Bridging the Gap between Rehabilitation and Performance in the Throwing Athlete

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Objectives:

1) Review the phases of throwing related to baseball as well as the windmill pitch in softball.
2) Demonstrate appropriate upper quarter progressions related to throwing.
3) Increase understanding of lower body hip engagement, stability, and dynamic control in the throwing athlete.
4) Discuss appropriate implementation of weighted balls during end phase rehab progressions.
5) Demonstrate throwing drills related to baseball and softball that can be performed in the clinic.

1. Phases of Throwing
Wind-Up
- Initiation of the throwing motion with transfer of weight to dominant leg
- Concentric activation of the rectus femoris, iliopsoas, sartorius, and pectineus flex lead leg hip
- Shoulders and hips lined perpendicular to the throw
- Quad and glut med activation is high to allow for level pelvis and stance knee flexion control

Stride
- Stance leg hip flexors eccentrically contract, beginning to move momentum towards home plate
- Glut med (hip abductors) add to forward motion with knee and hip extension as well as ankle PF of stance leg
- At foot strike of lead leg the arm should be in a semi-cocked position
- Lead leg hip IR ROM is required for proper pelvic positioning
- Throwing shoulder continues to move into external rotation and abduction
- Stride length will vary (just under thrower’s height is recommended) as well as stride placement

Arm Cocking
- Lead foot has contacted the ground with maximum shoulder external rotation (can be 180 degrees)
- Quadriceps on the lead leg eccentrically control knee flexion then stabilize isometrically
- Pelvic rotation begins with resultant lumbar hyperextension and stored tension is placed on the abdominals and oblique’s
- Shoulder continues to drift into external rotation while the legs, hips, pelvic, and trunk have accelerated

Arm Acceleration
- Maximum external rotation has been achieved and internal rotation begins
- The trunk moves out of hyperextended position and energy from abdominals and oblique’s is further transferred into the arm.
- As the ball is released the trunk is flexed and tilted forward with extension of the lead leg occurring (variations exist)

Arm Deceleration
- Elbow extension and shoulder internal rotation continue to occur.
- Trunk and hips continue to flex while the lead leg will continue to extend and/or maintain isometric stabilization
- Posterior shoulder musculature as well as overall compression of the glenohumeral joint further decelerates the arm

Follow Through
- Momentum is fully transferred to the lead leg with body weight now transferred to the stride leg
- The trunk continues to decelerate with flexion and rotation to non-throwing side
- Trail (stance leg) continues forward with hip and knee flexion occurring
Phase 1: Motion is initiated
- Pelvis becomes stabilized with an increase in glut max activity on stance leg
- Interscapular region (rhomboids) engage while the arm begins to move into extension
- Weight shifts to the right leg

Phase II: 6 o’clock into 3 o’clock
- Scapula is stabilized by the rhomboids
- Infraspinatus and supraspinatus muscle activity is high
- Glut medius stabilizes and begins to create torque at the pelvis

Phase III: 3 o’clock to 12 o’clock
- Glut medius continues to stabilize the pelvis
- Posterior deltoid, Infraspinatus, teres minor, and rhomboids continue to support the shoulder with humeral elevation and external rotation

Phase IV: 12 o’clock to 9 o’clock
- Glut medius continues to stabilize
- “Posting” of plant leg occurs initiating ground reaction forces (45 degrees)
- Highest biceps activity as well as an increase in serratus anterior activity
- Pectoralis major and subscapularis assist in IR as the arm begins to accelerate

Phase V: 9 o’clock down to ball release
- Momentum is transferred to adducted arm with pec major, subscapularis, and serratus anterior muscle activity remaining high
- Biceps brachii activity remains high with the overall highest biceps eccentric contraction with shoulder distraction stress and elbow extension torque
2. Demonstrate exercise progressions for the upper quarter
   - Quadruped: Thoracic and Scapular focus
   - Prone: Scapular Isolation series
     o Active, Resistive, Eccentric, Dynamic
   - ½ kneeling: 90/90 Progression
     o Perturbations, Holds, Eccentric, Dynamic
   - Wall Drills: Stabilization Multiple Directions
     o Flexion, Scaption, 90/90

3. Lower Extremity Involvement
   - Baseball
     o Initial Hip Engagement at Wall
     o OH tubing in lunge (varieties)
     o Med Ball Progressions
     o Rip Stick
   - Softball
     o SL balance holds and drive off decline
     o Stance control with contralateral PNF’s / resistance
     o Hip stability with pull downs
     o Med Ball Progressions
     o Rip Stick

4. Implementation of the Weighted Balls
   - ** Only certain patients in certain situations. Very rarely if ever are these done with accelerated throwing **
     o Plyo Care to Wall / Trampoline
     o Deceleration and Eccentric Work
     o Reverse throws

5. Demonstration of throwing drills for clinic
   - Baseball
     o ½ kneeling
     o Standing: Closed, partial, open, upper 90
     o Lunge stance
     o Step Behinds, Cross Body
   - Softball
     o Wrist Focus
     o Arm Break Down
     o Partial LE involvement

Thank you for your time!
Full power point presentation available upon request
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References


