



Fitness Learning Systems with Evidence Based Fitness Academy

Course Title: **Biomechanics of Low Back Pain**

Produced by: **Fitness Learning Systems**
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Course Type: **e-Learning Home Study**

Credits: AEA 3.0, ACSM 4.0, ATRI 0.3, NFPT 1.0, NCSF 1.5,
NSPA 4.0, YMCA 4.0, NASM 0.4, NSCA 0.4, COPS-KT 0.4

Author:

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Dr Emily Splichal, Podiatrist and Human Movement Specialist, is the Founder of the Evidence Based Fitness Academy. With over 10 years in the fitness industry, Dr Splichal has dedicated her medical career towards studying postural alignment and human movement as it relates to foot posture and foot strength. Dr Splichal is expert lecturer and TV personality with appearances on Oprah Winfrey, The Today Show & Good Day NY. Dr Splichal is sought after for her expertise in barefoot training, foot health and postural alignment.

Degrees/Certifications: Doctor of Podiatric Medicine (DPM), Master's in Public Health (Fall Reduction), M.S. Human Movement, NASM-CPT, ACSM- Exercise Specialist.

Course Summary:

Almost 80% of American adults will suffer low back pain at some point. Interestingly, 70-80% of LBP is associated with musculoskeletal imbalances and improper core activation during everyday movement. Join us as we take a look at the latest research on the biomechanics of low back pain. From the hip to the foot, you will be surprised by how many different imbalances attribute to low back pain. This course helps you learn how to alleviate and prevent low back pain from the foot up through the kinetic chain.

Objectives:

After completing this course you will:

1. Demonstrate the important role the fitness professional plays in educating, rehabilitating and enhancing function in clients with low back pain.
2. Describe the lumbopelvic hip complex and identify the local and global stabilizers of this region.
3. Understand the biomechanical link between lower extremity kinematics and spine function.
4. Identify how foot dysfunction can cause low back pain and how to effectively improve foot function to correct low back pain.
5. Explain how hip and pelvis dysfunction can lead to foot dysfunction and understand how to correct this hip imbalance therefore correcting the foot mechanics.
6. Identify how limb length discrepancy can cause sacroiliac joint pain and whether it is functional or structural limb length discrepancy.

7. Assess if delayed activation of the gluteus maximus is a contributing factor to sacroiliac joint pain and if so, learn how to re-activate the gluteus maximus.
8. Create an evidence-based lumbar stabilization program that starts from the foot and extends up the kinetic chain.

Outline:

Low Back Pain Facts

Low Back Pain and the Health-Fitness Professional Case Studies:

Case Study 1

Case Study 2

Case Study 3

The Spine – An Integral Part of the Lower Extremity

Bone Anatomy:

The Vertebral Column

Facet Joints of the Spine

Intervertebral Disks

Disk Herniation

Pelvis

Sacroiliac Joint

Muscle Anatomy:

Local Musculature System

Multifidus

Internal Obliques

Transversus Abdominis

Global Stabilizing System

Rectus Abdominis

Erector Spinae

External Obliques

Psoas Major

Quadratus Lumborum

Gluteus Maximus

Planes and Axis:

Planes of Motion

Sagittal Plane

Frontal Plane

Transverse Plane

Axis of Rotation

Frontal Axis

Sagittal Axis

Transverse Axis

Review Chart of Planes and Axis

Forces Acting on the Spine:

Ground Reaction Forces

Compressive Forces and Low Back Pain

Abdominal Brace

Shear Forces and Low Back Pain

Psoas Engagement and Shear Forces

Low Back Assessment:

Thomas test
Abdominal assessment
Strength assessment

The Foot and the Spine:

Rearfoot
Midfoot
Forefoot

Joints of the Foot & Ankle:

Ankle Joint
Subtalar Joint
1st Metatarsal Phalangeal Joint

Foot Type and Low Back Pain:

Neutral foot
Pes Planus
Pes Cavus

Enhanced Spinal Curvatures and Low Back Pain:

Lordosis
Scoliosis

Etiology of Low Back Pain:

Muscle Activation
Postural Assessment
Synergistic Dominance
Muscle Imbalances
 Sagittal Plane Imbalances
 Frontal Plane Imbalances

Evidence-Based Program Design:

Reversal of Any Muscle Imbalances
 Sagittal Plane Imbalance
 Frontal Plane Imbalance
Re-Sequencing Muscle Activation Patterns
Strengthening Lumbar Stabilizers
 Forearm Plank
 Pushup Plank
 Side Plank
 Quadruped
 Modified Curl-Up
 Glute Bridge
 Reverse Plank

Case Studies – Revisited!

Case Study 1
Case Study 2
Case Study 3

Low Back Pain Fitness Pearls

Bibliography:

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Kolber, Beekhuizen (2007). Lumbar Stabilization: An Evidence Based Approach for the Athlete with low back pain. *Journal of Strength and Conditioning*. 29,(2), 26-37.

Kuszewski, M., Gnat, R & Saulicz, E. (2009). Stability training of the lumbo-pelvic-hip complex influence stiffness of the hamstrings: a preliminary study; *Scandinavian Journal of Medicine & Science in Sports* (2009) 19:260-266.

McGill, S. (2000). Low Back Stability: From Formal Description to Issues for Performance and Rehabilitation, *Exercise & Sports Science Reviews*, 21(1): 26-31.

Peeler, J., & Anderson, J. (2007). Reliability of the Thomas test for assessing range of motion about the hip. *Physical Therapy in Sport*, 8(1), 14-21. doi:10.1016/j.ptsp.2006.09.023

van Wingerden, J., Vleeming, A., Snijders, C. & Stoeckart, R., 1993. A functional-anatomical approach to the spine-pelvis mechanism: interaction between the biceps femoris muscle and the sacrotuberous ligament; *European Spine Journal* (1993) 2:140-144.