

## **42<sup>nd</sup> Annual Symposium on Sports Medicine**

The University of Texas  
Health Science Center at San Antonio  
School of Medicine  
Department of Orthopaedics

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## **CORE STRENGTHENING**

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## **OVERVIEW**

- Objectives
- Core Function
- Neutral Spine
- Anatomy of Core Musculature
- Myofascial Sling Systems
- Specific Core Strengthening Exercises
- Conclusion
- References

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## OBJECTIVES

- To recall the anatomy of core musculature in order to formulate and implement an appropriate and effective core strengthening exercise program
- To attain the knowledge that core strengthening is vital and crucial to prevent injury and maximize function

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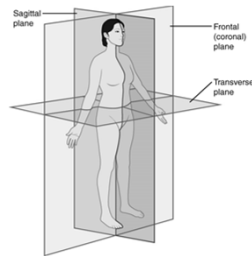
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## Core Function

- The core is used to stabilize the thorax and the pelvis during outside static or dynamic forces
- Outside forces can come from one or more of the three planes of movement



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## Neutral Spine

- Neutral is the biomechanical sound posture for the lower back
- It decreases tension of the spine-related ligaments and joints
- It allows the various forces acting on the discs and vertebrae to be distributed in a more balanced manner
- It keeps the patient's posture near their "center" thus enabling them to react more quickly when necessary
- It provides the greatest functional stability with axial loading

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## Anatomy of Core Musculature

Major Muscles Include:

- Pelvic Floor Muscles
- Transversus Abdominis
- Multifidus
- Internal & External Obliques
- Rectus Abdominis
- Erector Spinae, especially longissimus thoracis
- Diaphragm

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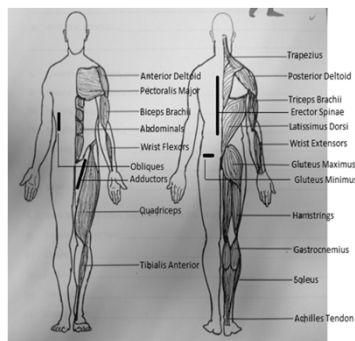
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## Anatomy of Core Musculature

Minor Muscles Include:

- Latissimus Dorsi
- Gluteus Maximus
- Trapezius




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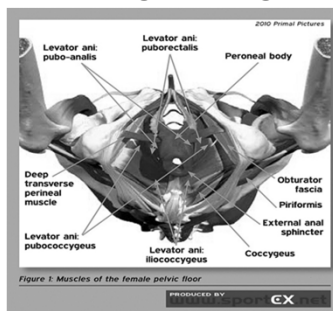
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## Pelvic Floor Strengthening

Kegel Exercises




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### **Transversus Abdominus Strengthening**

- Pelvic Tilt
- Bridging Exercises

Can progress by increasing time that patient/athlete hold contraction, increasing band resistance, adding cuff weights or changing body position

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### **Multifidus Strengthening**

- Supine resisted rotation of lower trunk  
Patient/Athlete lies supine with both knees together and with 90° of flexion

Keeping knees firmly together and core contracted, LTR resistance is provided by the therapist or athletic trainer

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### **Internal & External Oblique Strengthening**

- Planks: Prone & Side
- Crunches with Rotation
- Prone Plank with UE Punch

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## **Rectus Abdominus Strengthening**

- Crunches
- Sit Ups
- Planks

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## **Strengthening of Minor Core Muscles**

- Latissimus Dorsi: LAT Pulls, Chair Push Ups with full elbow extension, chin ups
- Gluteus Maximus: Squats, Lunges, Leg Press, Prone hip extensions
- Trapezius: Shoulder Shrugs, Overhead Press

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## **Myofascial Slings**

**Four Myofascial Sling Systems**  
Provide Proper Pelvic Force Closure

- Posterior Oblique Sling
- Anterior Oblique Sling
- Posterior Longitudinal Sling (Deep LS)
- Lateral Sling

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## Posterior Oblique Sling

- Consists of the superficial fibers of the latissimus dorsi blending with superficial fibers of contralateral gluteus maximus
- Superficial gluteus maximus then blends with superficial tensor fascia lata, especially down to the iliotibial band
- Causes force closure of the sacroiliac joint

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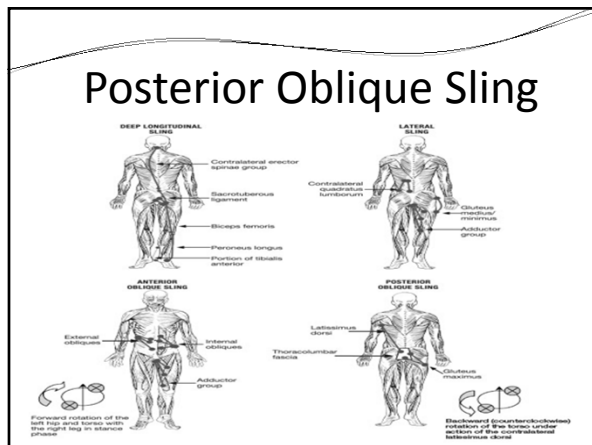
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## Posterior Oblique Sling




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## Posterior Oblique Sling Exercises

- Single leg squat with contralateral latissimus pulldown on Total Gym
- Prone Superman's with stick across shoulders:  
Unilateral leg lift while pulling down on stick with opposite UE
- Rock Wall Climbing

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## Anterior Oblique Sling

- Consists of the external oblique, internal oblique & transversus abdominis blending with contralateral adductor muscles
- These co-contractions cause force closure of the symphysis pubis

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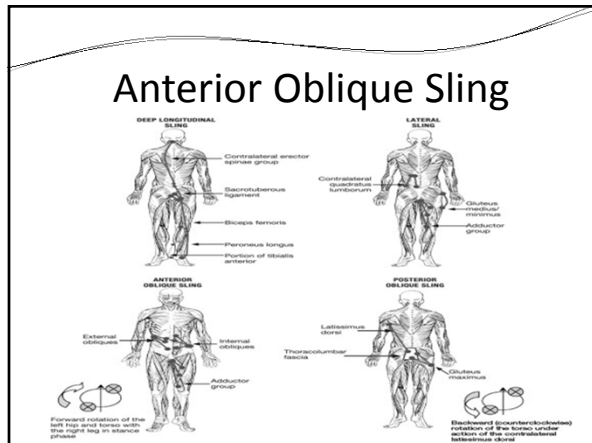
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## Anterior Oblique Sling




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## Anterior Oblique Sling Exercises

- Ball transfer crunch:  
Transfer ball between feet and hands
- Crunch with ball between knees
- Staggered/Split Kettlebell One-Arm Swings

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## Posterior Longitudinal Sling

- Consists of deep multifidus attaching to sacrum with deep layer of thoracolumbar fascia, blending with long dorsal sacroiliac joint ligament and continuing on into sacrotuberous ligament
- Causes compression of L5-S1 joint & compression of the SI joint

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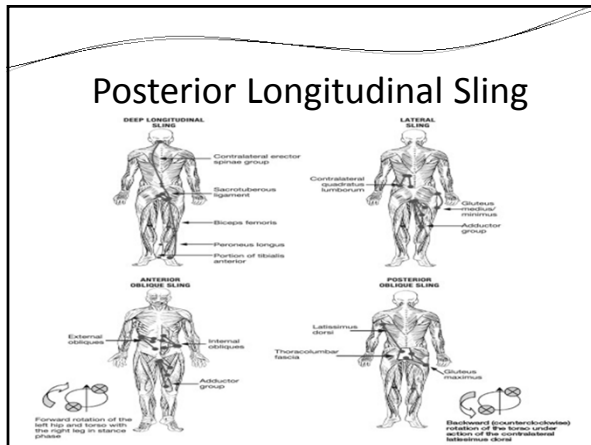
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## Posterior Longitudinal Sling




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## Posterior Longitudinal Sling Exercises

- Prone Superman's
- Quadruped Rock backs
- Quadruped: B-UE Flexion, B-LE Flexion
- Planks
- Walking Sled pulls

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## Lateral Sling

- Consists of the Gluteus Maximus, Medius & Minimus, Contralateral Hip Abductors & Adductors, Tensor Fascia Lata and Iliotibial Band
- Stabilizes hips during standing exercises and side-lying lateral thigh exercises

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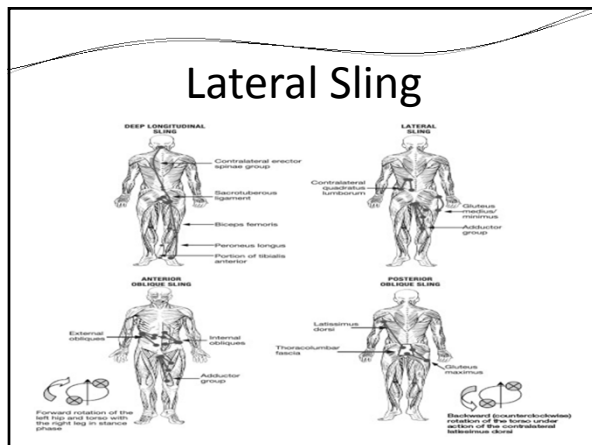
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## Lateral Sling



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## Lateral Sling Exercises

- Single Leg Stance/Balance
- Split Stance Medicine Ball Chest Pass
- Rebounder Ball Toss

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### Specific Core Strengthening Exercises



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### Specific Core Strengthening Exercises



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## Conclusion

Incorporating core strengthening into a comprehensive rehabilitation program is crucial. Understanding the anatomy of core musculature allows for the development and implementation of an effective training program, thus returning the athlete to their maximum function at a decreased risk of injury.

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