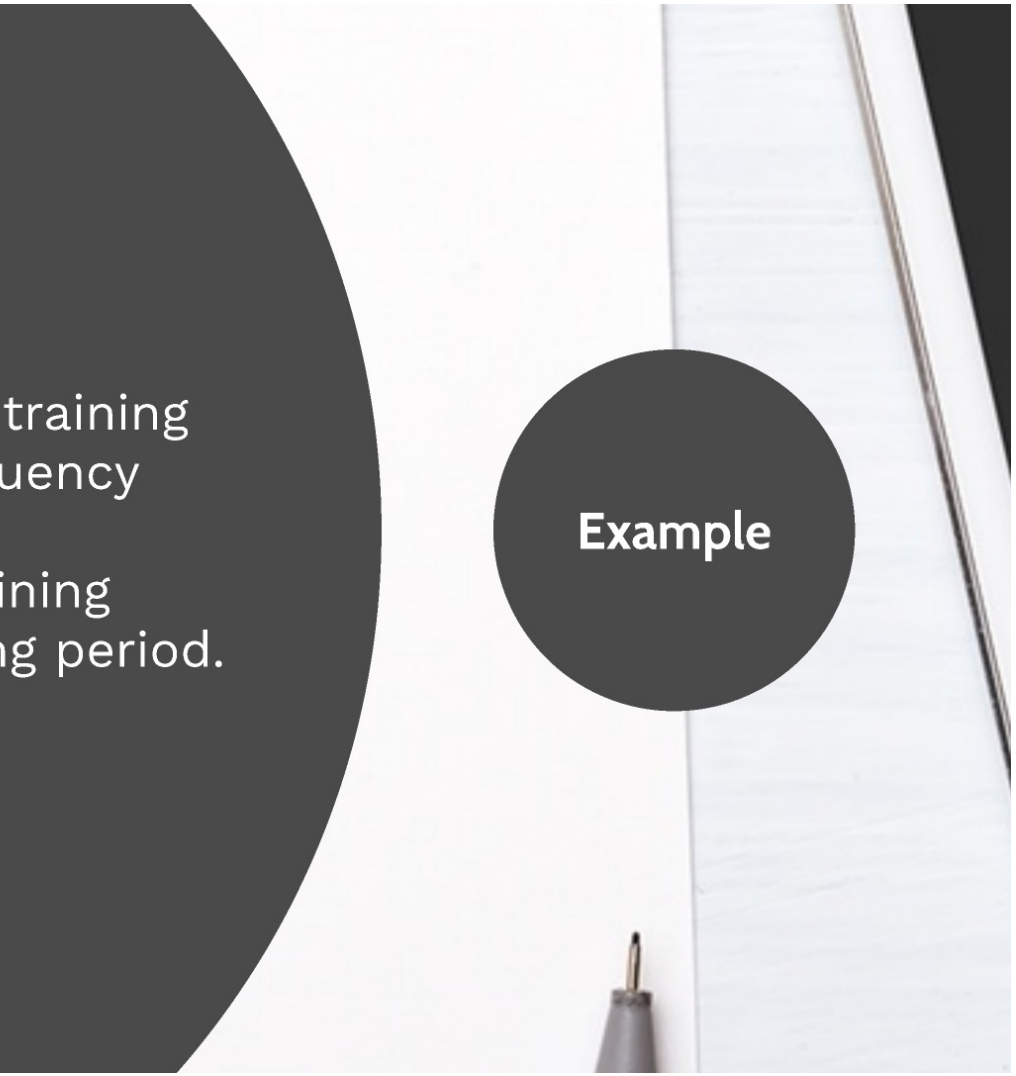

Mesocycle

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.

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Mesocycle

Week 1 - Base

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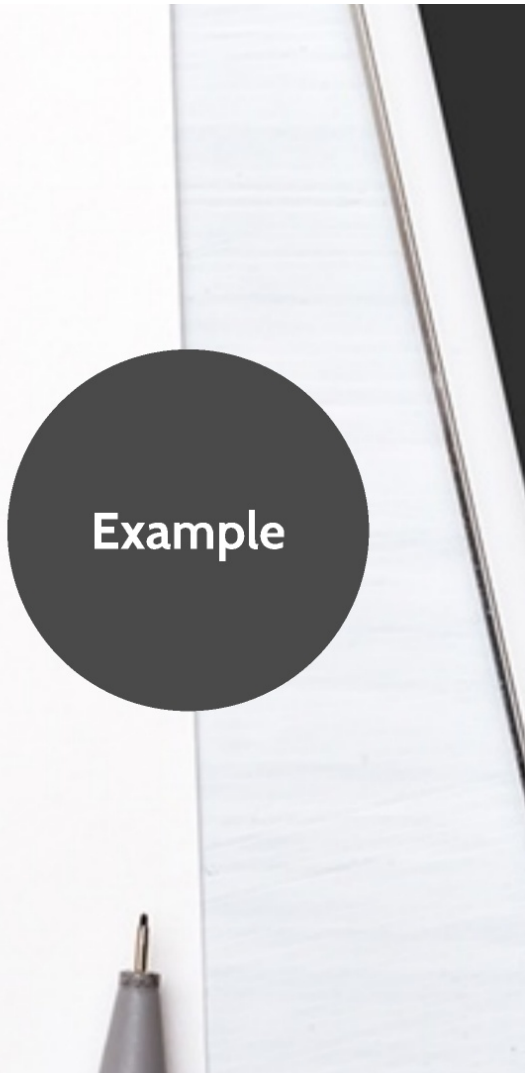
Intensify Week

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
Lifting - 5/4/4/3/3/3 (Force Velocity Curve)
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
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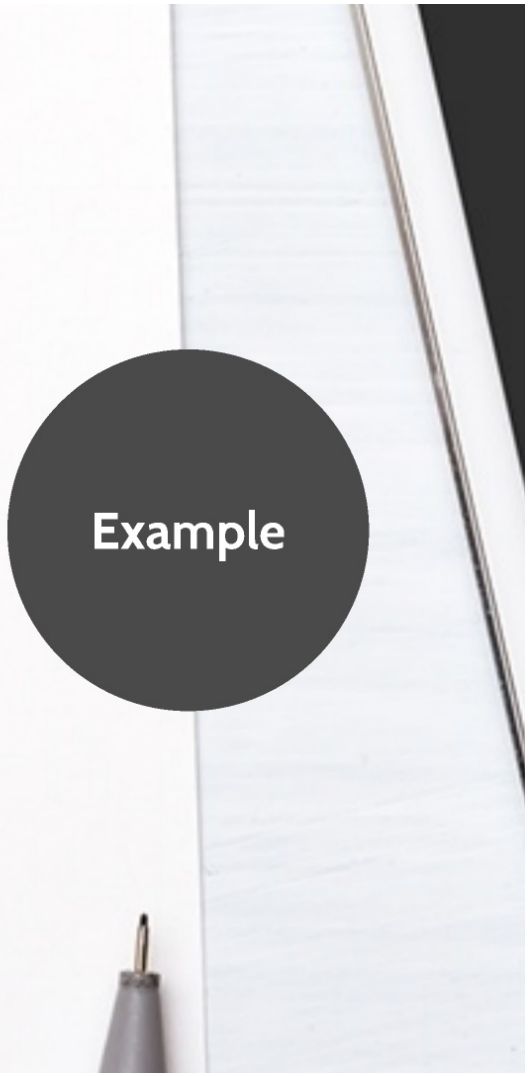

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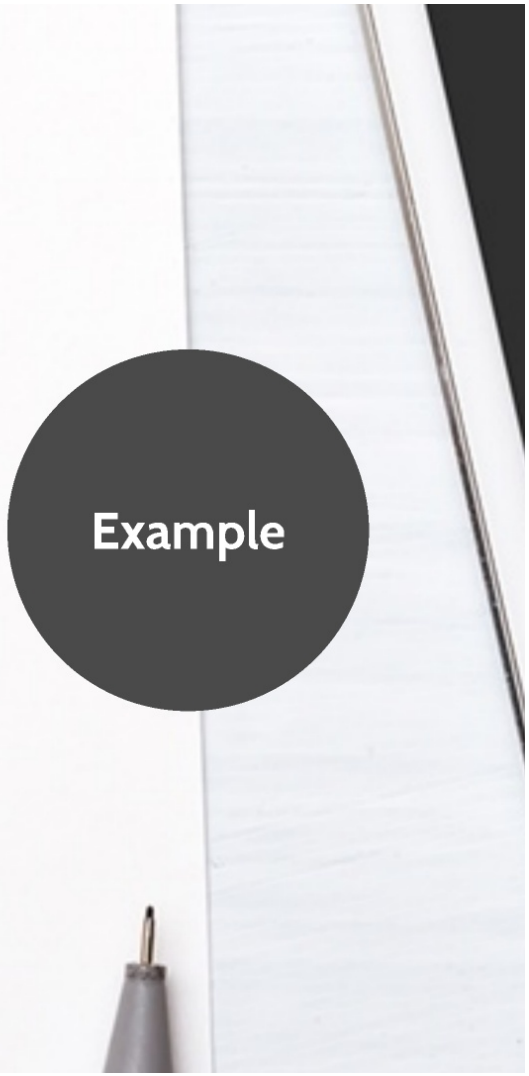
Recovery Week

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
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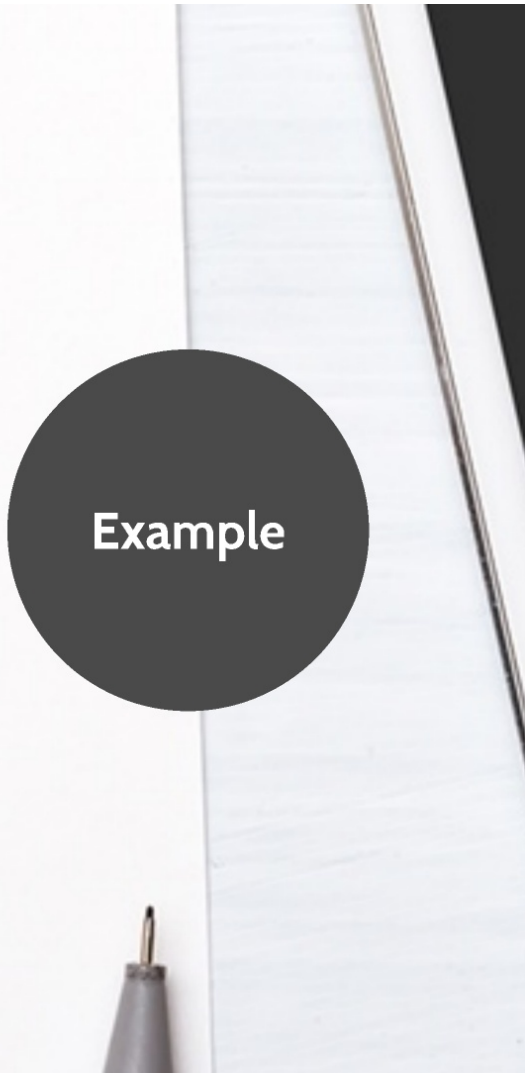

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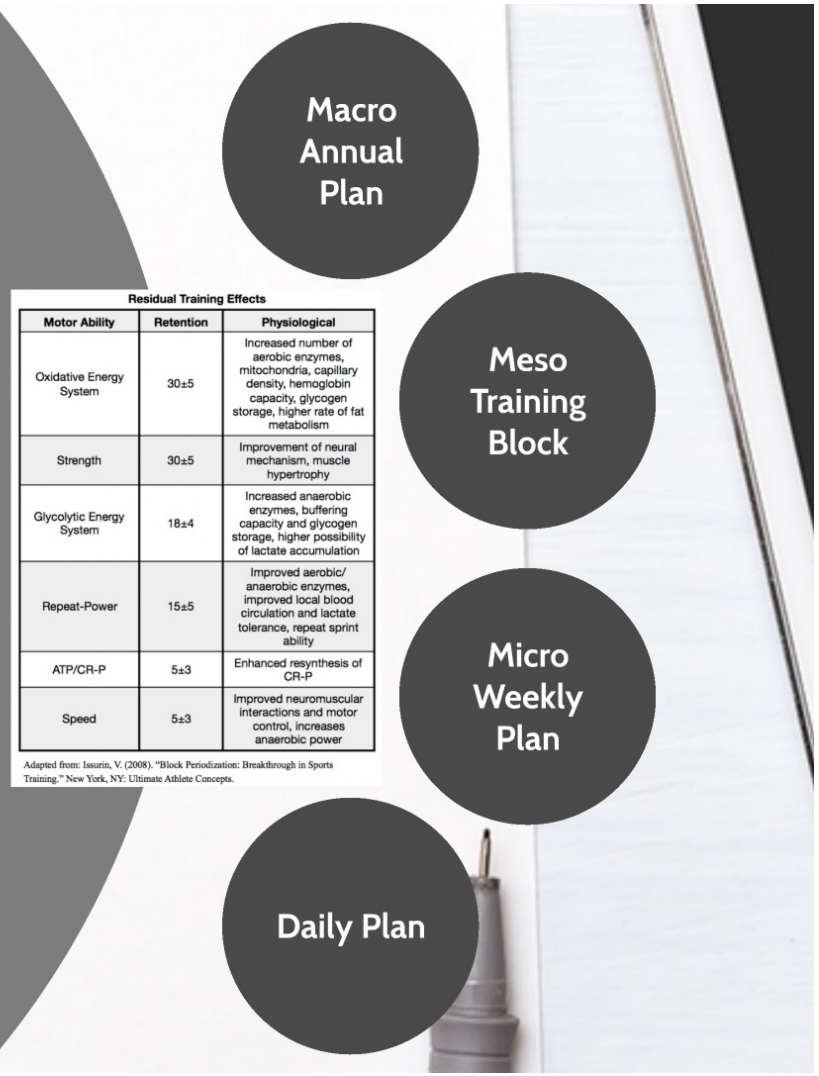

Microcycle

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

Complex Sets -	Alternating implements each throw, typically done Heavy to Light
Simple Sets -	Complete desired volume with an implement before moving to the next implement, can be done in any order
Giant Sets -	Alternating every 2-3 throws between a lot of implements

Discus - Coresponding Implements				
2lb PB	1.3k Denfi	4lb PB	1.6k Denfi	BP
1k Ball	1.5k Ball	4lb Ball	2k Ball	2k Ball
.75k	1k	1.25k	1.5k	1.6k
2k Denfi	6lb PB	2.5k Denfi	8lb PB	3.4k Denfi
5lb Pipe	2.5k Ball	6lb Ball	3k ball	8lb ball
1.75k	2k	2.25k	2.5k	3k

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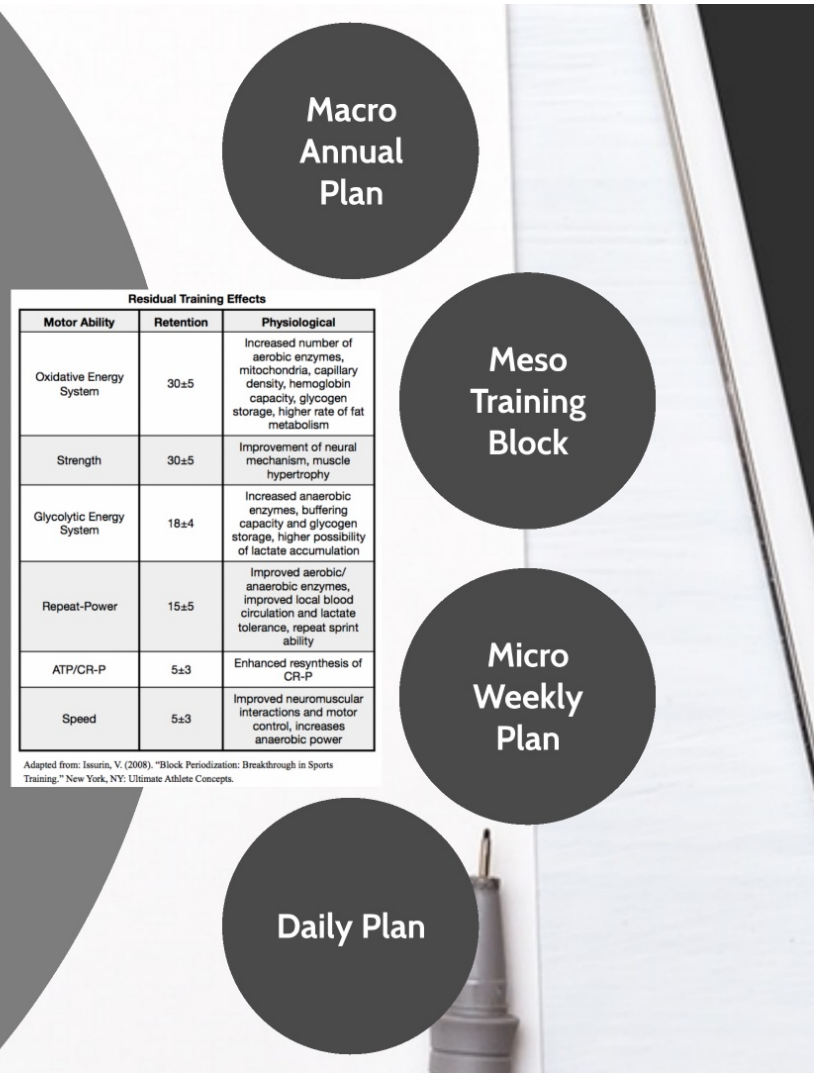

Daily Plan

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

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Specific Warm-Up or Special Strength
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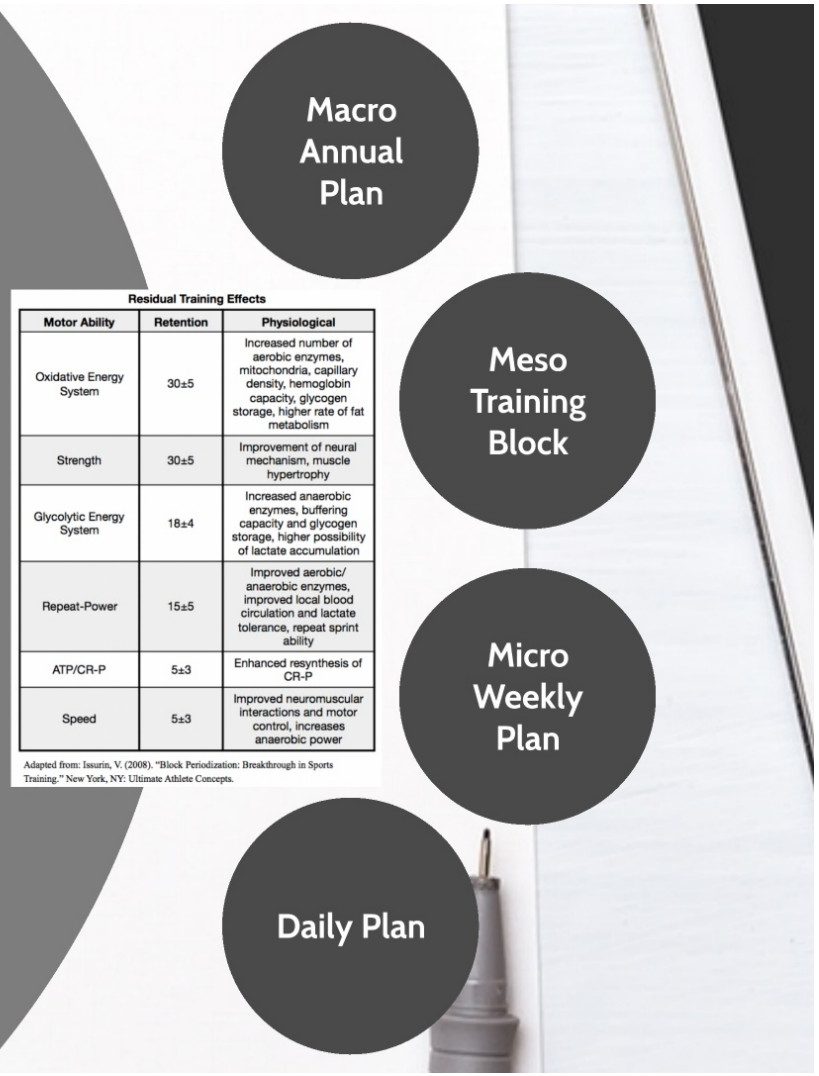


Discus Throw

Jon Tipton

Training Planning

Principles of the Discus

Positions

Application

5 Principles

Simplify the process

What really matters?

Focus on movement rather than positions

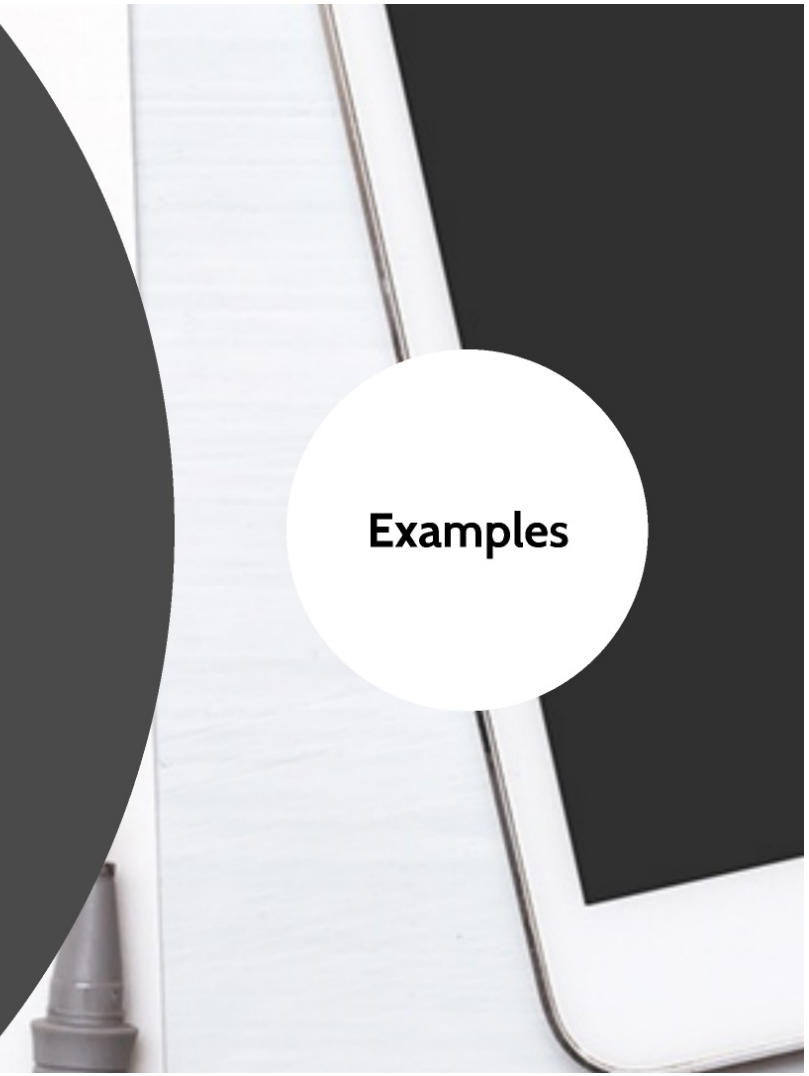
When competent in movement then look at positions.

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.



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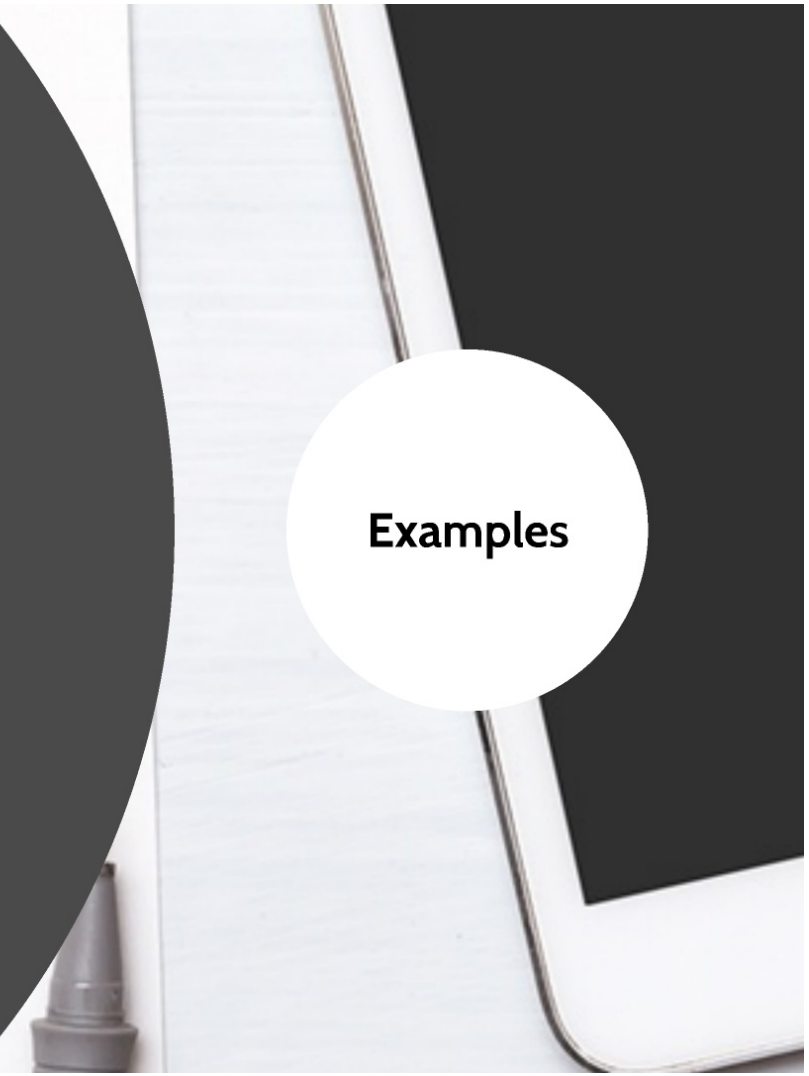

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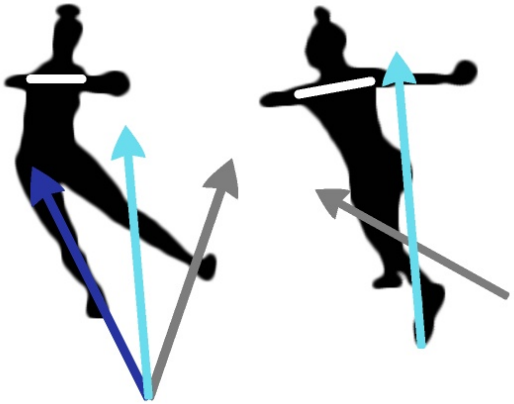
Direction

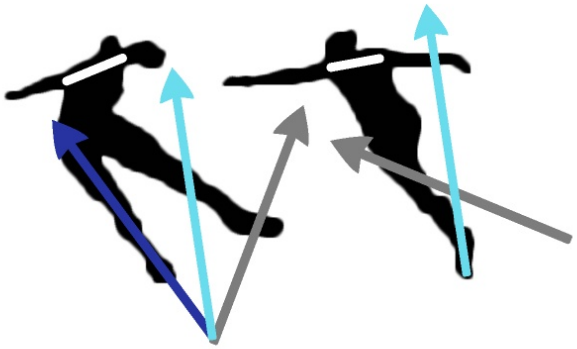
Sum of Force Vectors = Direction of Movement

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



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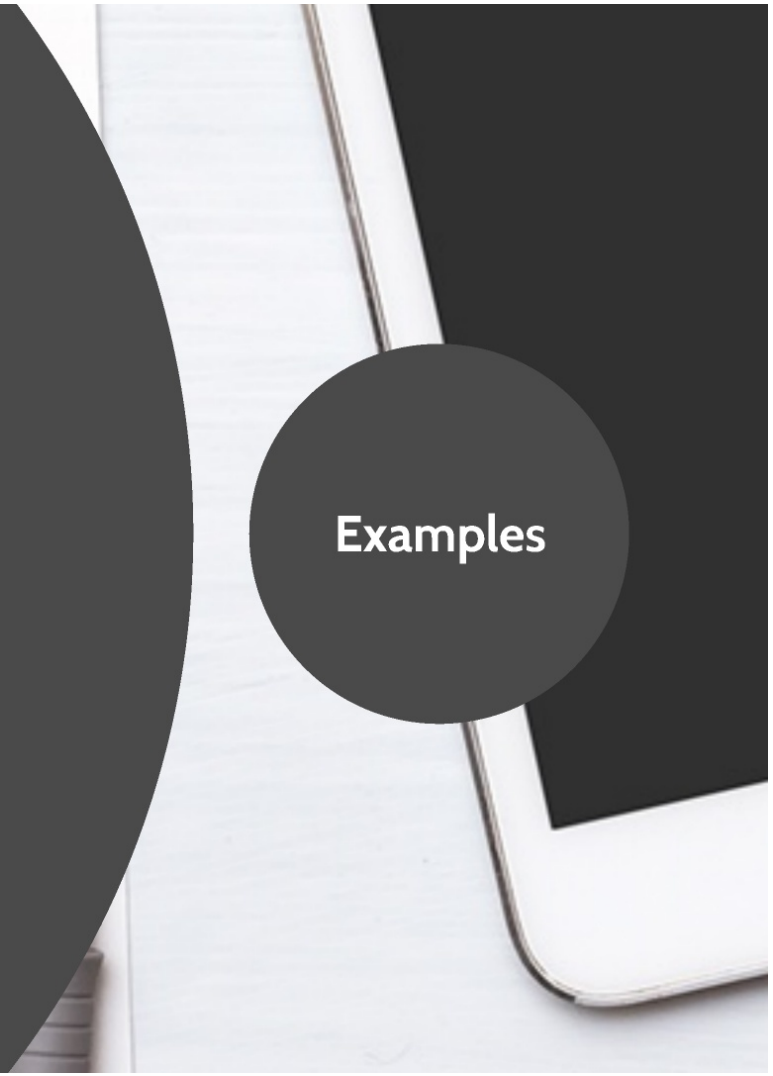
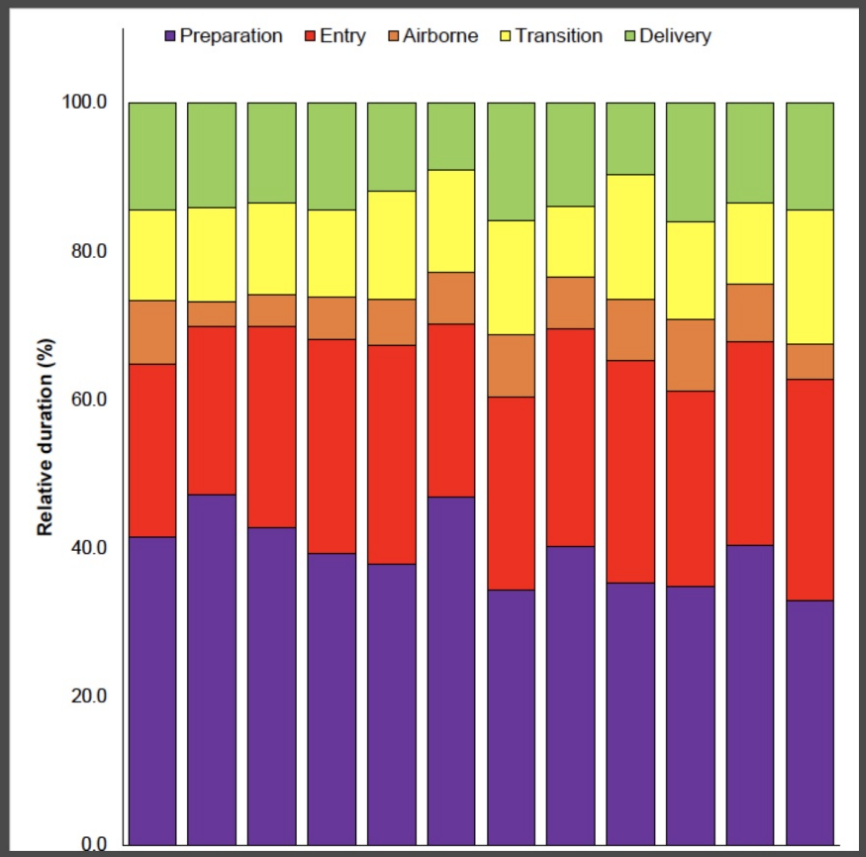
Rhythm

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

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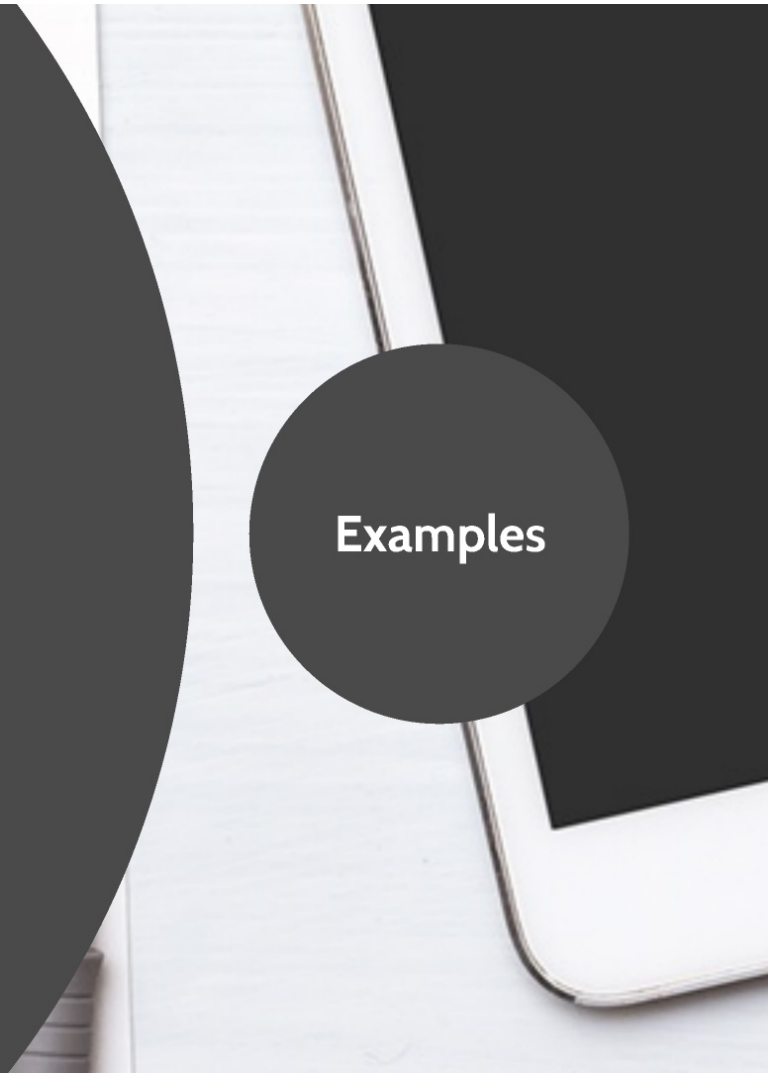

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Orbit

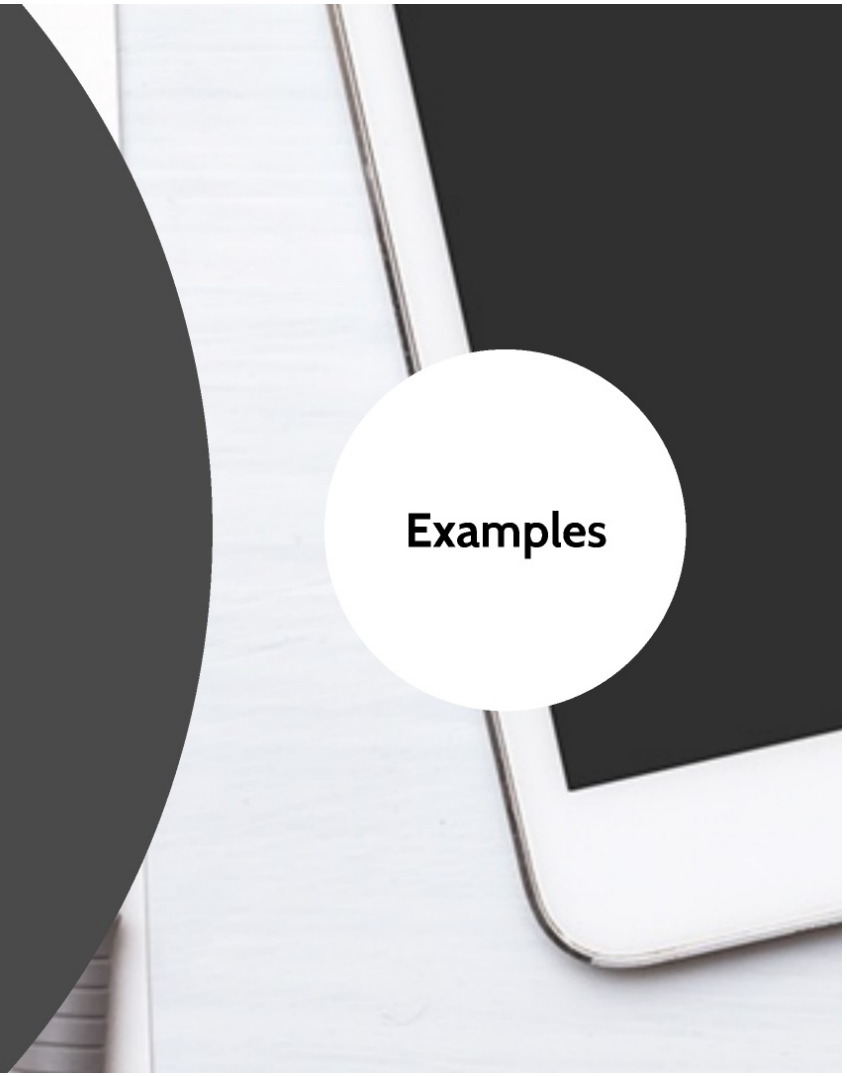
Tangential Velocity is directly proportionate to the radius.

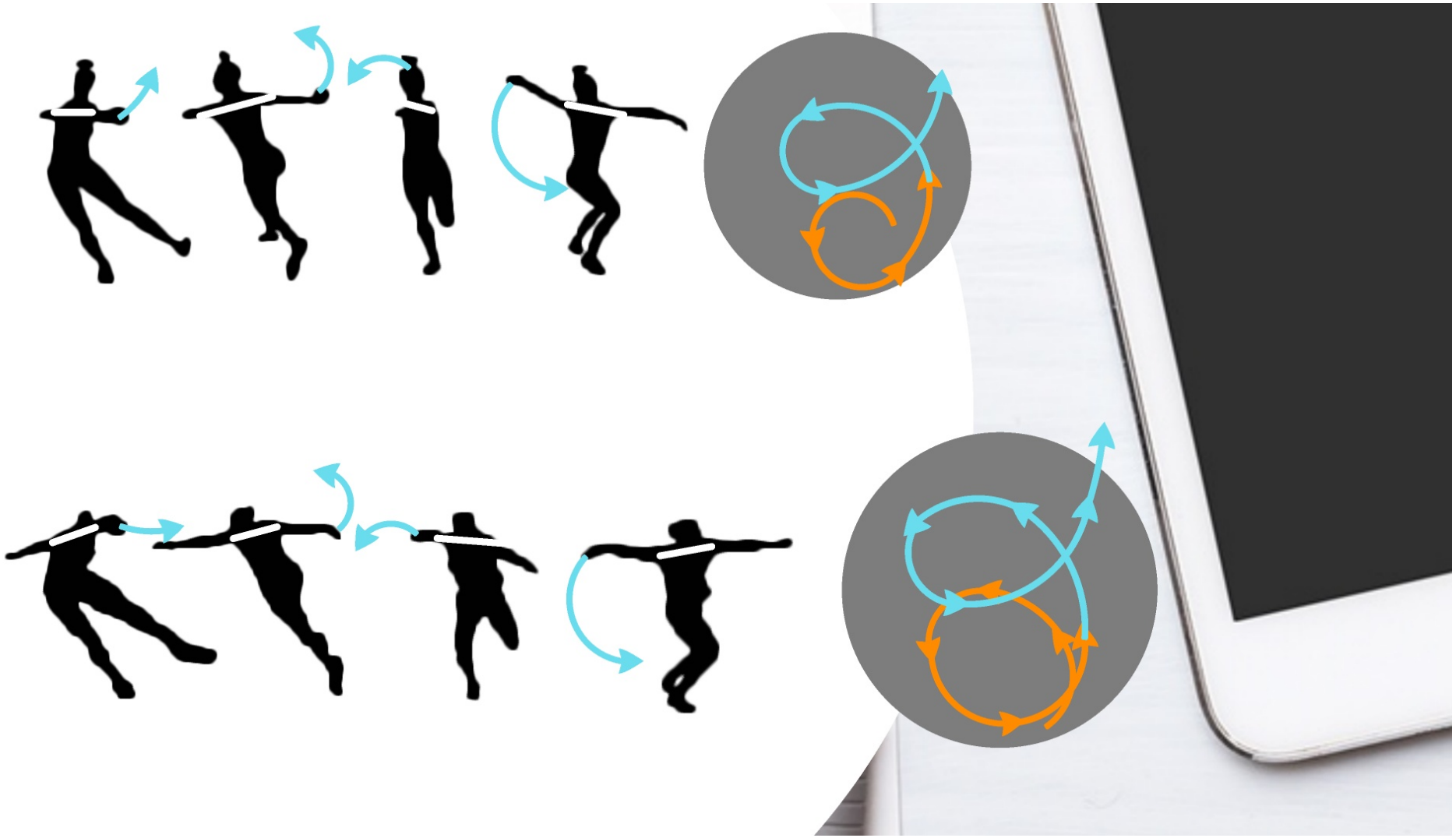
Angular Acceleration and the role it plays in Tangential Velocity.

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.





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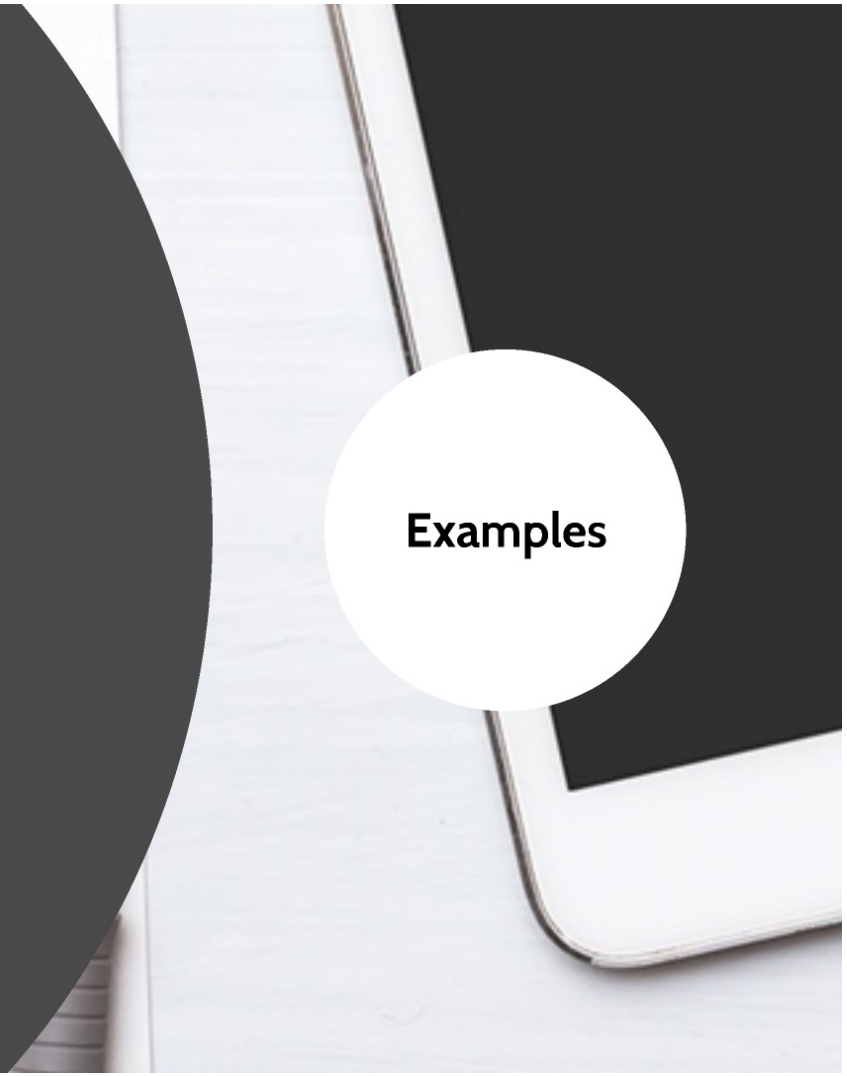

5 Principles

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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

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Discus Throw

Jon Tipton

Training Planning

Principles of the Discus

Positions

Application

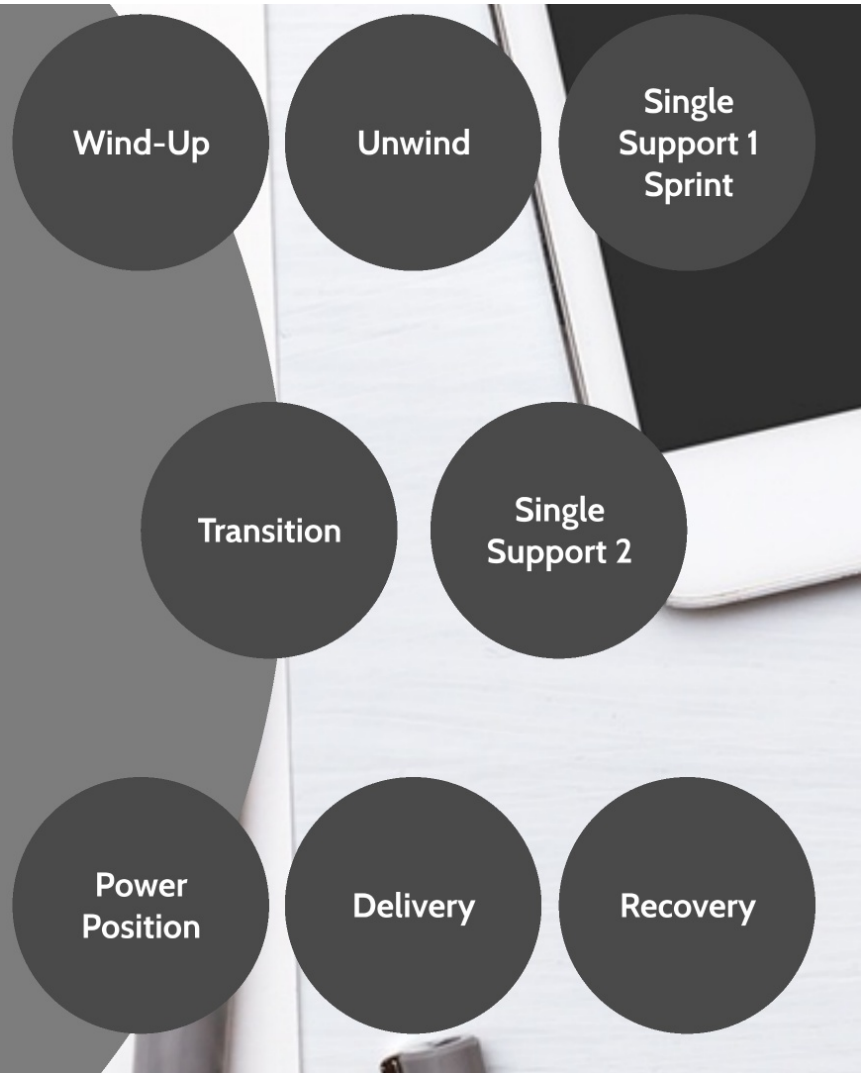
Positions

Positions Create Power

What Shapes do we see?

Where is the center of mass of the system?

Where is the discus?



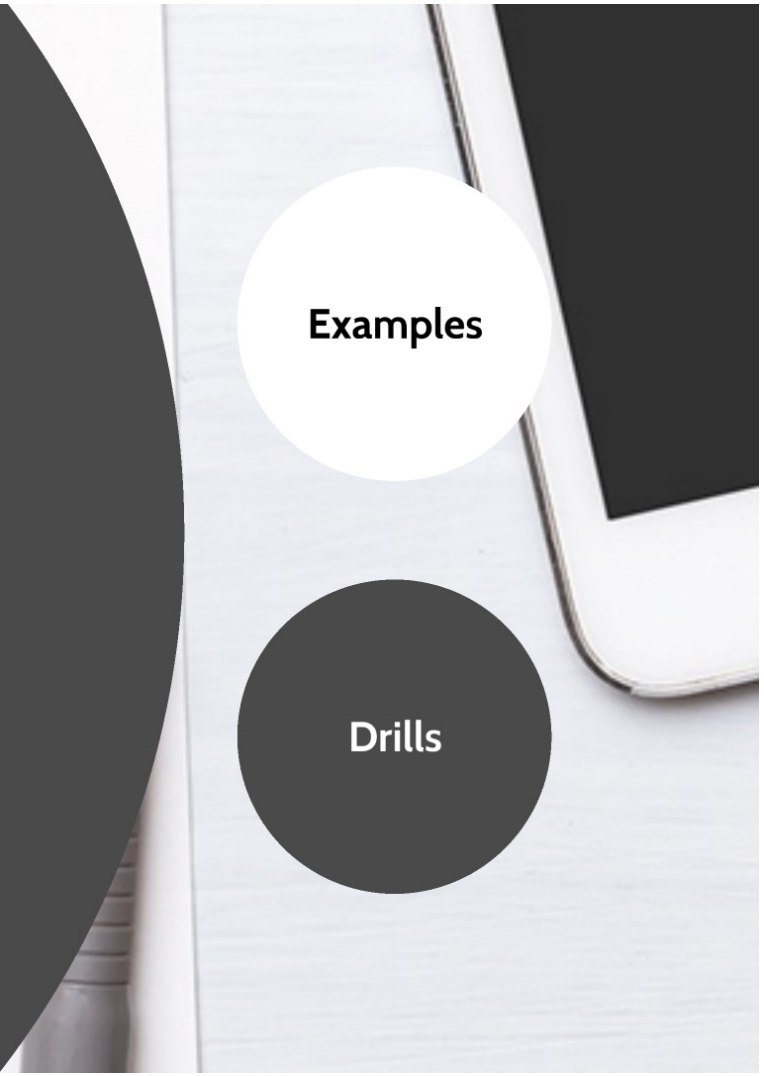
Wind-up

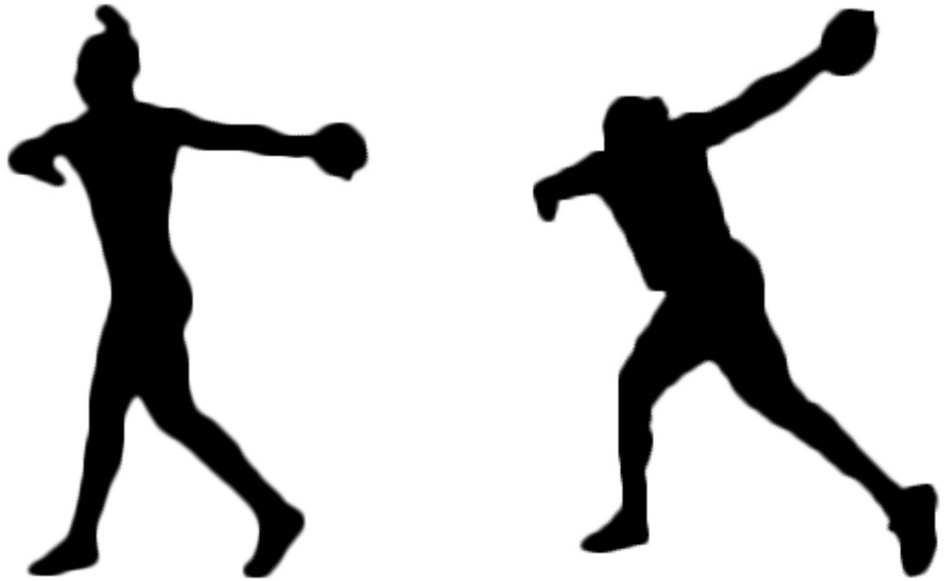
Pre-Wind Up:
- Load The Legs - Set Left Leg Axis

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





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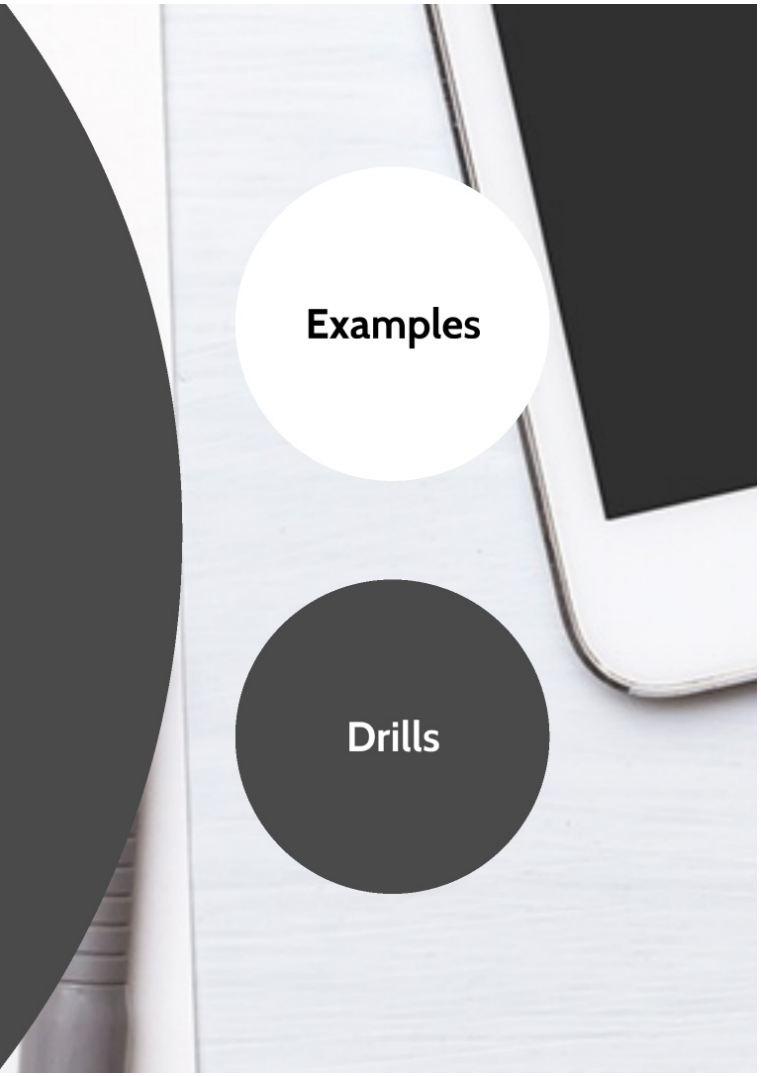

Wind Ups

Wind Up w/ Jump

Wind-up

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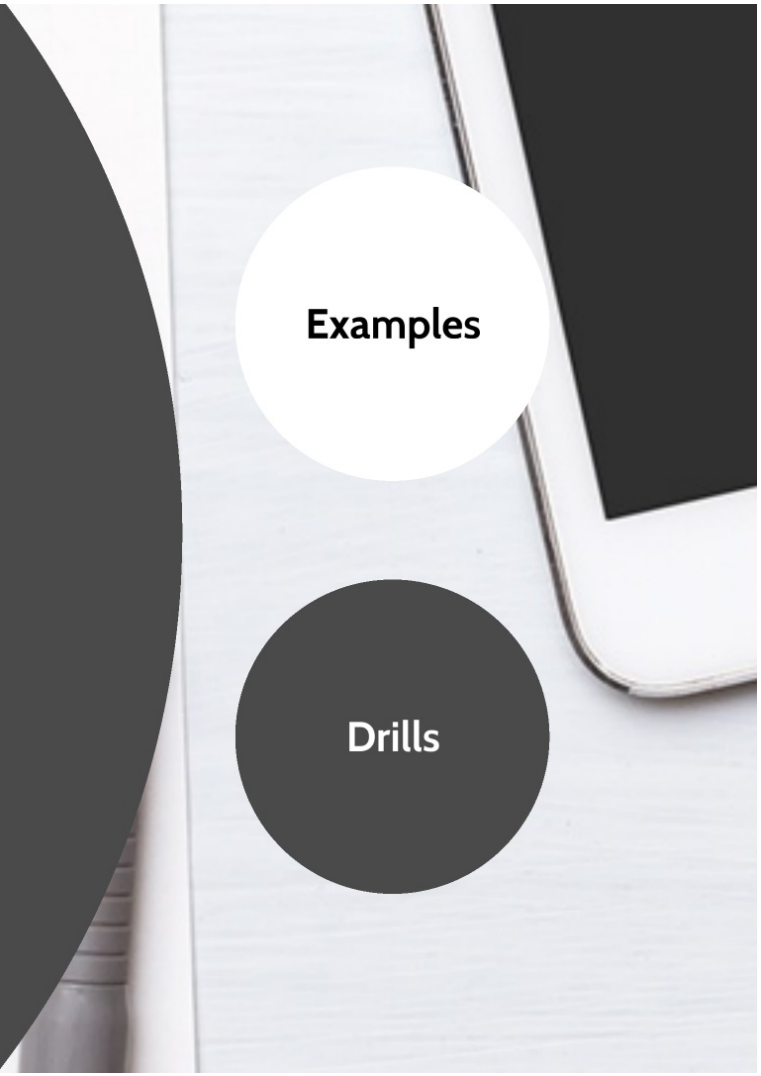

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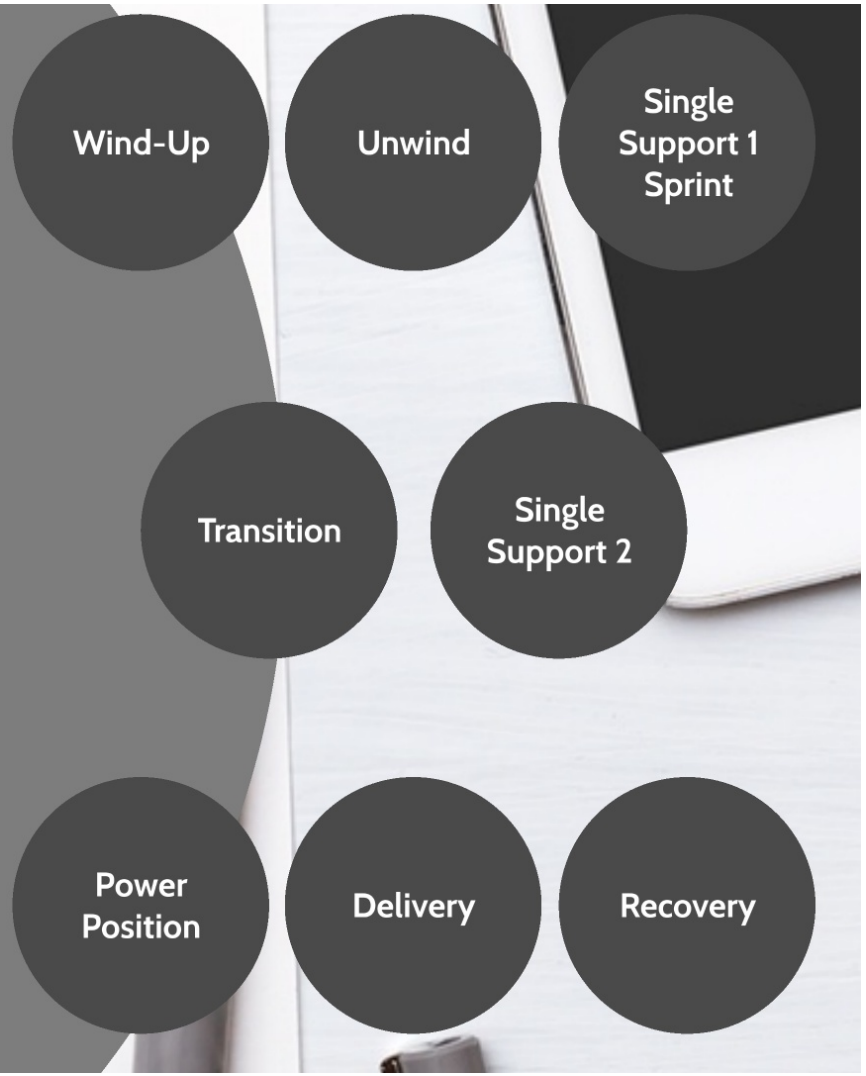


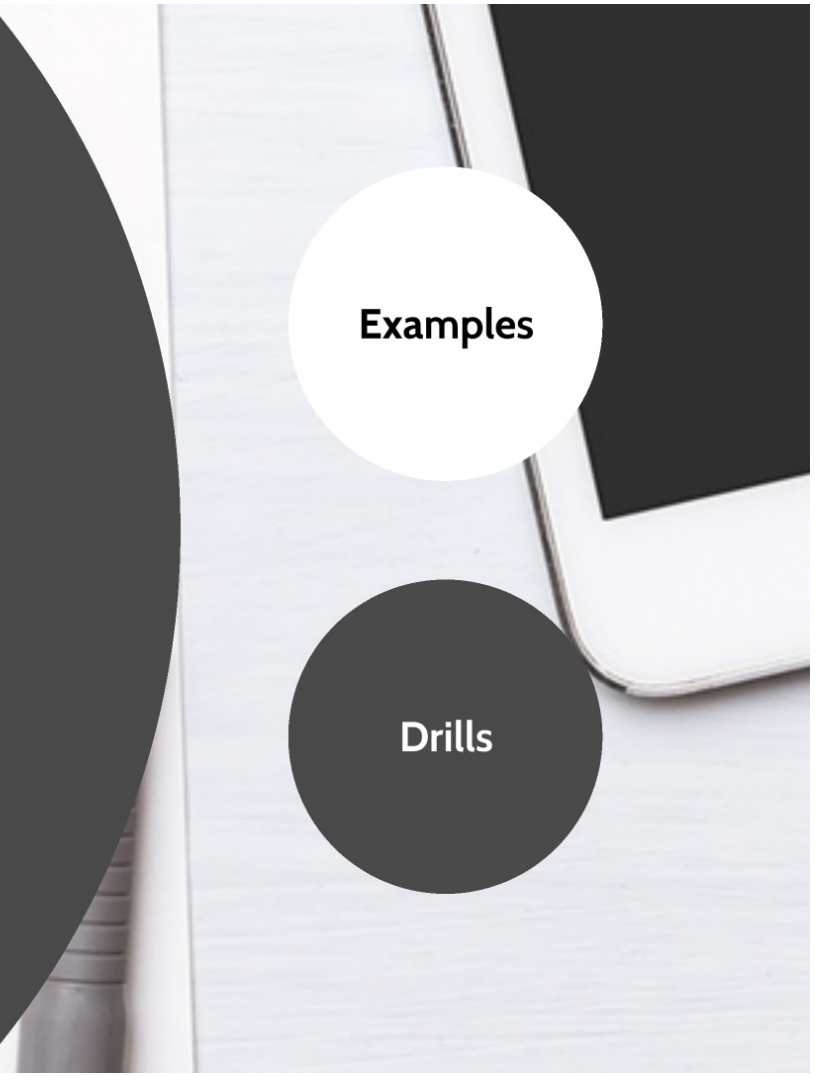
Unwind

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



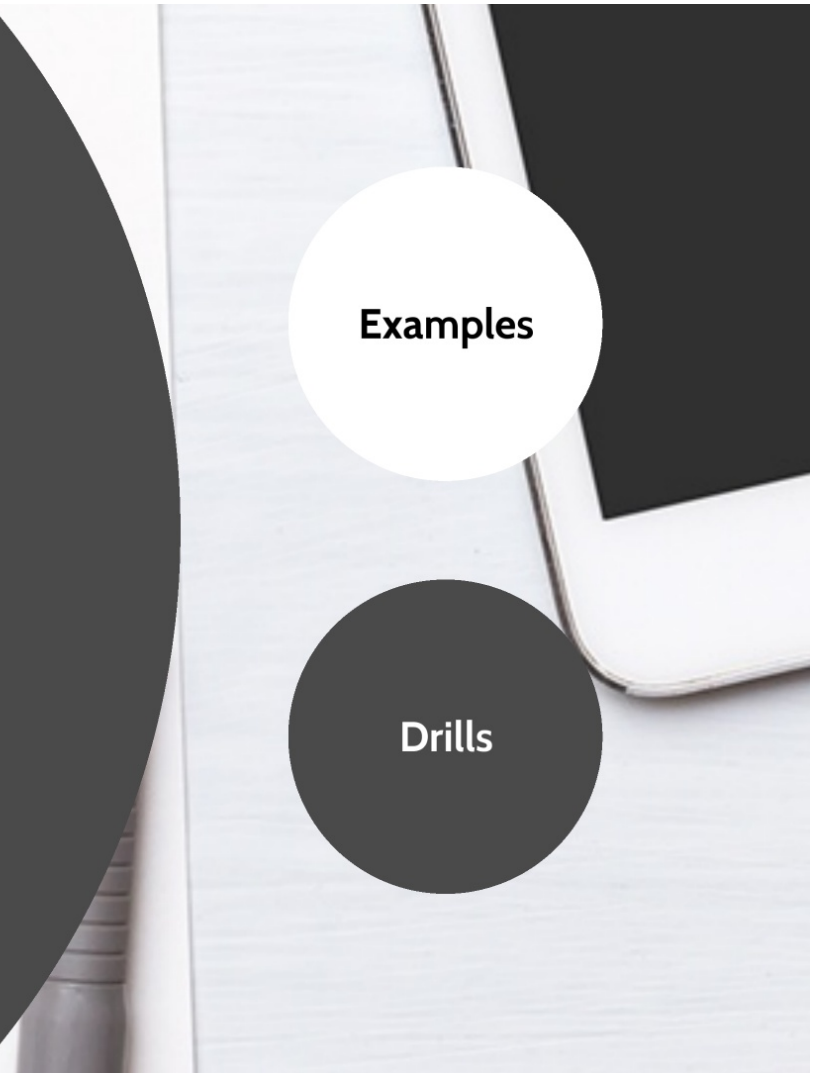
Unwind

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

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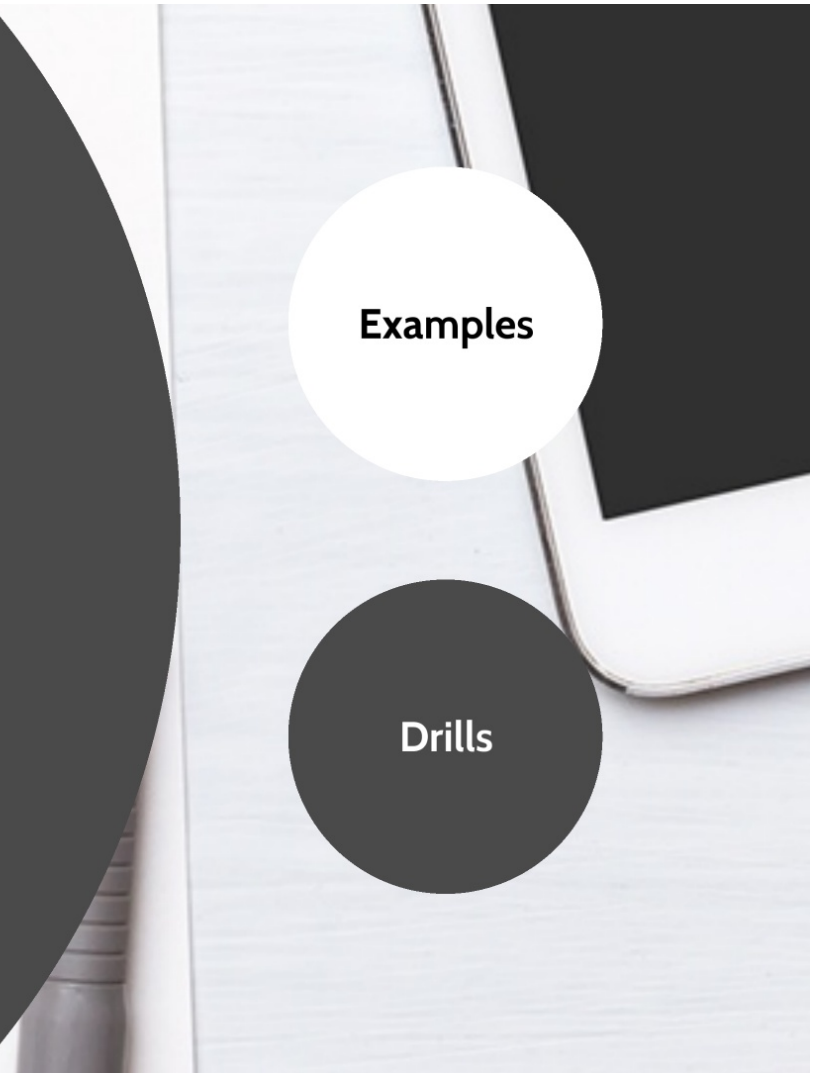


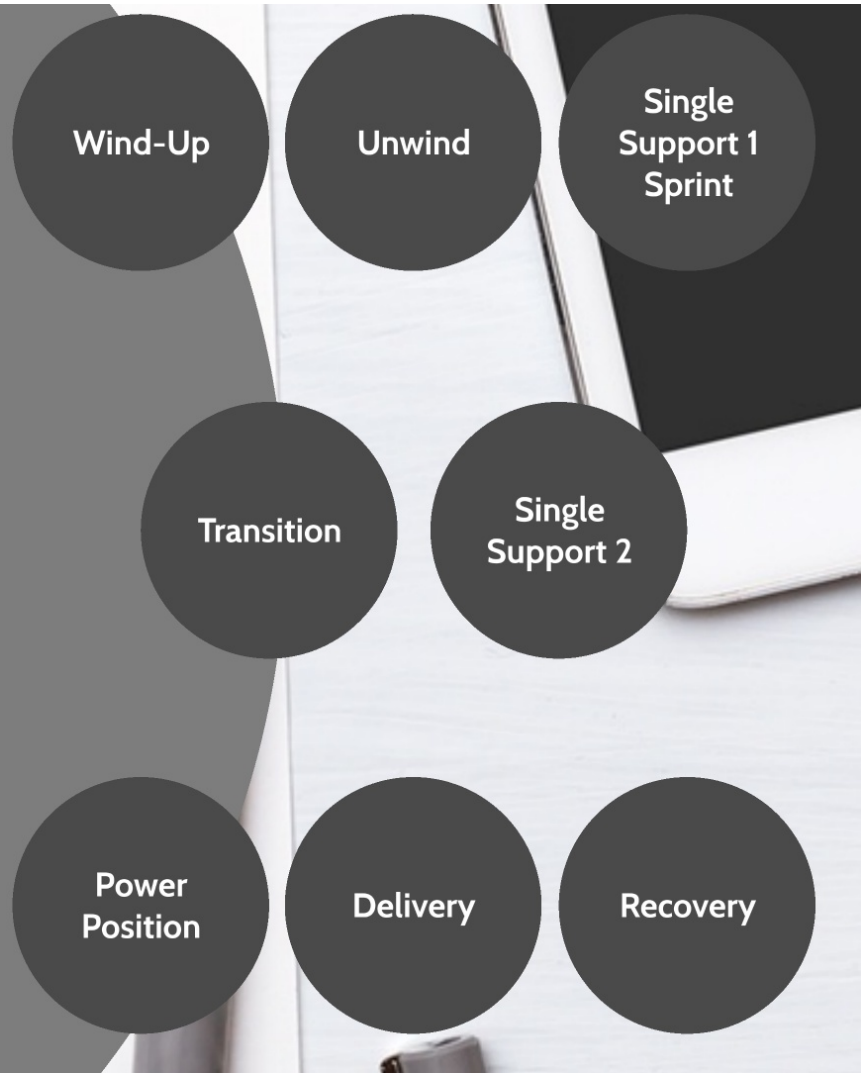
Positions

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

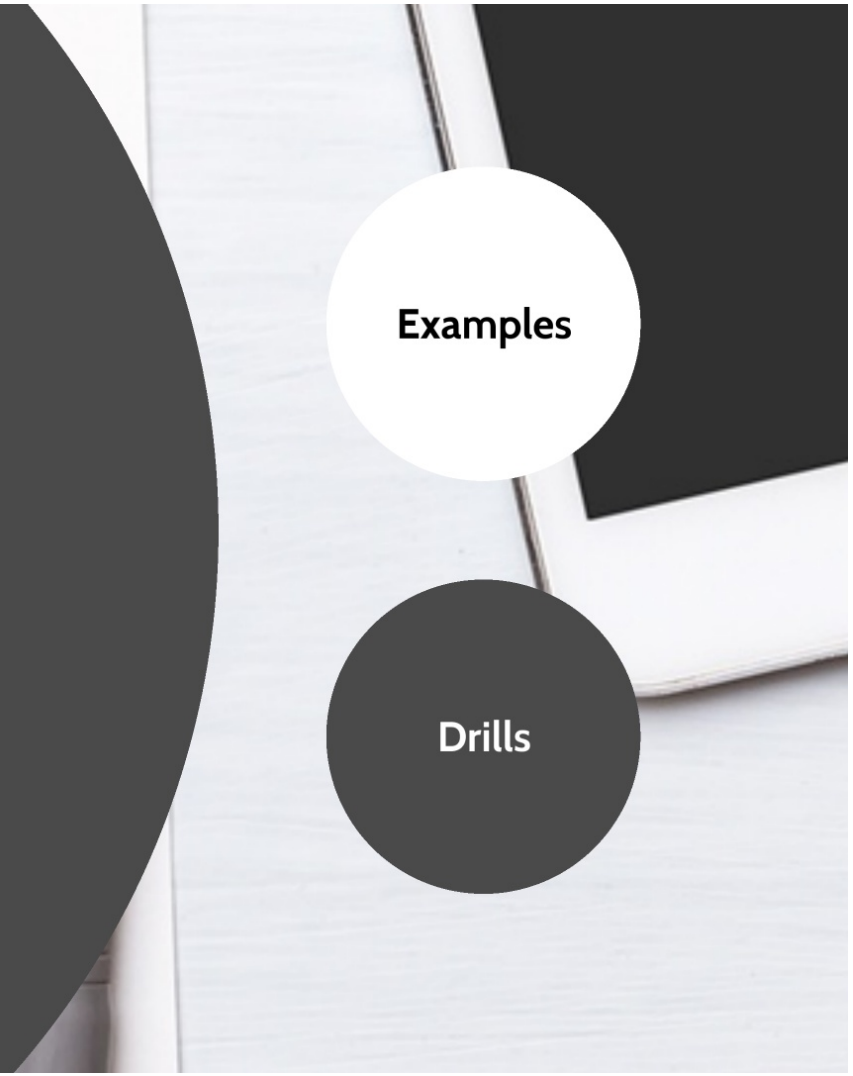
Get on the horse
- Right foot dorsi-flexes (Paw and Kick Mud) and Right Leg leads with inside of thigh

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



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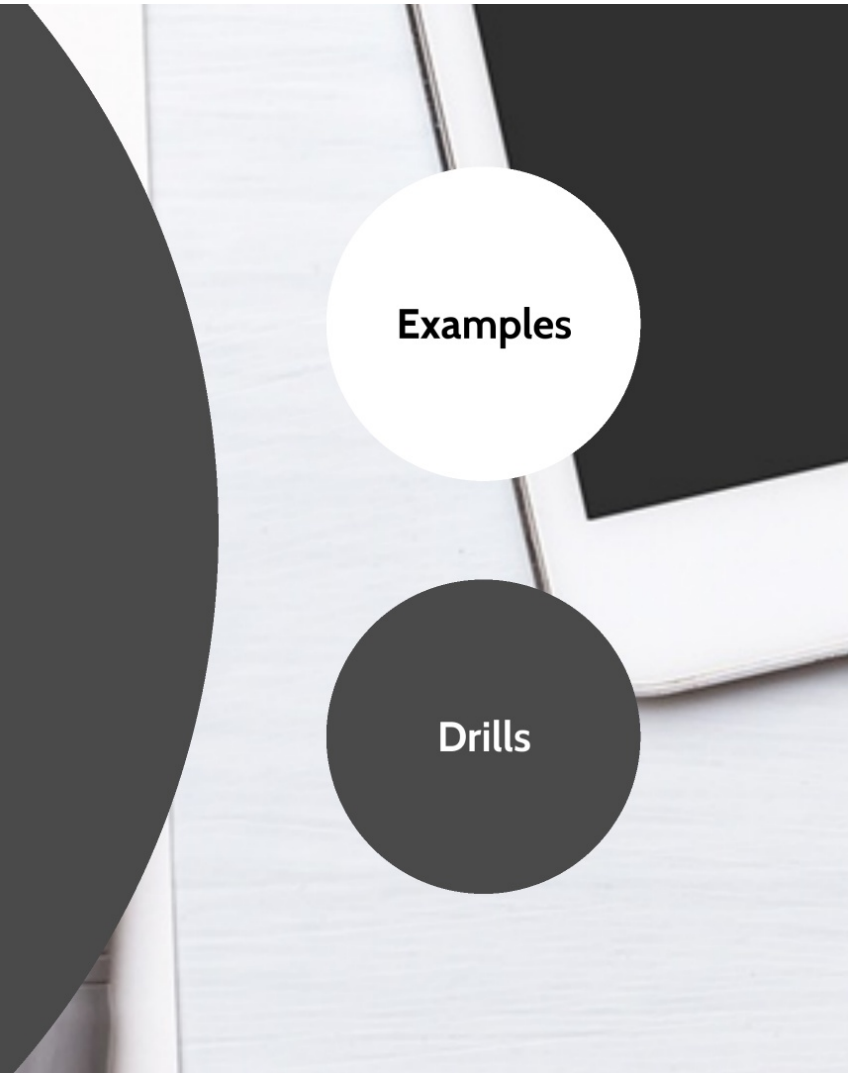
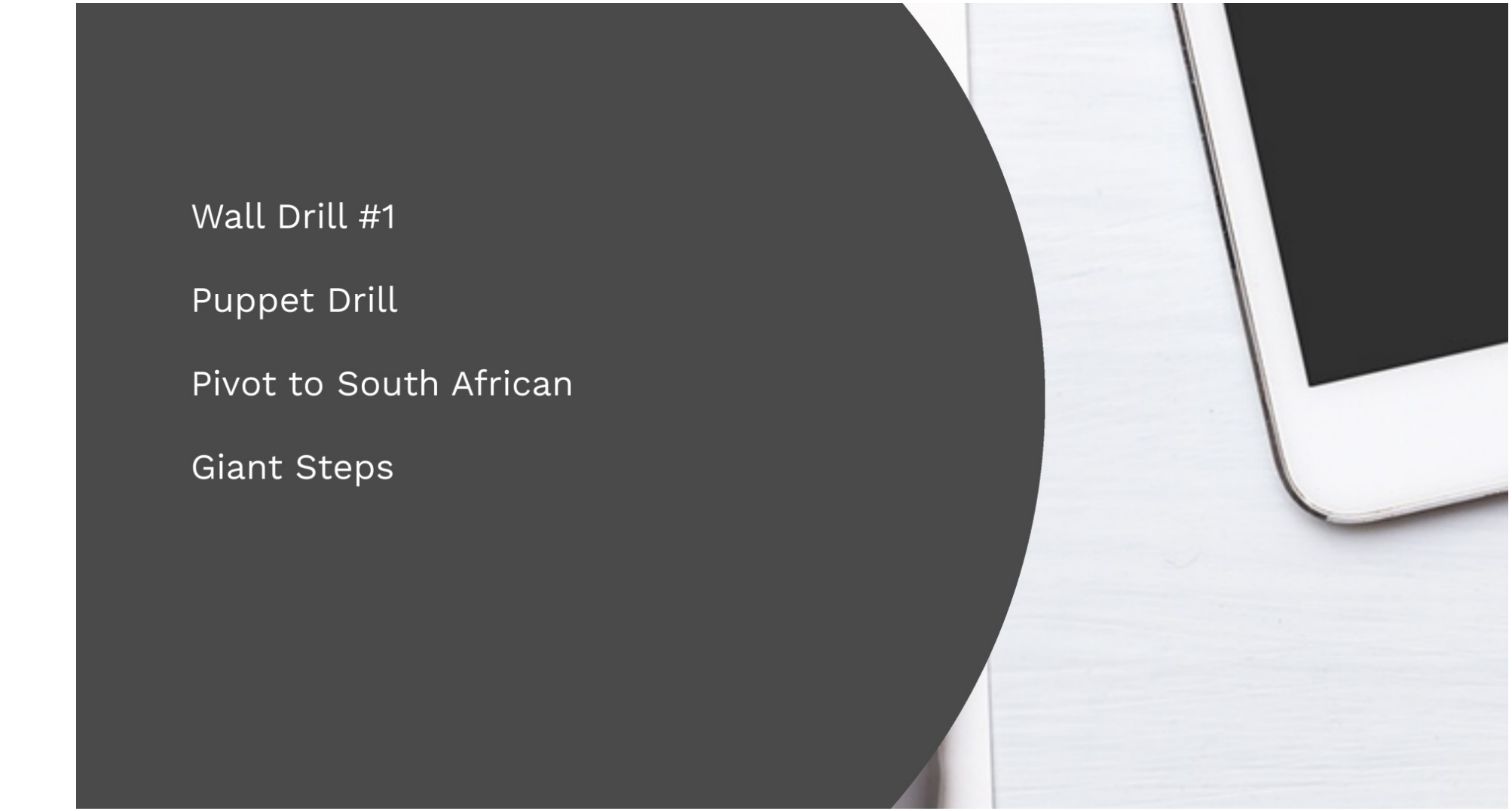


Wall Drill #1

Puppet Drill

Pivot to South African

Giant Steps



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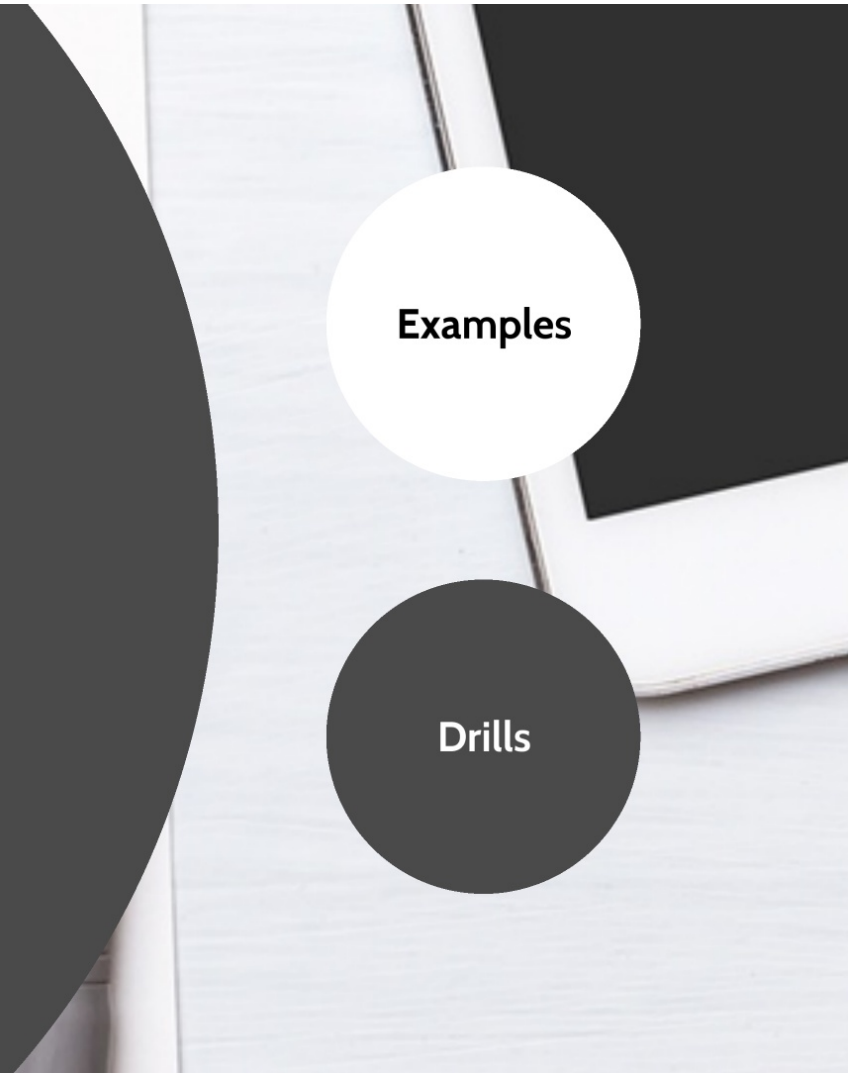

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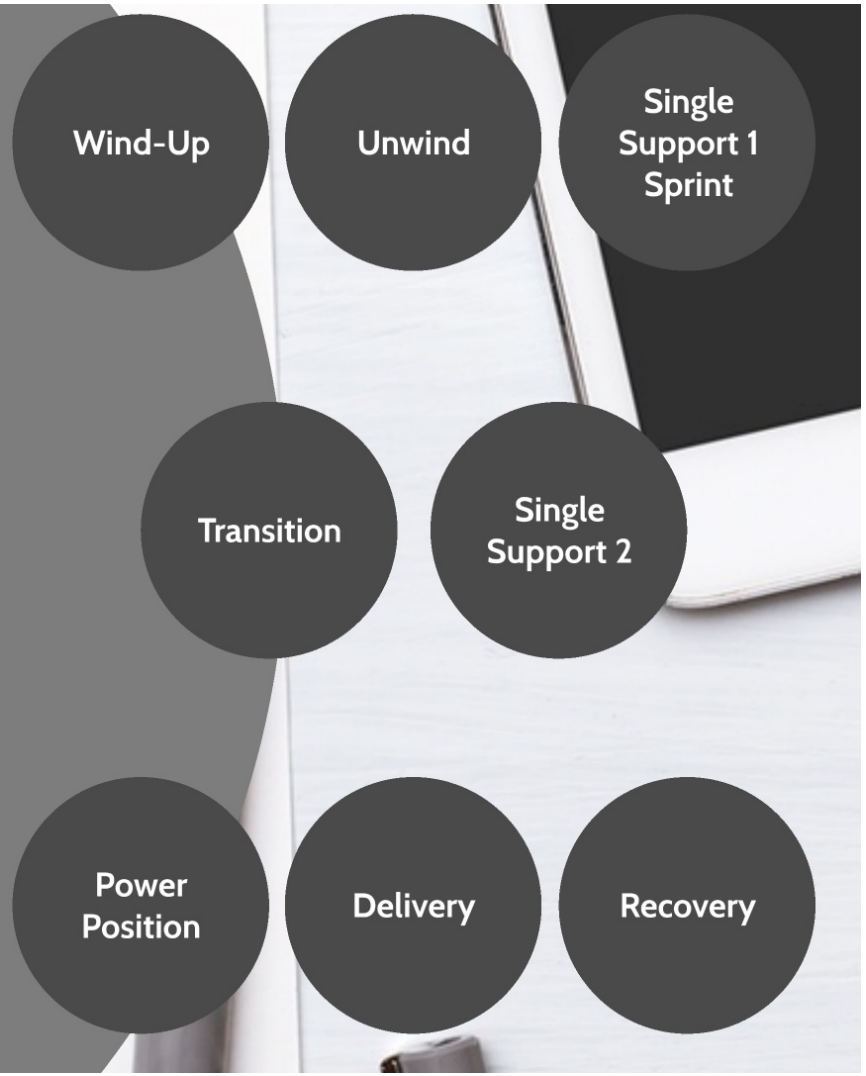


Transition

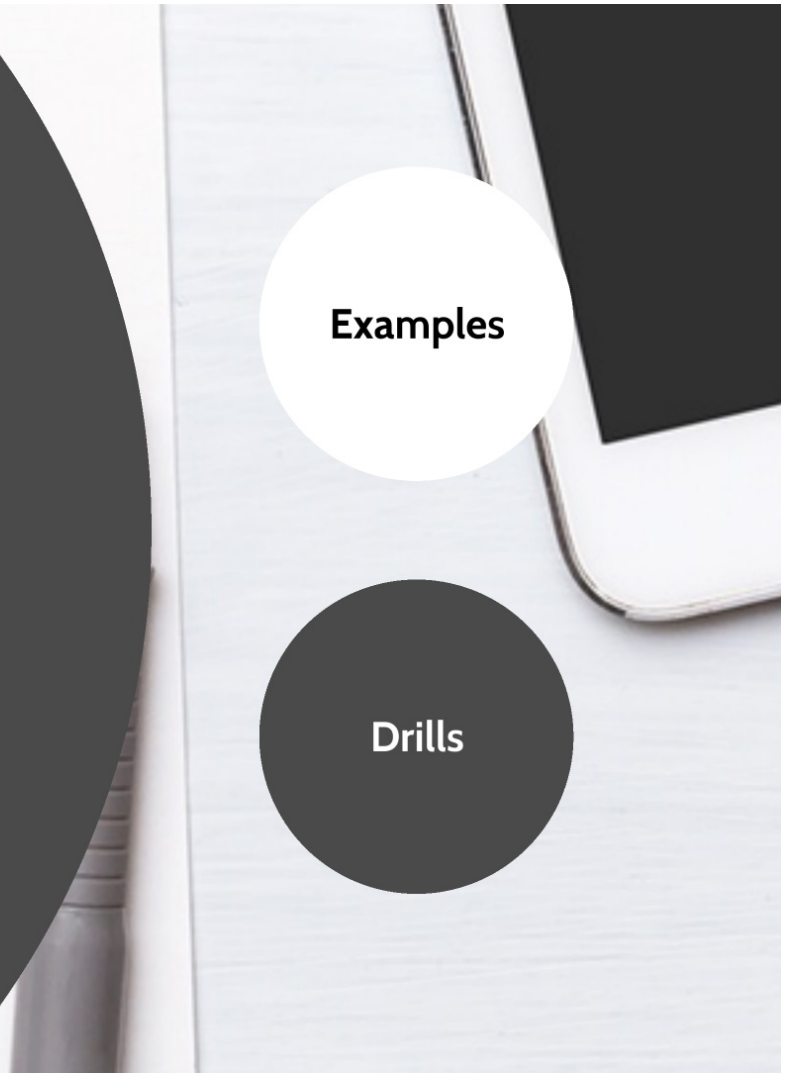
Switches Rotational Axis

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



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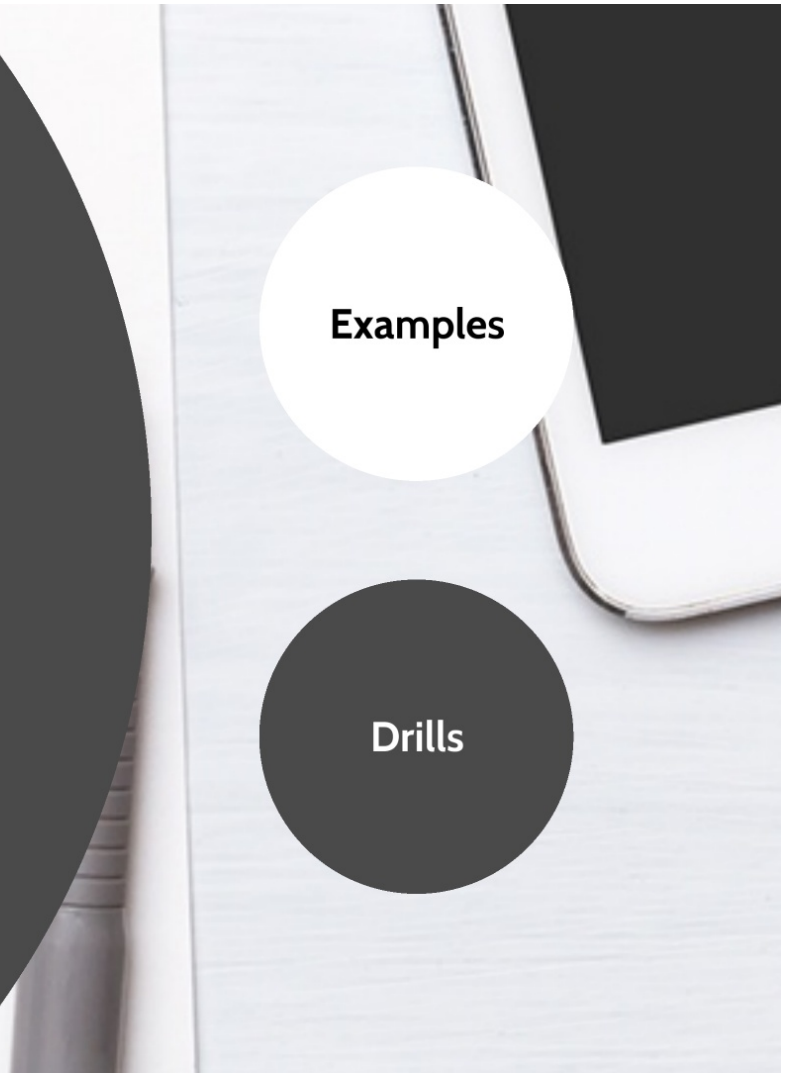

Patty Cake

Transition Drill

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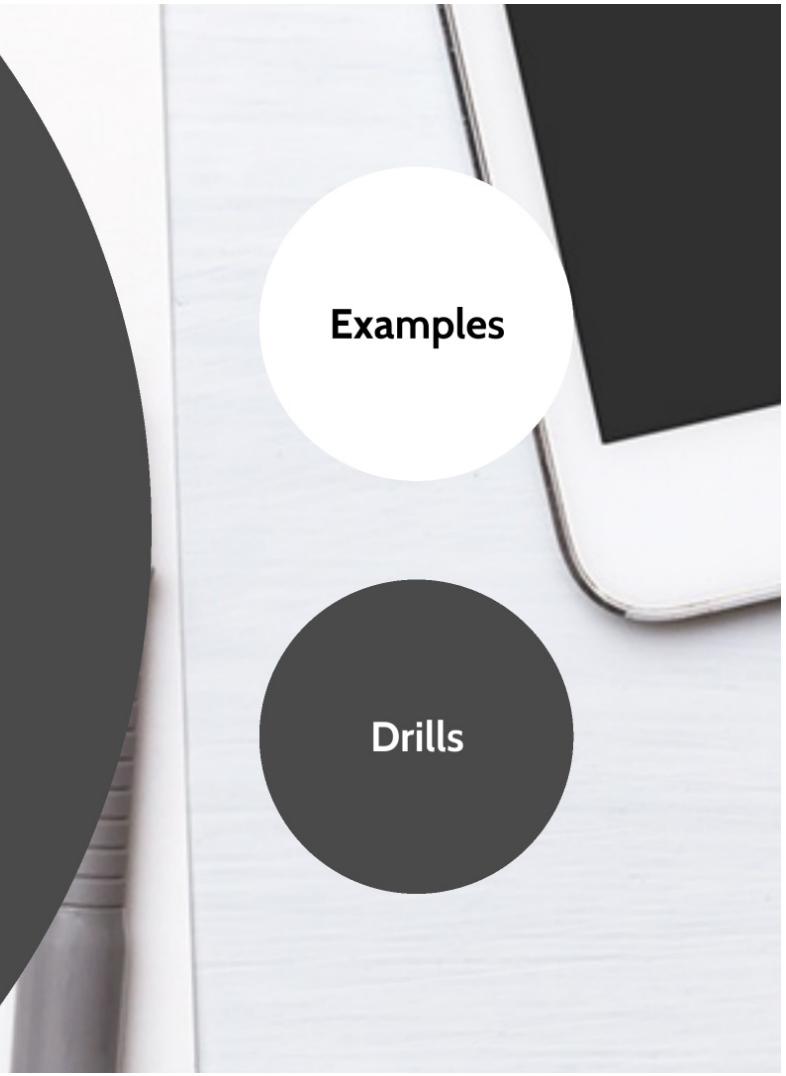

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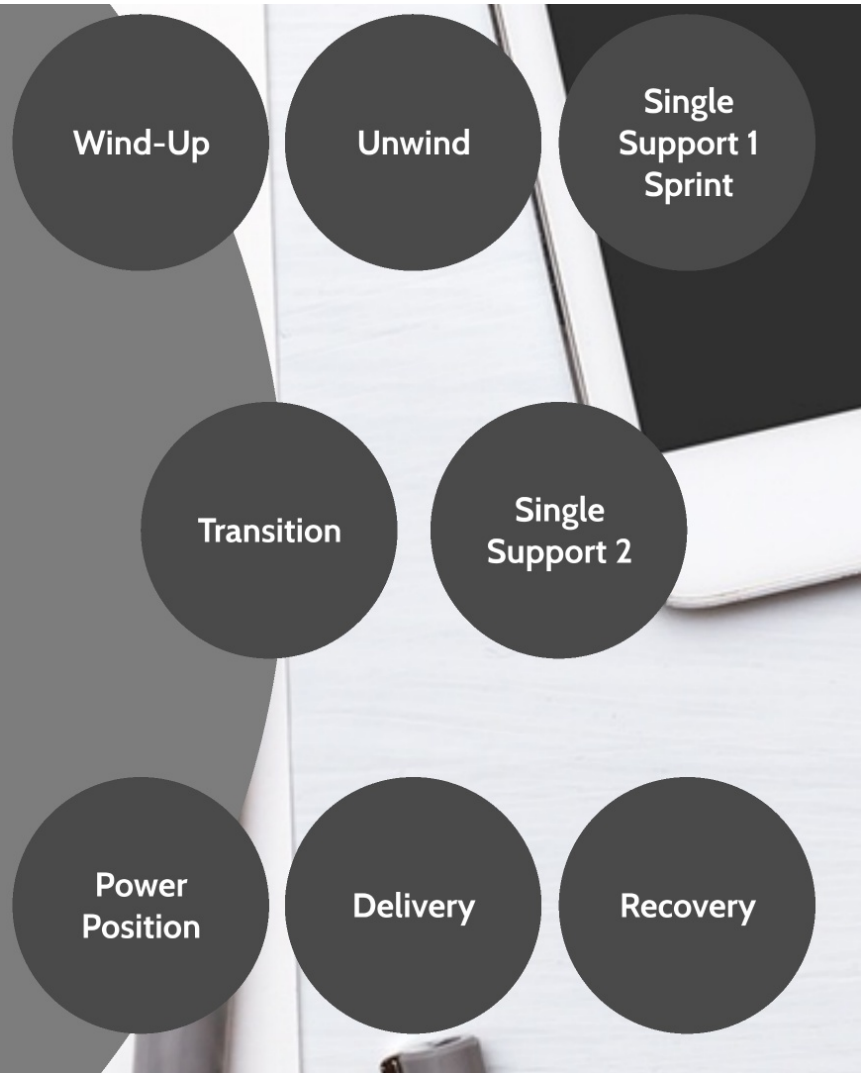


Right Leg Touchdown

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

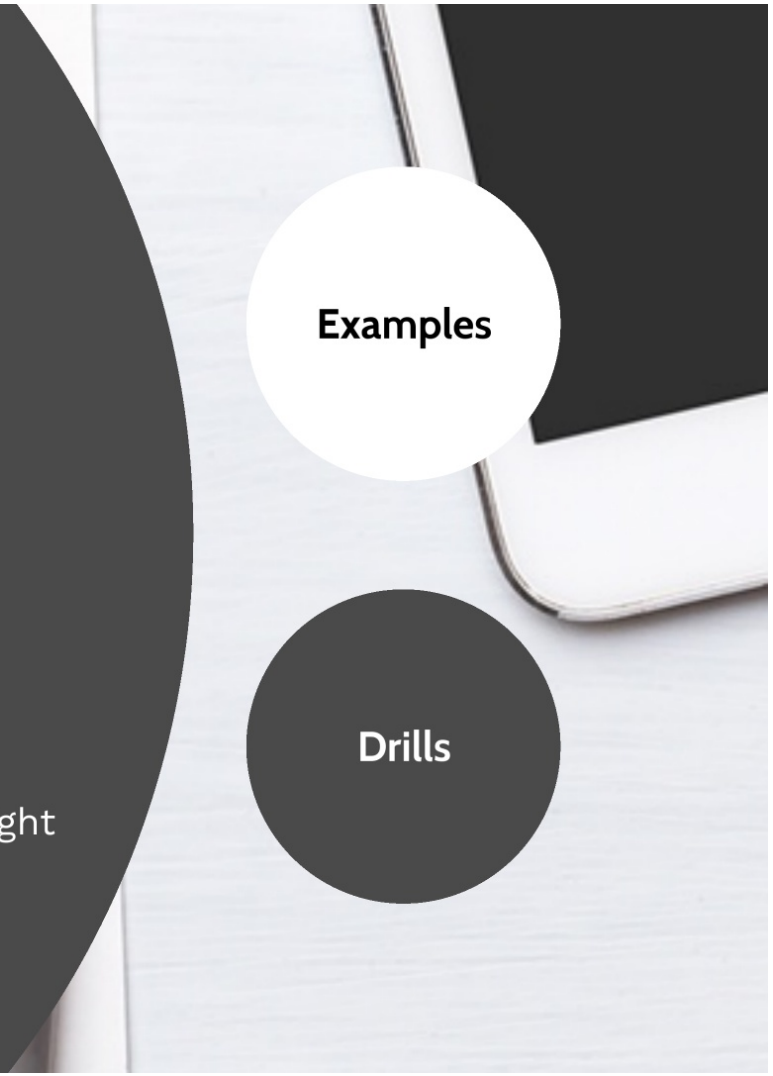
Center of Mass holds on top of Right Leg
- Sternum-Knee-Toe

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



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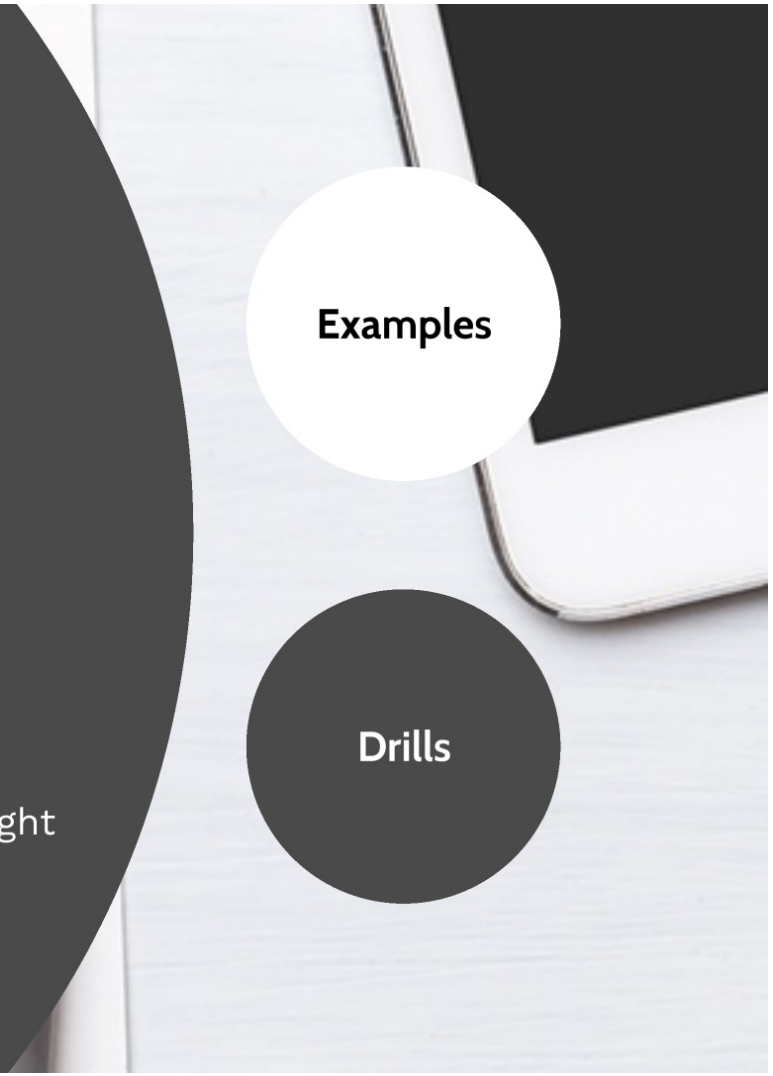
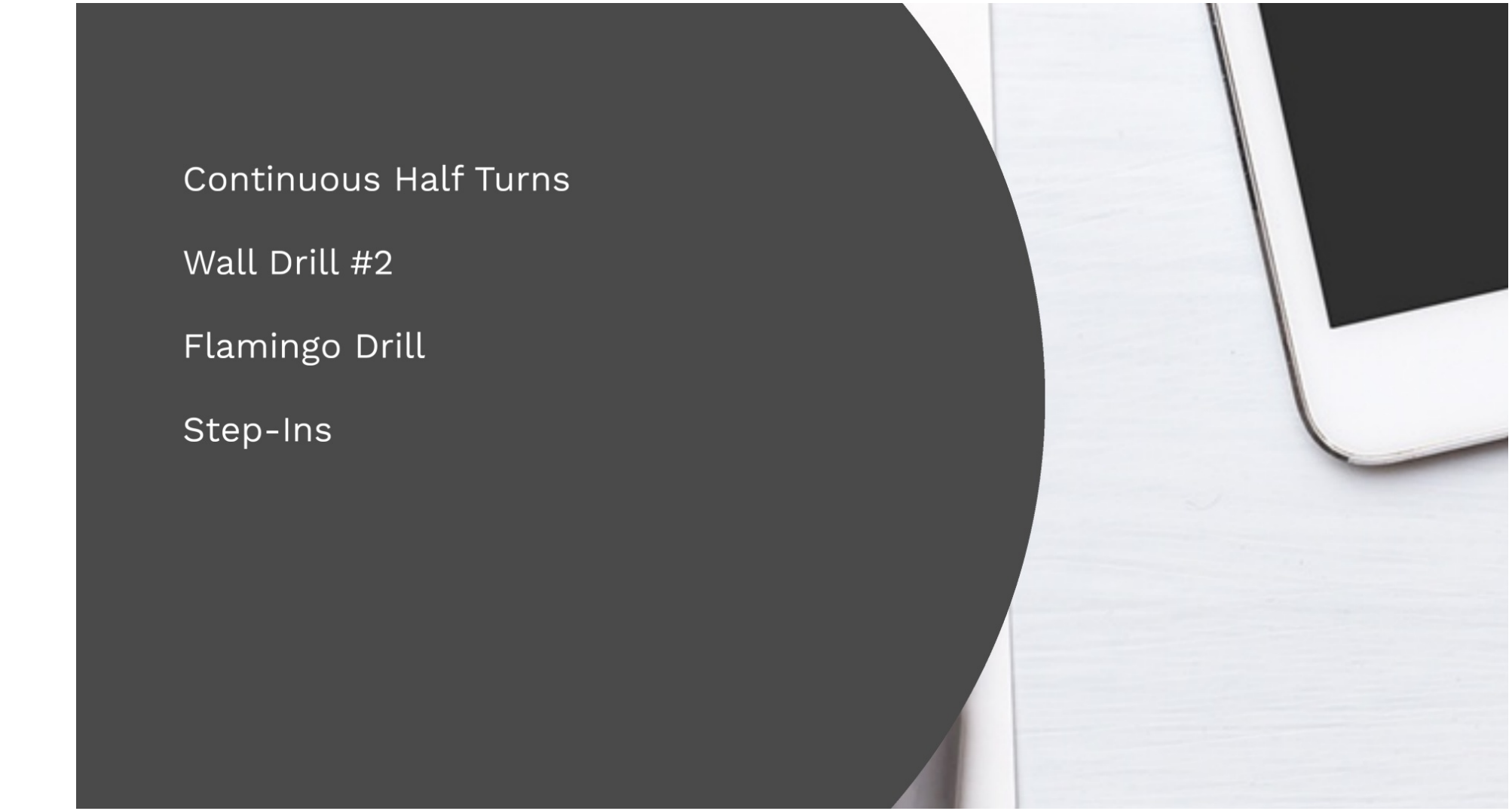


Continuous Half Turns

Wall Drill #2

Flamingo Drill

Step-Ins



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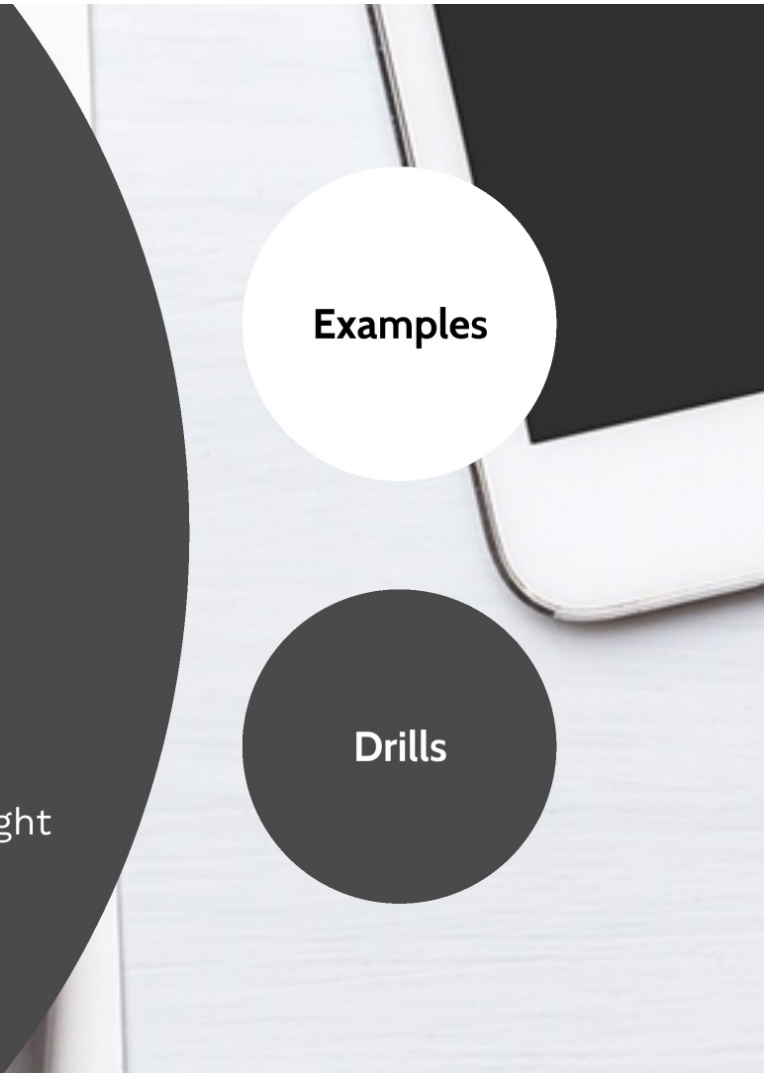

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Positions Create Power

What Shapes do we see?

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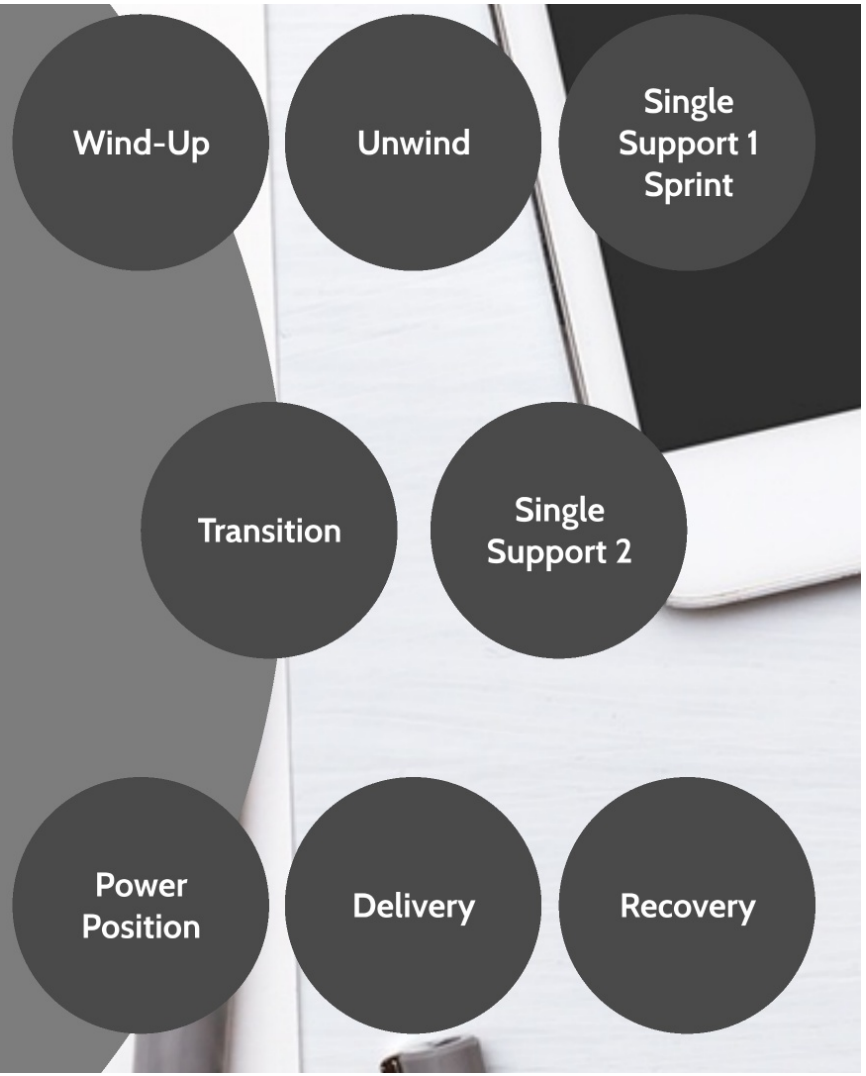
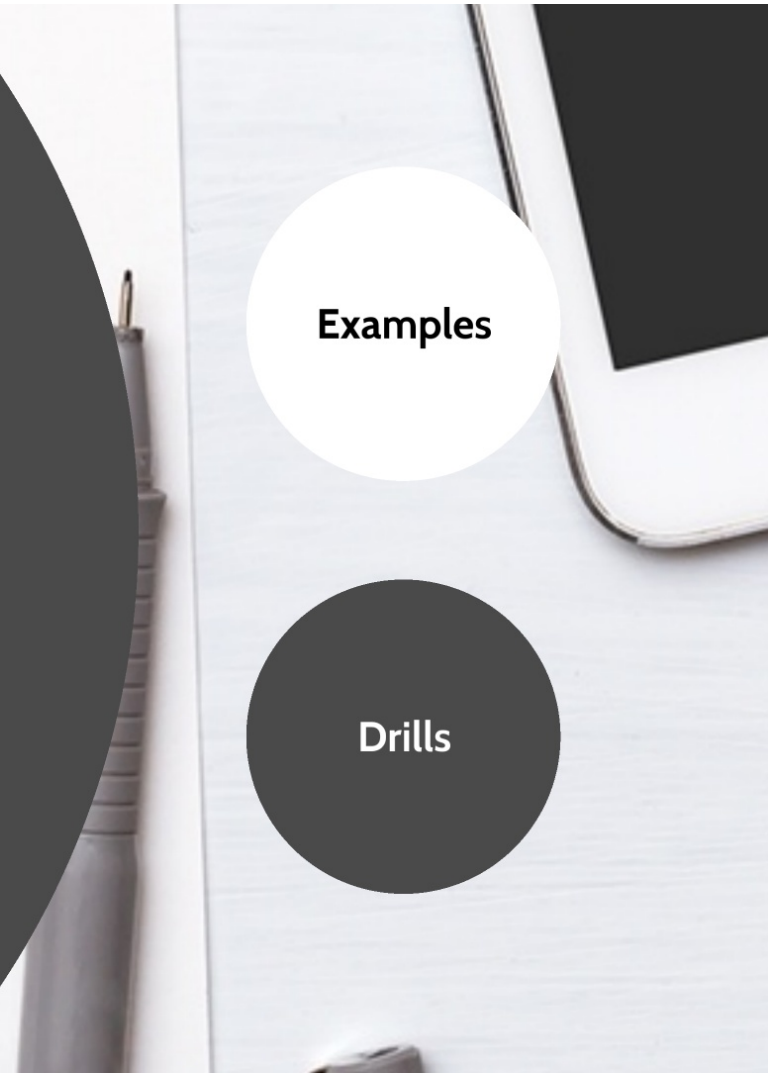


Power Position

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



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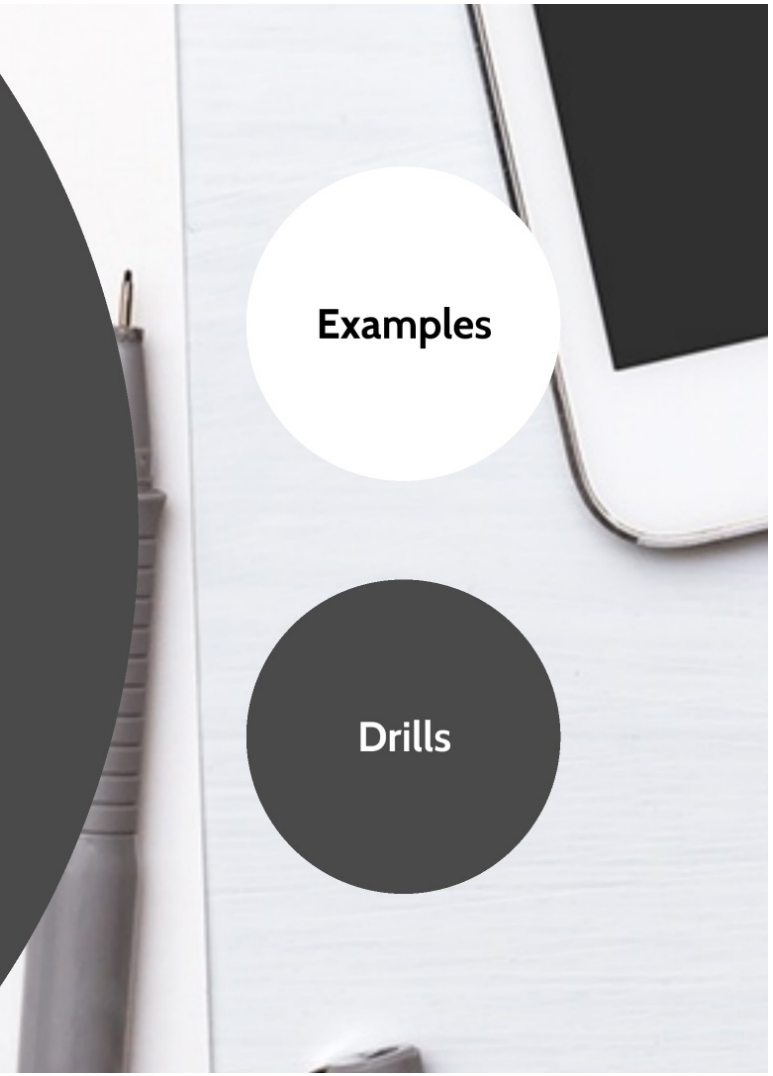

Half Turns

Power Throws

Drop Step Power Position

Walking Stands

MB/Dowel Drills

Power Position

Maintains Rotational Axis
- Pressure down on Right Leg
- POSTURE
- Hips Under

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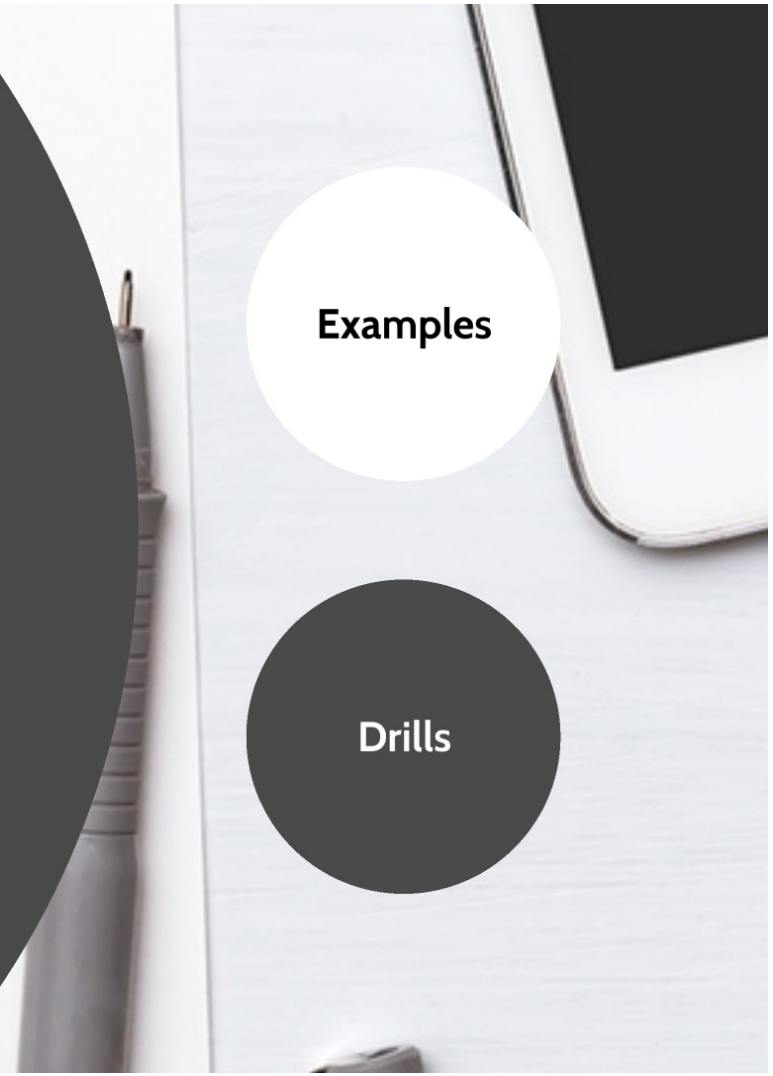

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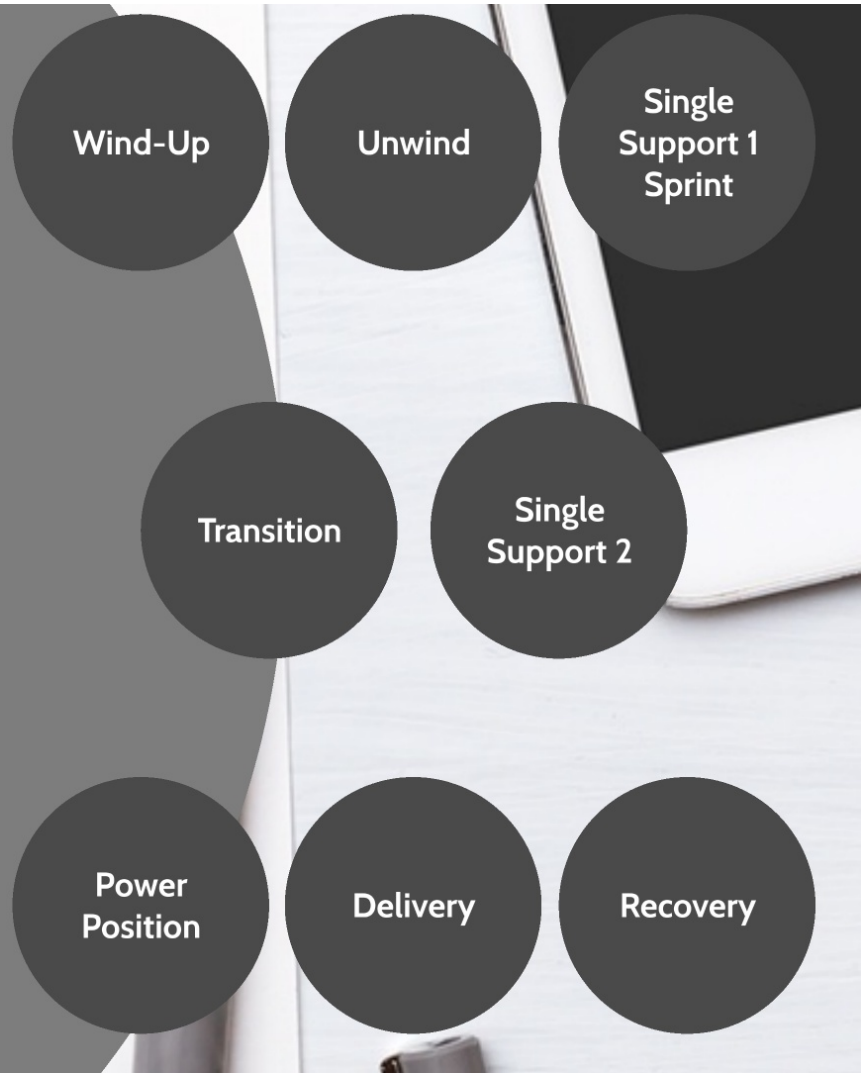


Delivery

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

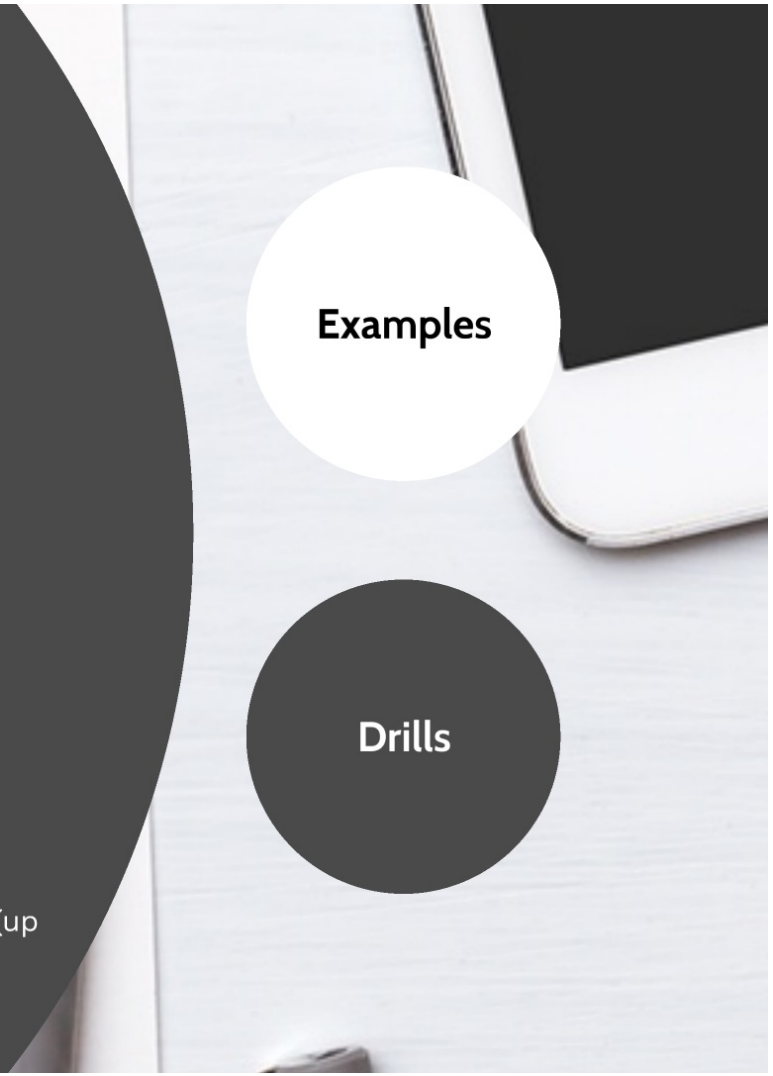
Double Support
- Bent Right leg "Digging" into the ground
- Hold the ground and see the release

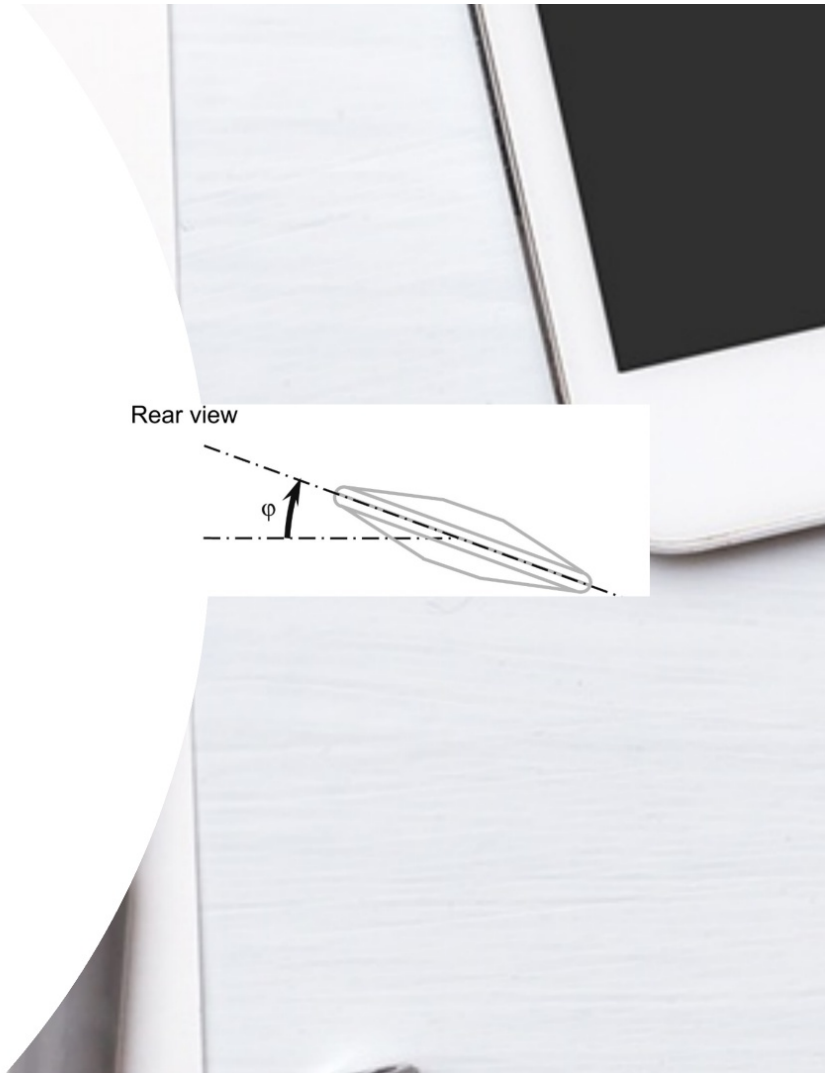
Block Firm
- Left Arm shortens and Left Side Stops
- Keep Left Hip Up

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])




Rear view
φ

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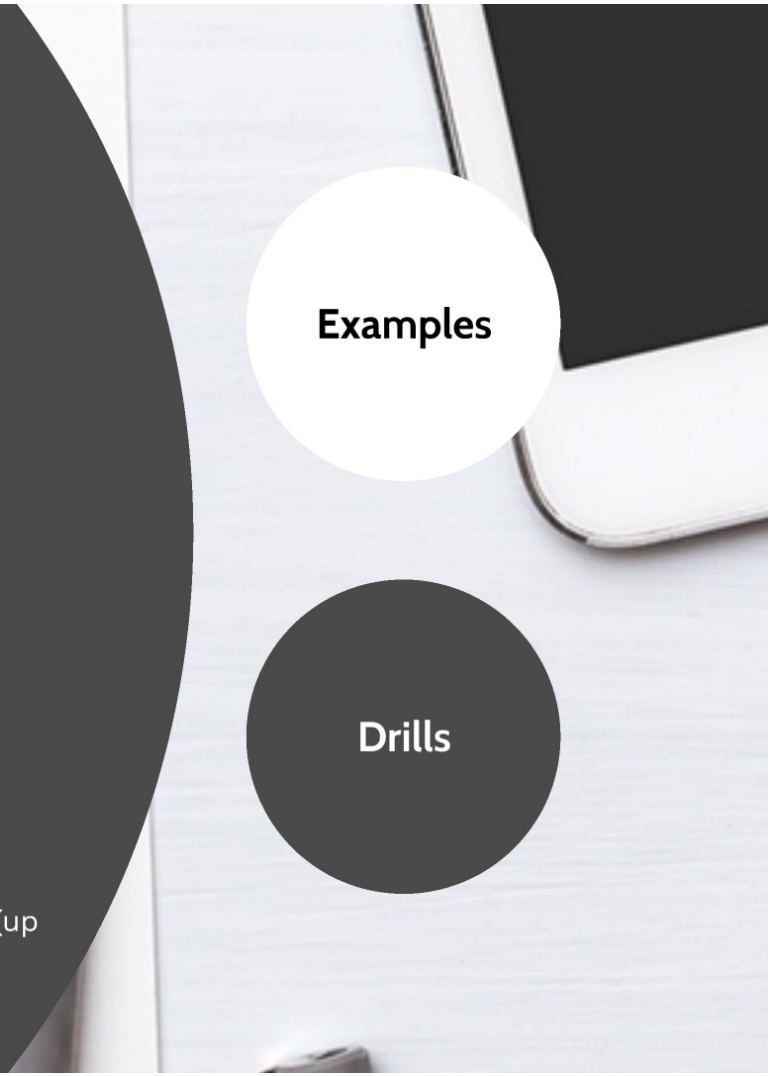

Towel Sweeps

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
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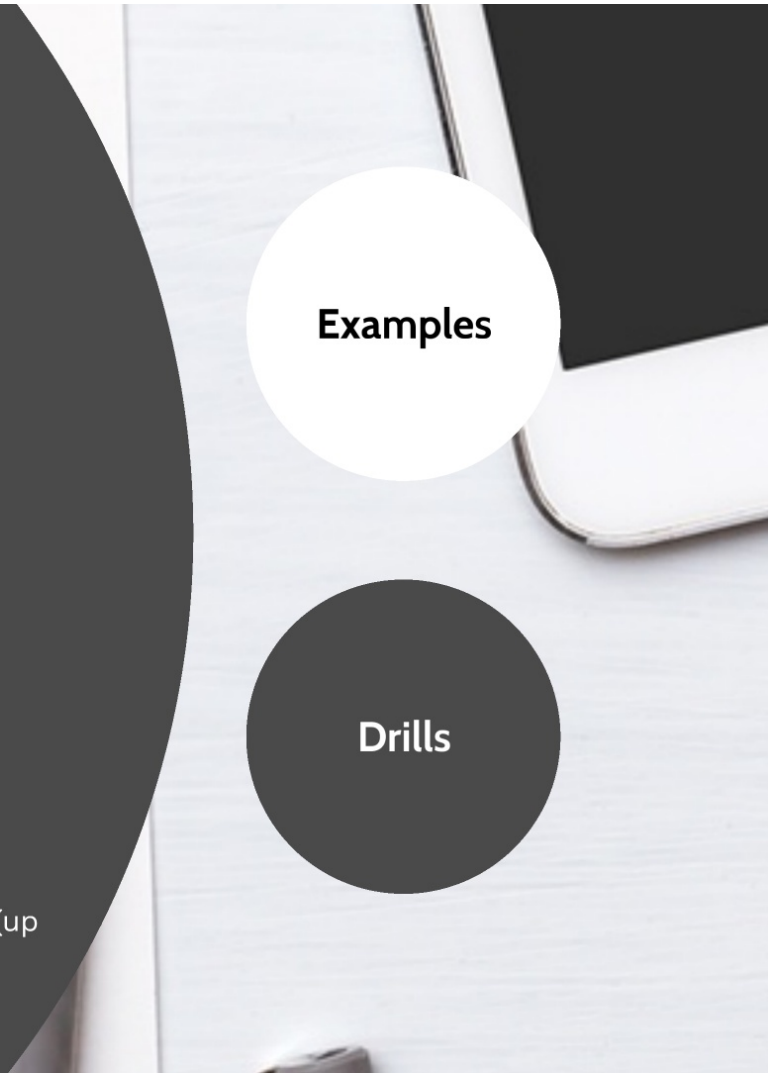

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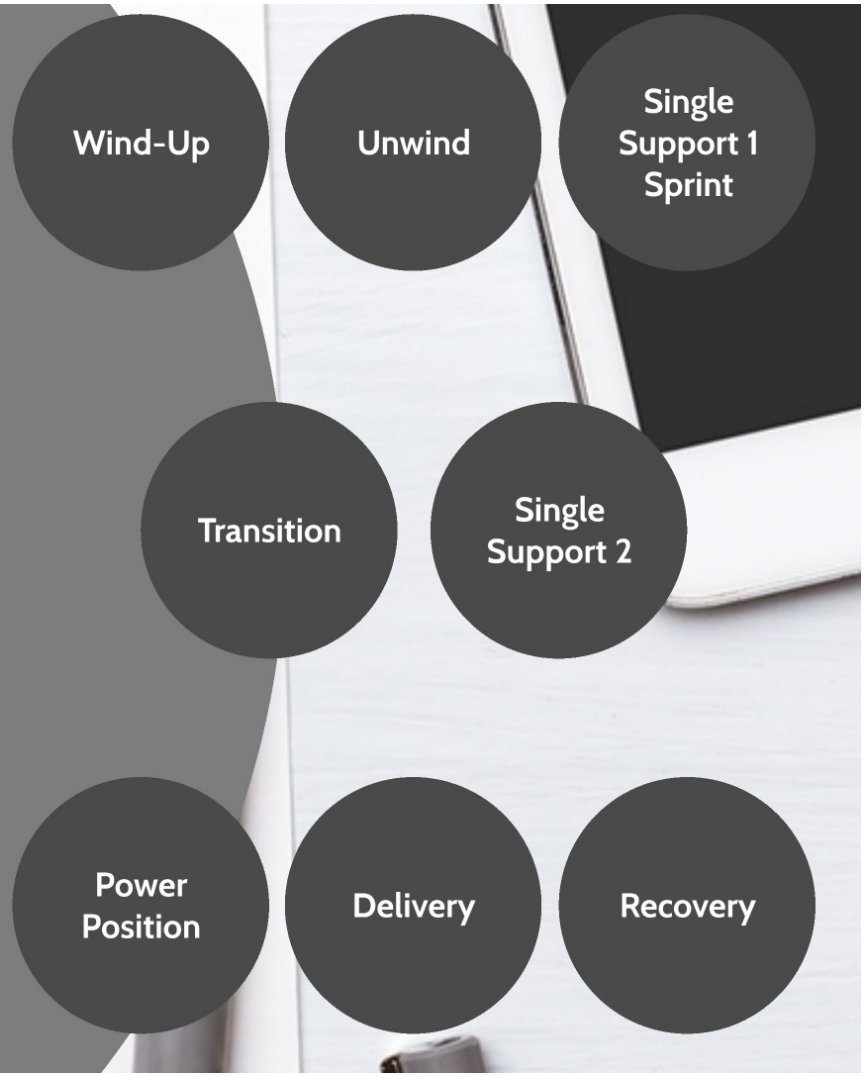


Recovery

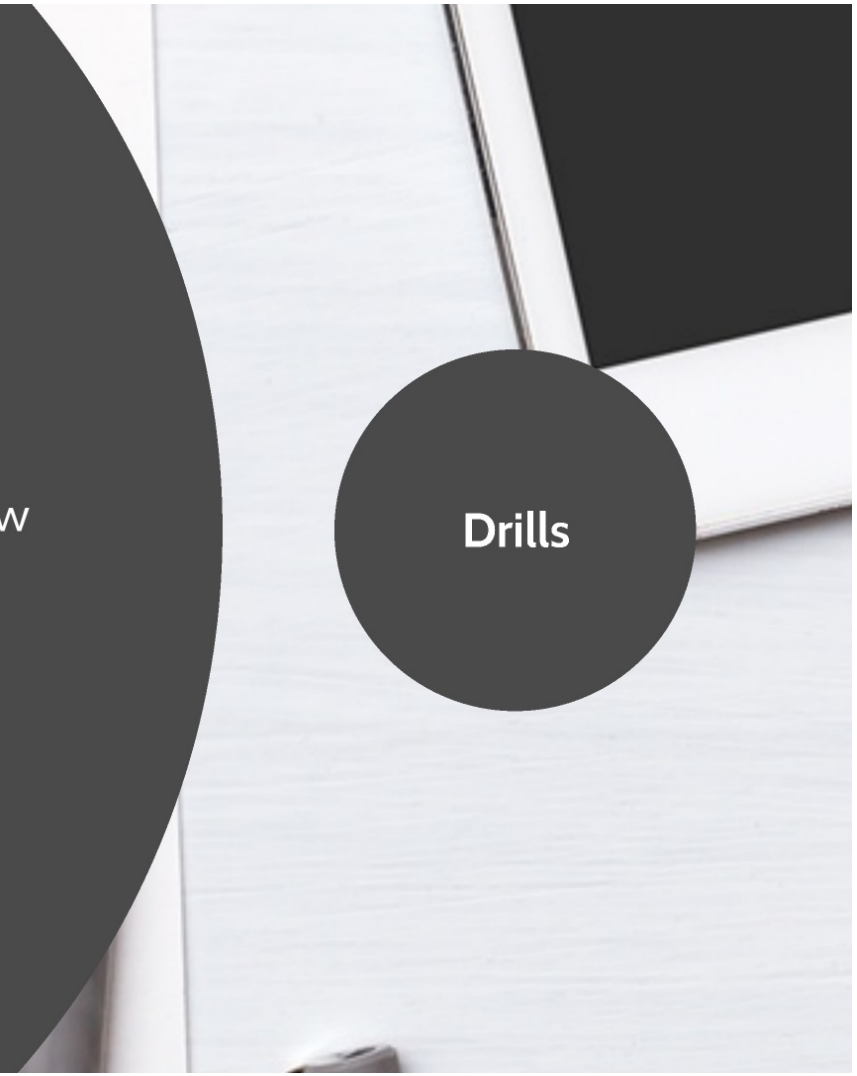
Non Reverse vs. Reverse

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

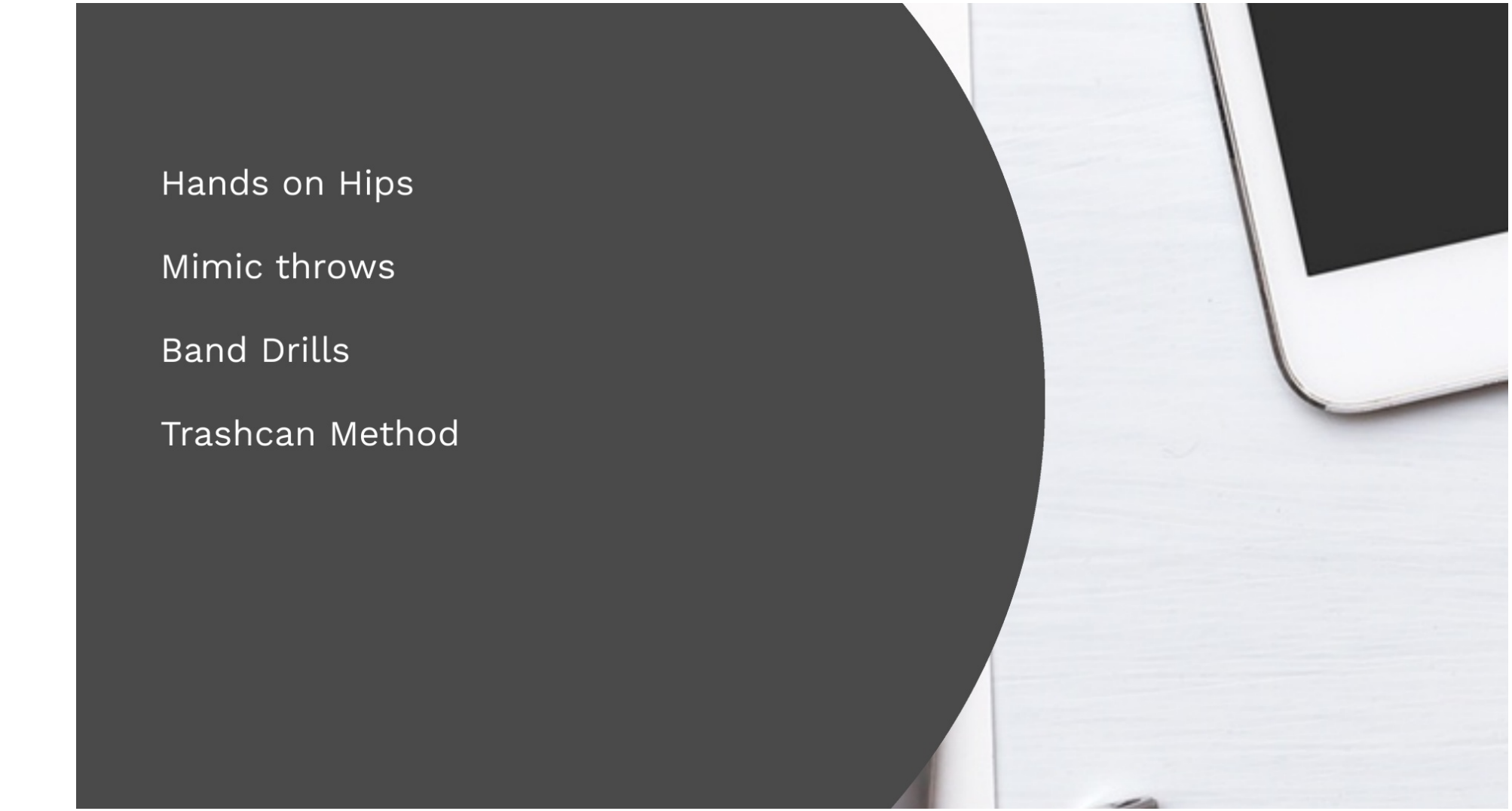


Hands on Hips

Mimic throws

Band Drills

Trashcan Method



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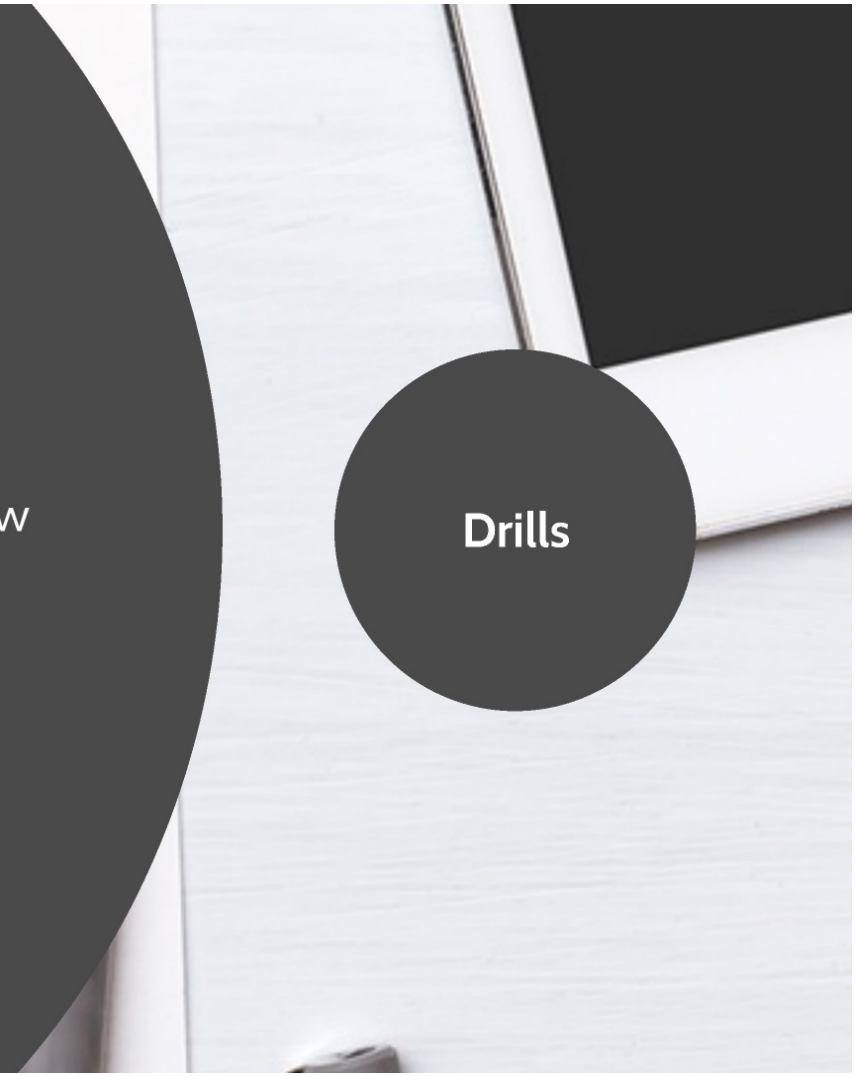

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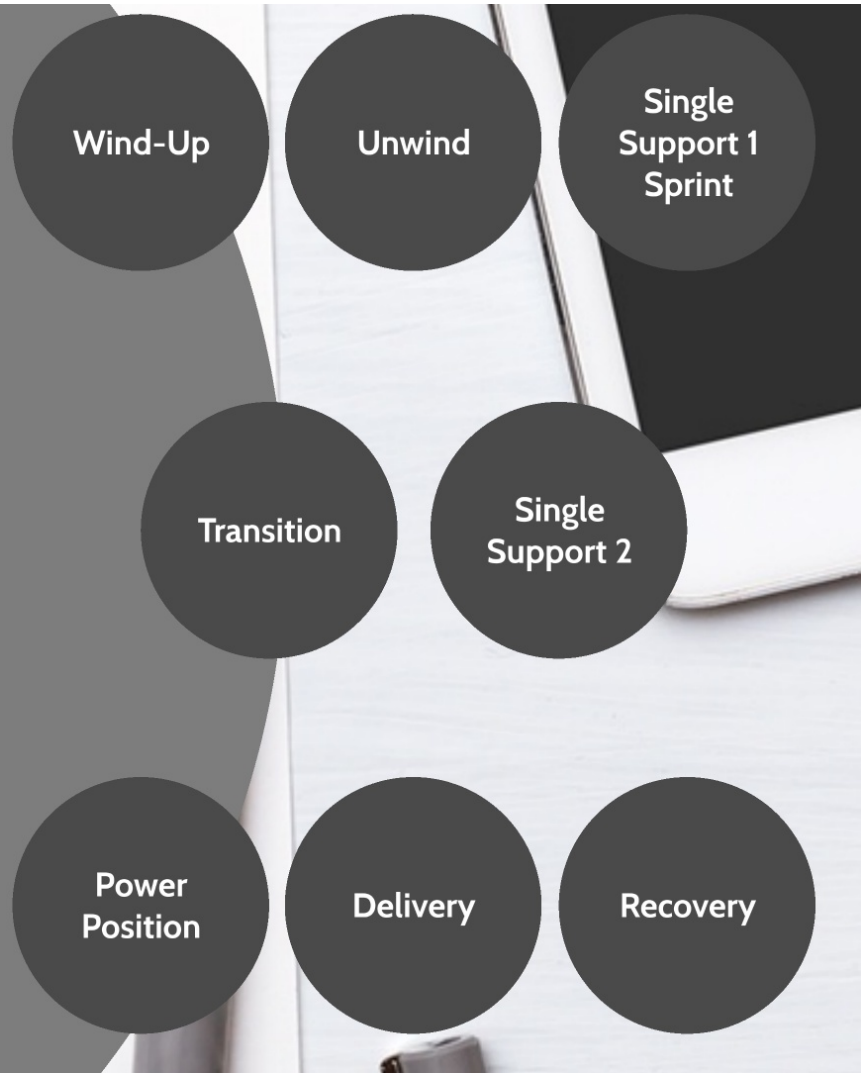
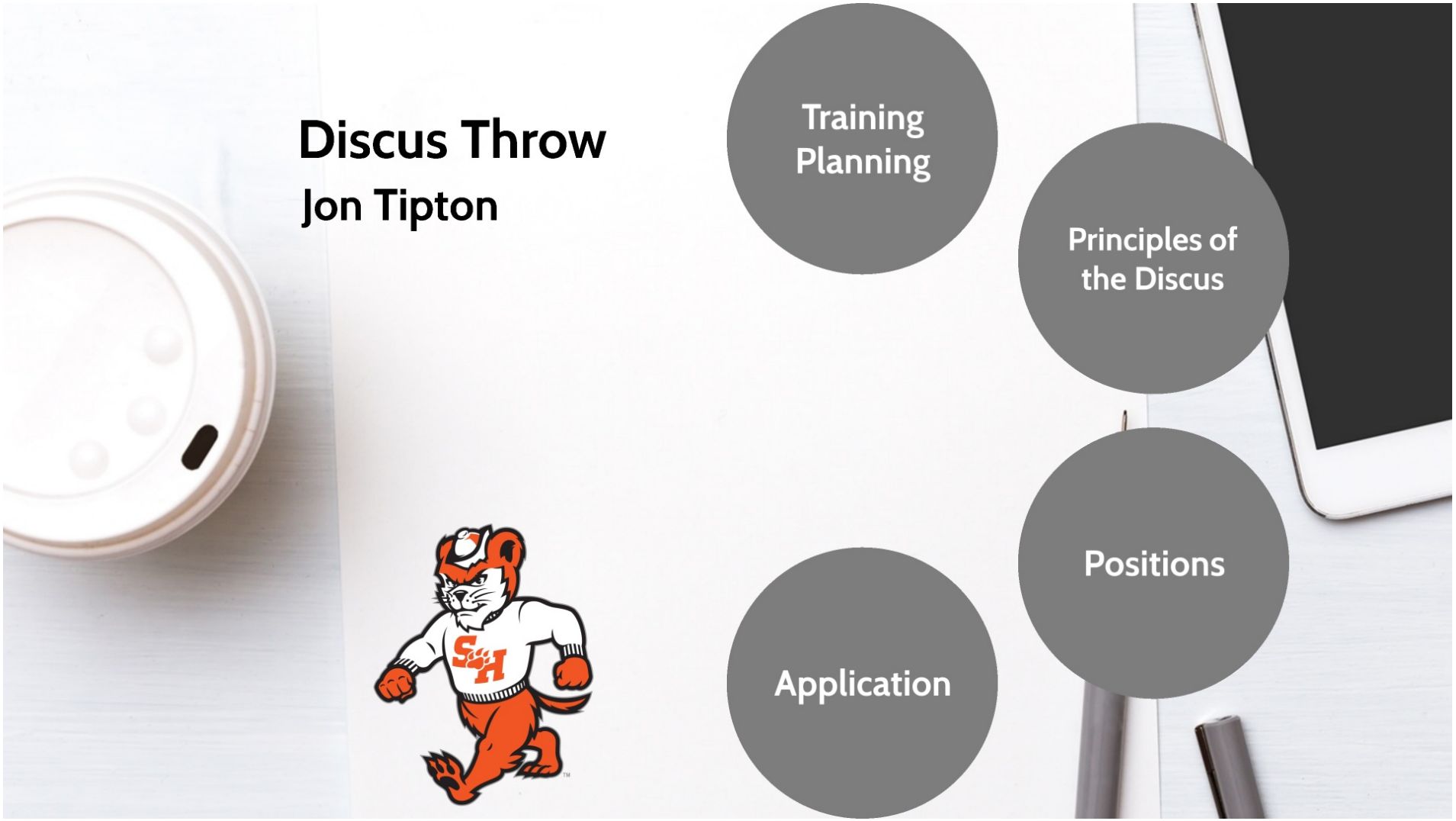


Discus Throw

Jon Tipton



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

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

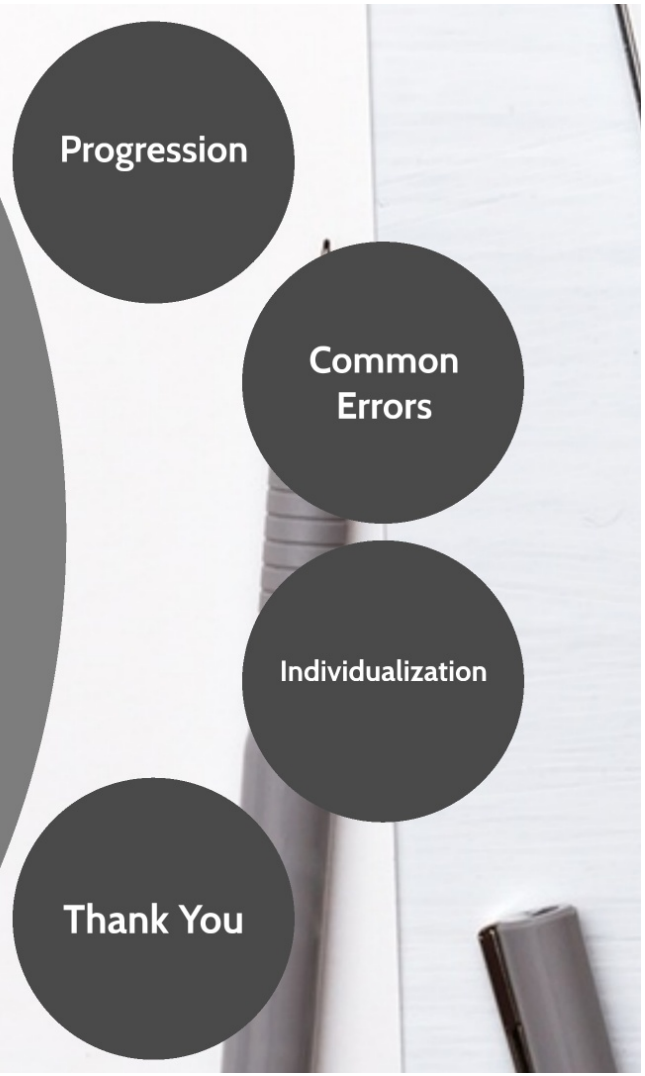
No focus on orbit

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 & Progessions

Application

Observe
Hypothesize
Intervention
Observe

Trial and Error

Discus Throw

Jon Tipton