SCIENCE
OF
SHOOTING
POWERPOINT

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PowerPoint based on the
Science of Shooting books
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Dr. Jim Solum
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13. LOWER BODY FUNDAMENTALS

TWELVE LOWER BODY RULES

1. Point Left Foot, Pivot
2. Right Leg Straight Back
3. Snap-In the Right Foot
4. Rotate Right Hip
5. Vertical Back
6. Crunch the Abs
13. LOWER BODY FUNDAMENTALS

TWELVE LOWER BODY RULES

7. Elevate
8. Elevate, Rotate and Crunch
9. Weight Transfer
10. Balance
11. Left Side Shooting
12. Right Side Shooting
13. LOWER BODY FUNDAMENTALS

1. LEFT FOOT POINT

Shooter’s left foot points at goal to aim the ball.

Right hand does not aim ball.
13. LOWER BODY FUNDAMENTALS

1. LEFT FOOT PIVOT POINT

Shooter’s left foot also acts as a pivot point to rotate the body back and forward.
1. Shooter pivots back to cock the body.
2. Shooter pivots and accelerates forward to shoot.
13. LOWER BODY FUNDAMENTALS

1. LEFT FOOT PIVOT POINT

Demonstration:

Stand on left toes and swing right leg back and forth.
13. LOWER BODY FUNDAMENTALS

2. RIGHT LEG BACK

Right leg straight back and slightly bent in the cocked position.

Right foot is cocked to side to cock right leg/hip.
13. LOWER BODY FUNDAMENTALS

2. RIGHT LEG BACK

Right leg straight back is superior to a vertical right leg: better balance, more power and height.
13. LOWER BODY FUNDAMENTALS

2. RIGHT LEG BACK

Right leg straight back is also called the split leg eggbeater.
13. LOWER BODY FUNDAMENTALS

2. RIGHT LEG BACK

THE SQUARE SHOOTER

A big mistake!

Square-to-the-goal shooter has both legs together.
13. LOWER BODY FUNDAMENTALS

2. RIGHT LEG BACK

THE SQUARE SHOOTER

Feet, hips and shoulders are parallel to the goal.

She can’t rotate body.
13. LOWER BODY FUNDAMENTALS

2. RIGHT LEG BACK

THE SQUARE SHOOTER

She can’t rotate body because left leg is not forward/right leg not back for an angled body
13. LOWER BODY FUNDAMENTALS

2. RIGHT LEG BACK

THE SQUARE SHOOTER

Square shooter falls over when catching the ball.

R. leg is not back for support.
13. LOWER BODY FUNDAMENTALS

2. RIGHT LEG BACK

THE SQUARE SHOOTER

Square shooter falls over because the hips cannot rotate the right arm back or the right leg back for support.
13. LOWER BACK FUNDAMENTALS

HORIZONTAL SHOOTER

Square shooter falls on back, throws a weak shot.
Square shooter falls on back, throws a weak shot.
13. LOWER BODY FUNDAMENTALS

3. SNAP-IN RIGHT FOOT

The right foot shoots the ball.

The split leg eggbeater kick uses a horizontal right leg to produce power for the shot.
13. LOWER BODY FUNDAMENTALS

3. SNAP-IN RIGHT FOOT

The right foot shoots the ball.

The split leg eggbeater kick has the legs widely spaced apart.
13. LOWER BODY FUNDAMENTALS

3. SNAP-IN RIGHT FOOT

The right foot shoots the ball.
Right foot is cocked to the side to cock the hips, torso, right arm.
13. LOWER BODY FUNDAMENTALS

3. SNAP-IN RIGHT FOOT

The right foot shoots the ball.

A scissor kick is not used as the finishing kick.
13. LOWER BODY FUNDAMENTALS

3. SNAP-IN RIGHT FOOT

The right foot shoots the ball.

The finishing kick or final kick is the kick that starts the shot.
13. LOWER BODY FUNDAMENTALS

3. SNAP-IN RIGHT FOOT

The combination of the left foot forward, the right leg straight back and slightly bent at the knee with the leg high and horizontal in the water creates a new leg and foot position.
3. SNAP-IN RIGHT FOOT

With shooter’s leg horizontal with the surface of the water the right foot can snap inward for greater power.

Scissor kick is weaker & unnecessary.
4. The Right Hip Rotates

- HIPS ROTATE BACK
- COCKED

- HIPS ROTATE FORWARD
- SHOT
1. Shooter rotates back to cock body.
2. Shooter accelerates forward to shoot the ball.
13. LOWER BODY FUNDAMENTALS

4. RIGHT HIP ROTATES

Hip rotation is the major force in throwing.

No hip rotation = no shot.
13. LOWER BODY FUNDAMENTALS

4. RIGHT HIP ROTATES

When body is angled with the left foot forward and the right leg straight back hip rotation can occur.
13. LOWER BODY FUNDAMENTALS

4. RIGHT HIP ROTATES

Both hips rotate to cock the ball and shoot the ball.
Shooter can only feel the right hip move.
13. LOWER BODY FUNDAMENTALS

4. RIGHT HIP ROTATES

Hungarians state the “Right Hip is Supreme.”

What this means is that hip rotation is the major motion in throwing.
13. LOWER BODY FUNDAMENTALS

4. RIGHT HIP ROTATES

Hungarians state the “Right Hip is Supreme.”

Hip rotation is the shot.
13. LOWER BODY FUNDAMENTALS

4. RIGHT HIP ROTATES

Hungarians state the “Right Hip is Supreme.”

The lower body, hips, make rotational acceleration.

The upper body, torso and right arm make linear acceleration by flexion and extension motions.
13. LOWER BODY FUNDAMENTALS

4. RIGHT HIP ROTATES

Shooter’s hips rotate to cock the ball and to shoot the ball.
13. LOWER BODY FUNDAMENTALS

4. RIGHT HIP ROTATES

Shooter’s hips rotate back to cock the ball.
13. LOWER BODY FUNDAMENTALS

4. RIGHT HIP ROTATES

Shooter’s hips rotate forward to throw the ball.
13. LOWER BODY FUNDAMENTALS

4. RIGHT HIP ROTATES

Shooter’s hips rotate forward to throw the ball.
13. LOWER BODY FUNDAMENTALS

4. RIGHT HIP ROTATES

The aware shooter can feel the right hip rotate during the cocking and throwing stages.
13. LOWER BODY FUNDAMENTALS

4. RIGHT HIP ROTATES

Numb shooters cannot feel the right hip.

Great shooters feel the right hip.
13. LOWER BODY

5. VERTICAL BACK

Strong legs keep shooter’s back vertical.

Strong leg positioning also keeps the shooter’s back vertical.
Water Polo demands a vertical back with a strong leg kick.
Verticallity
Strong legs and the correct leg positioning.
Verticality

Legs are strong to support the shooter.
Verticality

Legs are split wide to balance the shooter.
Verticality

Both are necessary to have a vertical back.
13. LOWER BODY DRILLS

LEG DRILLS

5 LEG DIRECTIONS
1. Vertical
2. Horizontal
3. Lateral
4. Backward
5. Forward

3 LEG SPEEDS
1. Slow
2. Medium
3. Quick

3 INTENSITY
Low, medium, high
## 13. LOWER BODY DRILLS

<table>
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<tr>
<th>Dry Land Drills</th>
<th>In-The-Water Drills</th>
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<tr>
<td>Jump Rope</td>
<td>Combined Tubing/Ball Eggs.</td>
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13. LOWER BODY DRILLS

The basketball coach has the player run 3 miles for cardio and then do slowly slam-dunk baskets.

Explosive quick movements requires quickness training.

Water polo shooting also demands quickness.

Train quick, be quick for a quick powerful shot.
13. LOWER BODY DRILLS

DRILL THEORY

A third of the drills are high intensity, high strength drills. A low intensity eggbeater workout: eggbeater 4 laps with a light ball. Ok if quickness drills are done later to duplicate the actual speed of shooting. Swims: 100’s, 75’s, 50’s and 25’s sprints.

Train quick, be quick.
13. LOWER BODY DRILLS

LEG DRILLS

Player’s legs and hips are strong, quick and flexible. Player has good vertical elevation, lateral movement to the right and left and backward motion.

Legs and hips of the player move from horizontal to the vertical to intercept a pass or shoot a R.B. shot (a horizontal to vertical shot dry wrist shot).
13. LOWER BODY DRILLS

LEG DRILLS

Player learns to move from an offensive vertical leg position to horizontal position after the ball is shot.

In addition, the player on offense has to quickly change directions from north to south when the ball changes hands.
13. LOWER BODY DRILLS

LEG STRENGTH DRILLS

Player must have leg strength, leg speed and leg movement.

Drills to strengthen the legs and hips fall into dry land drills using tubing, weights and medicine balls and in-the-water drills.
13. LOWER BODY DRILLS

WARM UP LEG DRILLS

Players need to warm up their legs before performing high intensity/high speed drills.

Players flutter kick for 100 meters with the hands out front. Switch to breaststroke for 200-meters. Finish: 8 low intensity eggbeater laps.
13. LOWER BODY DRILLS

10 WEIGHTLIFTING LEG AND HIP DRILLS

1. Lunges without weight
2. Lunges with 2 dumbbells
3. Squats
4. Power Cleans (barbell on floor lift to chest)
5. Leg Press
6. Squat jumps with dumbbells
13. LOWER BODY DRILLS

WEIGHTLIFTING

7. Hamstring curls on stomach use Universal Gym.
8. Quadriceps extensions sit on bench Universal Gym.
9. Stand next to Universal Gym, elbow in, grip pulley handle and rotate body forward. A hip builder.
10. Exercise arm/shoulder rotate arm by keeping body motionless. An arm builder.
13. LOWER BODY DRILLS

8. MEDICINE BALL TRAINING

Hip and torso rotation is the most important movement in throwing. Legs turn to right and left due to hip rotation.

Demo: stand with hands on hips and try to turn the right foot out or in without moving the hips. Nothing. Eggbeater kick is hip rotation.
13. LOWER BODY DRILLS

MEDICINE BALL TRAINING

Core muscles, the abs and low back, are weak in water polo players. These are important muscles that snap the torso forward and stabilize it.

Abdominal muscles flex torso forward and are strengthened by med ball throws. Back extensors (straighten the back) are also helped by med balls.
13. LOWER BODY DRILLS

MEDICINE BALL TRAINING

1. Med ball sit up throws. Ab muscles strengthened. The player holds the ball and throws the ball to a partner when lifting up. This type of sit up builds strength, quickness and movement.

2. Standing med ball slams. Stand on a bench and slam the ball into the deck and have it bounce back. Great for explosive movement.
13. LOWER BODY DRILLS

MEDICINE BALL TRAINING

3. Standing med ball hip rotation. Use very heavy ball, hold to chest, and rotate to the left and right 30x.

4. Side to side med ball. Use a 4-9 lb. ball toss the ball from side to side. Get on knees, isolates the torso muscles, and throw the ball side to side 20x.

13. LOWER BODY DRILLS

MEDICINE BALL TRAINING

7. Med ball jumps. Jump up and toss 2-hand pass to partner.
8. Lie on back lift. Partner places heavy med ball in outstretched hands, lower and lift up.
13. LOWER BODY FUNDAMENTALS

**SUMMARY**

1. The legs throw the ball.
2. The legs are the shot.
3. The left foot pivots and points.
4. All throwing mistakes are leg mistakes.
13. LOWER BODY FUNDAMENTALS

SUMMARY CONTINUED

5. The legs create aim, accuracy, angularity (angled body), verticality and velocity to the shooter’s shot.

6. The lower body is composed of the legs and hips. The legs elevate, hips rotate the shooter’s body.
13. LOWER BODY Q & A

1. The left foot aims the ball.
   True
   False

2. The right hand aims the ball.
   True
   False

3. The legs and hips are the shot.
   True
   False

4. Aim, accuracy, angularity, velocity and verticality come from the shooter’s legs.
   True
   False
13. LOWER BODY Q & A

5. The lower body is the legs and hips.
   - True
   - False

6. The hips throw the ball.
   - True
   - False
13. LOWER BODY Q & A

ANSWERS

1. True
2. False
3. True
4. True
5. True
6. True
13. LOWER BODY Q & A

ANSWERS

1. T    Left foot aims the ball. Right hand follows left foot.
2. F    Right hand releases the ball but does not aim it.
3. T    Most of the power and all accuracy is the lower body.
4. T    Almost everything comes from the legs.
5. T    Anatomically the lower body is the legs and hips.
6. T    (Hips provide the rotation to throw the ball.)
13. LOWER BODY SHOOTING

End of Part II