



LOW BACK PAIN—THE MOBILITY-STABILITY CONTINUUM

TEDDY WILLSEY, DPT, PT, CSCS, USAW

A primary goal of many exercise programs is to reduce the likelihood of injury. Low back pain (LBP) is a common cause of disability. Nearly all fitness professionals are forced to address LBP to some extent, regardless of the age or population with which they work. The purpose of this article is to shed light on contemporary research surrounding LBP. It will provide an evidence-based explanation of the difficulty in determining the cause of non-specific low back pain (NSLBP). Additionally, it will discuss psychosocial aspects of pain and address the fitness professional's role in NSLBP. Lastly, this article will explain the mobility-stability continuum of exercise selection. Please note, any suspicion of neurological signs or symptoms including shooting pain, weakness, changes in sensation, radiating symptoms, or unrelenting pain should always be referred to a qualified healthcare professional for further evaluation. This article only applies to NSLBP, or pain without a known pathoanatomical cause.

CAUSES OF BACK PAIN

Healthcare professionals develop an understanding of the causes of NSLBP through a product of their own education and experience. Despite the many structural theories attempting to explain NSLBP, none have proven to be explanatory in all cases. Examples include assessing trunk strength, hip range of motion, and pelvic tilt, to a name a few. Due to the inconsistent symptom presentation and often favorable treatment outcome, researching NSLBP has proven challenging (8). Diagnosing and properly labeling cause for back pain is further complicated by the lack of reliability of diagnostic imaging for spine related pathology (5,9).

All of these factors combined lead to a high degree of ambiguity surrounding NSLBP.

PSYCHOSOCIAL ASPECTS OF BACK PAIN

Contemporary research suggests that the psychosocial factors associated with the experience of pain are crucial to understanding NSLBP. Life satisfaction, happiness, education, self-confidence, as well as depression levels have all been shown to be strongly related to chronic NSLBP (3,6,10,24). Research on the biopsychosocial model of pain can help to account for cases where biology and structure alone do not make sense (11). Unfortunately, public awareness on this topic is still relatively low.

THE ROLE OF THE FITNESS PROFESSIONAL

Fitness professionals can play a significant role in shaping their clients' perceptions about back pain. When individuals experience NSLBP, they tend to search for the cause somewhere in their typical daily regimen (18). They form beliefs based on their own education and experiences. These beliefs can be both misinformed and challenging to dispel. Fitness professionals are oftentimes the first in line to answer questions regarding pain. It is the responsibility of the fitness professional to be comfortable discussing NSLBP with their clients and to provide up-to-date information.

In the case of a client who may have a history of back pain, but is safe to exercise, fitness professionals can help their client's recovery by creating a positive atmosphere and discouraging negative self-talk and feelings of hopelessness (16). It can be

helpful to remind them that well-researched methods are available to create programs, modify exercise, and alter environment and ergonomics in order to improve comfort and decrease pain. They should also remind clients that the majority of NSLBP resolves with conservative medical care (2). Fitness professionals can assist in reducing fearful and catastrophizing behavior.

THE MOBILITY-STABILITY CONTINUUM

The mobility-stability continuum is a common paradigm used to understand LBP and prescribe exercise (1). This structural-based thought process assumes LBP is caused by imbalance of mobility and stability; whereas, an ideal dosing of the two is said to create a healthy and functional back. For example, most fitness professionals consider hip mobility and trunk stability as key components of low back health. These qualities are assessed in many of the widely used screens and assessments for identifying low back health.

The purpose of mobility exercises, such as a hamstring stretches, is to increase joint range of motion. Two straightforward ways to assess mobility are lunges and deep squat tests. The purpose of stability exercises, such as planks, is to strengthen supporting musculature. Two typical ways to assess strength are trunk stability and trunk flexion exercises. Typically, mobility and stability exercises are used together in a program addressing NSLBP. The mobility-stability continuum is a common paradigm that is easily relatable for the general population. Most people can appreciate the dichotomy between stretching and strengthening. This provides a consistent way to prescribe and explain these exercises to clients.

EXERCISE SELECTION: MOBILITY

There is reason to believe that mobility exercises can be beneficial in the treatment and prevention of back pain. Hip range of motion is a common consideration with back pain. Two of the typical narratives that individuals have regarding the explanation of their back pain. Although there may be a strong theoretical basis for both of these structures influencing spinal motion, their specific influence on pain is not as well understood.

When clients report feelings of perceived tightness in muscles, the role of the nervous system and muscle tone cannot be discounted. Assessing mobility is more complex than simply taking one's word for it. During periods of pain, in both chronic and acute cases, involuntary descending neural control processes initiate muscle guarding in the form of tonic contraction. This can explain feelings of tightness as well as observed restrictions in mobility. It is thought that this is a protective mechanism of the body. Widespread reports of tight hamstrings are an example of this common complaint (14). Typically, cessation of pain will improve feelings of perceived tightness.

Individuals with back pain exhibit decreased mobility of the surrounding structures of the spine as well as the spine itself (13). In addition to hip flexor and hamstring stretches, spinal segment motion exercises are often used in the treatment and prevention of NSLBP. Exercises, such as the cat-cow and standing trunk rotations, should be performed by taking the spine through a comfortable range of motion. A thorough movement assessment can help to determine individual mobility and range of motion needs.

EXERCISE SELECTION: STABILITY

There is strong evidence to support the practice of strengthening and stabilizing the muscles surrounding the trunk and lumbar spine. In addition to changes in mobility, research has shown alterations in patterns of the trunk stabilizers in patients experiencing pain (2,11). It is thought that trunk strengthening and endurance exercises can help normalize firing patterns, decrease spinal motion, and improve spinal stabilization. Many of these exercises are referred to as anti-extension or anti-rotation movements, and their goal is to maintain a neutral spine position.

Injury prevention through trunk strengthening is meant to promote tissue and movement adaptation (13). The strategy has more recently been referred to as building tissue resilience. Two examples of exercises with the potential to improve lumbar spine tissue stabilization, teach core bracing, and improve overall trunk strength are the plank and bent-over barbell row. Both of these exercises can be progressed by adding time, weight, and instability.

Research has shown increased trunk muscle electromyography activity when instability is added to core stability exercises (7). The dead bug, crawling patterns, and many other common core exercises fall into the category of instability exercises. Standing on one foot, planking on one arm, or using an unstable surface are three ways to increase instability during trunk strengthening and endurance exercises.

CONCLUSION

It is important to note that addressing NSLBP does not always need to involve complex exercise prescription. Some studies have shown general exercise to be just as effective as physical therapy for treating NSLBP (19). Walking programs are shown to be effective for NSLBP as well (17). On the prevention side, recent research has even shown improvements in intervertebral disc strength in runners (4).

The fitness professional can play a significant role in helping clients with NSLBP by choosing appropriate exercises, leading informative discussions, and considering psychosocial aspects in their approach. Working with a client with back pain never changes the goal: help them move pain free and improve their strength and conditioning.

REFERENCES

1. Alfuth, M, and Cornely, D. Chronic low back pain: Comparison of mobilization and core stability exercises. *Der Orthopade* 45(7): 579-590, 2016.
2. Akbari, M, Sarrafzadeh, J, Maroufi, N, and Haghani, H. Changes in postural and trunk muscles responses in patients with chronic nonspecific low back pain during sudden upper limb loading. *Medical Journal of the Islamic Republic of Iran* 29: 265, 2015.
3. Bartys, S, Frederiksen, P, Bendix, T, and Burton, K. System influences on work disability due to low back pain: An interventional evidence synthesis. *Health Policy* 121(8): 903-912, 2017.
4. Belavy, DL, Quittner, MJ, Ridgers, N, Ling, Y, Connel, D, and Rantalainen T. Running exercise strengthens the intervertebral disc. Published ahead of print. *Scientific Reports*, 2017.

5. Borenstein, DG. The value of magnetic resonance imaging of the lumbar spine to predict low back pain in asymptomatic subjects: A seven year follow-up study. *Journal of Bone and Joint Surgery American Volume* 83-A(9): 1306-1311, 2001.
6. Cahalan, R, Purtill, H, and O'Sullivan, K. Biopsychosocial factors associated with foot and ankle pain and injury in Irish dance: A prospective study. *Medical Problems for Performing Artists* 32(2): 111-117, 2017.
7. Calatayud, J, Casaña, J, Martin, F, Jakobsen, MD, Colado, JC, Gargallo, P, et al. Trunk muscle activity in different variations of the supine plank exercise. *Musculoskeletal Science and Practice* 28: 54-58, 2017.
8. Dhillon, KS. Spinal fusion for chronic low back pain: A “magic bullet” or wishful thinking? *Malaysian Orthopaedic Journal* 10(1): 61-68, 2016.
9. Endean, A, Palmar, KT, and Coggon, D. Potential of MRI findings to refine case definition for mechanical low back pain in epidemiological studies: A systematic review. *Spine* 36(2): 160-169, 2011.
10. Hruschak, V, and Cochran, G. Psychosocial and environmental factors in the prognosis of individuals with chronic pain and comorbid mental health. *Social Work in Health Care* 56(7): 1-15, 2017.
11. Jubany, J, Marina, M, and Angulo-Barroso, R. Electromyographic and kinematic analysis of trunk and limb muscles during a holding task in individuals with chronic low back pain and healthy controls. Published ahead of print. *P M & R* 9(11): 1106-1116, 2017.
12. Lall, MP, and Restrepo, E. The biopsychosocial model of low back pain and patient-centered outcomes following lumbar fusion. *Orthopedic Nursing* 36(3): 213-221, 2017.
13. McGill, S. *Low Back Disorders: Evidence-Based Prevention and Rehabilitation*. (2nd ed.) Champaign, IL: Human Kinetics; 2007.
14. McGill, S. *Ultimate Back Fitness and Performance*. (4th ed.) Backfitpro; 2009.
15. Roch, S, and Hampel, P. Short- and mid-term effectiveness of primary and secondary prevention of comorbid depressive symptoms among patients with chronic low back pain. Published ahead of print. *Psychotherapie, Psychosomatik, Medizinische, und Psychologie*, 2017.
16. Ross, GB, Sheahan, PJ, Mahoney, B, Hodges, PW, and Graham, RB. Pain catastrophizing moderates changes in spinal control in response to noxiously induced low back pain. *Journal of Biomechanics* 58: 64-70, 2017.
17. Shamsi, M, Sarrafzadeh, J, Jamshidi, A, Zarabi, V, and Pourahmadi, MR. The effect of core stability and general exercise on abdominal muscle thickness in non-specific chronic low back pain using ultrasound imaging. *Physiotherapy Theory and Practice* 32(4): 277-283, 2016.
18. Videman, T. The influence of occupation on lumbar degeneration. *Spine* 24(11): 1164-1168, 1999.
19. Wang, XQ, Zheng, JJ, Yu, ZW, Bi, X, Lou, SJ, Liu, J, et al. A meta-analysis of core stability exercises versus general exercise for chronic low back pain. *PLoS One* 7(12): 2012.

ABOUT THE AUTHOR

Teddy Willsey practices sports medicine physical therapy at Healthy Baller, a sports performance center in Rockville, MD. Willsey received his Doctor of Physical Therapy degree from Old Dominion University in 2015 and his Bachelor of Science degree in Exercise Science from the University of Pittsburgh in 2008. Willsey was a strength and conditioning coach for four years before becoming a physical therapist, and he takes pride in blending the two disciplines to help his clients and patients achieve their best performance.

Conflicts of Interest and Source of Funding: The authors report no conflicts of interest and no source of funding.

EDUCATE. MOTIVATE. INSPIRE.



Perform Better would like to thank YOU – Personal Trainers, Strength & Conditioning Coaches, Physical Therapists, Athletic Trainers, Sport Coaches, Rehab & Performance Specialists – for all of the hard work and dedication that you put into this industry. Keep continuing to educate, motivate and inspire your clients, patients and athletes in order to get them to perform better.

800-556-7464 | **PERFORMBETTER.COM**