1 □ Return to Play Volleyball

Evaluation, Treatment and Biomechanical Analysis of the Volleyball Athlete

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2 □ No Disclosures

3 □ Objectives

1. Background
2. Evaluation/Assessment
3. Biomechanical analysis
4. Treatment and Return to Play

4 □

• >500 million athletes worldwide
• 460,000 high school athletes (410,000 girls)
• 13,000 collegiate athletes
• Lowest for all major sports
• Shoulder = Top 3 injuries

5 □

• College men: 50 –60 mph
  – Record: 82.02 mph

• College women: 45-55 mph
  – Record: 64 mph

• 40,000 or more hits in one year (not including practice swings or serves)
  Reeser et al, 2006
“Extreme ranges of motion enacted and high forces generated, resulting in microtraumatic stresses placed on the shoulder.”
Hurd et al, 2009

80% of shoulder injuries could be linked to OH hitting Mitchenson et al, 2013

**Differential Diagnosis**
- Tendinopathy or tear
  - Rotator Cuff
  - Long head of Biceps
- Labral tear or Instability
- Impingement
  - Internal/External
  - Primary or Secondary
- Little league shoulder
- Suprascapular nerve
- Cervical radiculopathy
- Brachial Plexopathy

**Scapular Mechanics**

* Merolla et al, 2010
  - Acquired scapular dyskinesia in overhead athletes can lead to rotator cuff weakness.
  - Inhibition due to pain and the negative biomechanic effect of scapular dyskinesia results in specific infraspinatus dysfunction.
• A functional rehabilitation protocol, designed to restore scapular muscles balance and shoulder mobility, is essential in the training program to prevent shoulder dysfunction and improve sports performance.

22  □ What happens in OH hitting...

SOFT TISSUE CHANGES:

• Decreased shoulder IR
• Decreased ER strength
• Increased shoulder depression
• Increased anterior glenohumeral laxity

23  □ Analyze the Mechanics of the Approach

24  □ Side View

25  □ Court View

26  □ Take off and Jump

• The running approach = maximum momentum for the height of the vertical jump (Gyulai, 2010).

• Strong foot plant and push-off

• Build momentum with arms

27  □ Arm Swing

• Generate horizontal momentum then vertical momentum

• The arm momentum and position, along with truck rotation and flexion all influence the velocity of the ball (Moellendorf, 1993)

28  □

29  □ Hit and Follow Through

• Reach
• Snap wrist
• Follow-through
Challoumas et al, 2017

• 22 males

• DOM scapula
  – Lateralized
  – Dorsal capsule laxity
  – Compromised stretching ability in posterior muscles

• Present/Past shoulders with pain
  – Greater laxity in dorsal capsule
  – Tightening of the inferior capsule
  – Lower SS

• Dorsal capsule measurements bilaterally were significant predictors of SS

• Scapular lateralisation was more pronounced with increasing years of experience

• Scapular antetilting was greater with increasing age

• Adaptations of the DOM shoulder may be linked to pathology and performance.

“The best way to TREAT an injury is to PREVENT an injury”

(Dr. James Andrews)
Normalize Motion

- Consider total motion concept
- Caution when stretching into ER
- IR motion and stretching
- Focus on soft tissue

Li-Fang et al, 2008

Range of Motion

Always Remember...

- Symptomatic patients cannot just strengthen/stretch
- Soft tissue treatment (TFM, ART, Graston, etc)
  - Decreases pain improves function and total ROM
    - 35% with manual therapy
    - 17% strengthening and stretching alone (Bang and Deyle, JOSPT 2003)

Don’t Neglect Posture

- Cervical position
- Thoracic position

Strengthening Requires a “Balanced Approach”

- Emphasize muscle groups that have to decelerate arm and maintain stability
  - Eccentric and Concentric
  - LE and Core Strength
  - Proprioception

Key Principles of Treatment

- Restore ROM and proper mechanics
• Start strength with shorter lever arms
  – watch for form/technique
• Scapular stability
• Introduce closed chain exercises
• Address dynamic stabilizers

45  □  Best Scapular Exercises:
    1. Row (rhomboids, middle trap)
    2. Push-up plus (serratus)
    3. Seated press-ups (pec minor, lats)
    4. Scaption (upper and lower traps, serratus and rhomboids)

46 □

47 □

48 □

49  □  Focus on Core
  • Seated on ball and work on “wind up”
  • Rotation vs. Piking
  • Stretch
  • 38%

50 □

51  □  Volleyball Specific Drills

52  □  Arm Swing Mechanics
  • Toss and Tilt (L hand points to ball) feel the stretch in the obliques/abs
  • Swim move or bow and arrow
  • Left hand to heart, reach up
  • Give Shaq a high five
  • Play tall not small

53 □
  • Toss and tilt for trunk rotation
  • FOCUS ON TURNING
Shoulder tilt with arm wind up to maximally engage abdominal muscles

Jumping and Landing Drills

Return To Play

• Interval hitting program (Hurd et al, 2009)
  – By position
  – 6-10 steps
  – Number of steps reflects volume of hitting
  – Similar to long toss program (full-court hits)

One for the books...

References

References


Thank You!
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