

Getting Back To Exercise Without Pain: The Lower Back

Most people today live a sedentary lifestyle, lack of movement results in the body becoming less equipped to take part in sporting activities presenting considerable challenges for personal trainers and sports coaches. When the body is expected to perform...



Authors: **Judit Resinka**
columnist
Title: Personal Trainer,
Strenght & Conditioning,
Coach Workplace:
Crowne Plaza Battersea
e-mail: juditressinka@yahoo.co.uk
Picture, figure: Judit Resinka
Other-authors: Péter Fritz

Part 2. DOI: 10.21486/recreation.2016.6.2.1

Abstract



Most people today live a sedentary lifestyle, lack of movement results in the body becoming less equipped to take part in sporting activities presenting considerable challenges for personal trainers and sports coaches. When the body is expected to perform, a weak musculoskeletal foundation can lead to postural deviations, muscular imbalances and unaligned joint. Physical inactivity is increasing the risk of musculoskeletal disorders (MSDs) (12, 14) and injuries during sport and recreational activities. A common issue of most work environment is inappropriate, repetitive sitting, lifting and standing positions that are aggravating low back pain. Tight muscles around the hips like the hip flexor complex, the lumbar erector spinae and underactive muscles like the gluteus maximus or transversus-abdominis (TVA), multifidus can result in excessive, unwanted motion of the lumbar spine(14,18).

One approach to counter ailments is the NASM Corrective Exercise Continuum (CEx) – that promotes the activation and deactivation of muscles, fascia and the nervous system(2).

To accomplish the four stages of the CEx model (Self-Myofascial Release (SMR), stretches, isolated activation and integration of muscles) a good understanding is needed of the healthy musculoskeletal system through different postures, the nature of musculoskeletal diseases and finally identify risk factors for potential musculoskeletal problems.

My aim is to discuss how improved muscle strength and flexibility around the hips can help prevent or help improve core strength and decrease lower back hypermobility. In line with the NASM CEx system, I have suggested some easy to implement techniques and exercises and drew attention to preventative body awareness measures.

Please refer back to my previous three articles on description and use of the movement assessments and the CEx.

Keywords: low back pain, lower crossed syndrome, the NASM Corrective Exercise Continuum, neutral spine, sedentary lifestyle

Training Approach

Therefore a training approach to avoid the occurrence or re-occurrence of low back pain should aim to improve LPHC stabilization and muscle balance.



The two stages and main objectives of training should be: one to train muscle endurance of the deep and secondary stabilizers (7) and re-education of motor control of the CNS (6,26) and the Glutes such as the gluteus maximus and medius. It is necessary to facilitate a co-contraction in such muscles as the oblique abdominals, the TrA and particularly the multifidus (13) while aiming to switch on the glutes in hip extension and lateral stabilization while reducing overactivity of specific superficial muscles

For long term success the client needs to become aware of the muscles initially through palpation of the trainer and self-palpation later in dynamic movements by awareness only. Segmental stabilization is superior to superficial strengthening for all variables (27), in a study comparing traditional exercise program and core stabilization program one group of soldiers (N = 2616) between 18 and 35 years of age were randomized to receive a Traditional Exercise Program (TEP) with sit-ups or Core Stabilization Exercise Program (CSEP). CSEP did not have a detrimental impact on sit-up performance or overall fitness scores.

There was however a small but significantly greater increase in sit-up pass rate in the CSEP (5.6%) versus the TEP group (3.9%) (1). Core stabilizing programs shown short-term improvements over just 8-12 weeks, participant maintained the results after 6 and 12 months (4, 24, 17), however after stopping the subject haven't improved any further suggesting that a constant repetition of intervention exercise is needed or change of the working environment.

Static Assessment of the low back - Lateral view

From static lateral view it can instantly become evident especially in women subjects if they have an excessive lumbar curve as when the plum line is linked together the line doesn't run across the lumbar vertebral bodies but rather well behind them.

Also the end lines of clothing can be used as a visual landmark for a practiced eye but the excessive anterior tilt can be marked by the bottom line of the T-shirt.

However excess curvature is not always evident from a lateral standing view. With inclinometer measurements, the anterior tilt should be no more than 4-7 degrees from anatomical neutral for man or no more than 7-10 degrees for woman. In the absence of an inclinometer a simple wall test can be performed that will confirm our suspicion or on the long term the test will help clients to check on improvements themselves (15, 21).

**Figure 11. a) normal lumbar curve
b) excessive lumbar curve**

Wall Test: Make the client stand with its back flat against the wall heels few inches away and measure the space between the lower back and the wall. The natural curvature of the spine should allow only the back of the hand to slide into that space. If something much larger than the hand is able to fit back there then it's likely that the client has a large anterior tilt and excessive lordosis.

**Figure 12. a) normal lumbar curvature
b) excessive lumbar curvature**

Dynamic Assessments

Overhead Squat Test

Excessive lumbar curve in the NASM overhead squat test means that the person will show one or more of the following compensations: lower back arches rather than being neutral and/or excessive forward lean from the hips. It becomes evident from the lateral view when the lumbar spine is excessively extended not being able to maintain neutral position. (2)

Figure 13. Overhead squat test

NASM CEx for injury prevention at the lumbo-pelvic-hip complex (LPHC)
- Corrective exercise strategy



Figure 14.

Sample corrective exercise program for LPHC impairment:
excessive forward lean/lower back arches
Step 1: SMR

Exercise Interventions for low back arches		
Exercise Sequence	Focus	Exercise Protocol
1) Inhibit tight/overactive muscle SMR	Hip flexor complex: iliopsoas, rectus femoris Latissimus dorsi	Foam roll each for 2 minutes
2) Lengthen tight/overactive muscles	Hip flexor complex: iliopsoas, rectus femoris Latissimus dorsi Erector spinae	Static Stretch for 2 sets of 30 seconds
3) Strengthen weak/underactive muscles	Gluteus maximus – Bridge, Bridge rotate Abdominal complex/intrinsic core stabilizers – Birdog (Superman)	Each repetition lasts for ~7 seconds at a slow tempo: Concentric phase (1 count), Isometric (2 counts), Eccentric (4 counts)
4) Integration exercises	Complex, Movement quality Squat to rotate	Single-leg squat Progress to: single leg stability

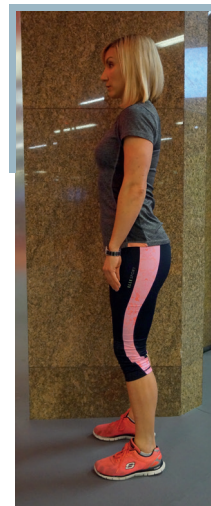


Figure 12 a

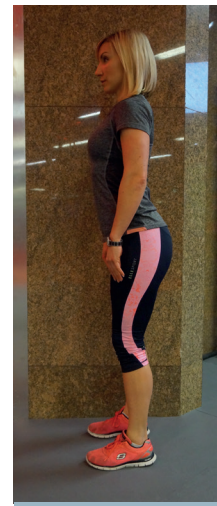


Figure 12 b

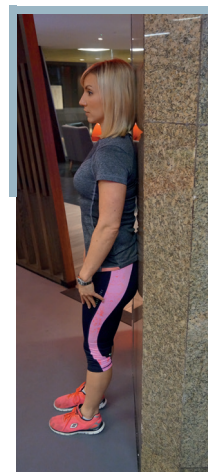


Figure 12 a



Figure 12 b

Figure 15 b



Figure 15. Hip flexor (rectus femoris)

Look for tender knots using a foam roller or ball and roll over the muscle. Hold as close to the tension area as possible for 30 to 45 seconds or if the pain is too intense hold for 90 seconds with lower intensity. If an area really hurts, transfer more body weight to your arms as you support yourself on them. Roll all the way to the top.

Step 2: Stretching

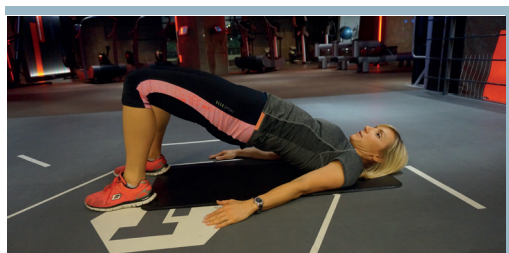
Figure 16. Hip flexor complex

From a kneeling position, plant the right foot on the ground in front, so the leg is bent at 90 degrees, the knee and ankle aligned.

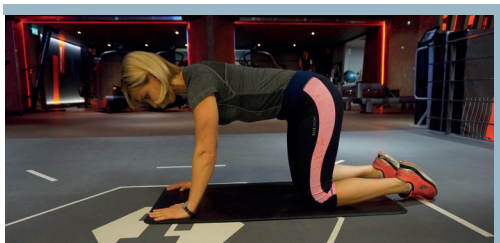
The back should be straight, shoulders back and down. Press the pelvis forward, so that the left hip is stretched, and leaning over the body from the left. To increase the intensity of the stretch and to deactivate the short hip flexors, squeeze the left bottom.

**Figure 17. Seated twisting stretch (erector spinae)**

Bend your left knee and step your left foot over your right leg. Put your left hand on the floor, fingers pointing outward, for support. Turn to the left, placing the back of your right arm against your left knee. Inhale as you sit tall (even taller than I did). Breathe out as you twist, pressing your arm into your leg and looking over your left shoulder. Hold for five breaths, then slowly return to the center.

**Figure 19. Four point kneeling tummy vacuum (TVA)**

Kneel on the floor with your shoulders directly above your hands and hips directly above knees. Let the intestinal contents rest against the abdominal wall. This will put a pre-stretch on the TVA. Holding neutral spinal alignment, take a deep breath, exhale and draw the belly button toward the spine and slightly upward. Do not flex the spine nor posteriorly rotate the pelvis. Hold for ten seconds. Relax for ten seconds and repeat the process ten times.

**Step 3: Isolated activation****Figure 18. Glute bridge (gluteus maximus)**

Starting on the back, with the heels on the ground and legs at about 90 degrees. As the glutes are squeezed, the hips lift up to a straight line from the knees to shoulders. To minimize the hamstring activation and isolate gluteus maximus, imagine yourself lifting from the heels.

**Figure 20. Alternating superman four point kneeling**

Position as with the tummy vacuum lift arm with alternate leg and hold (2-5 sec). Raise limb to hip or shoulder level don't hyper extend the lumbar spine keep it in neutral. Progress to Swiss Ball supermans. Maintain TVA activation throughout the movement as you hold tummy vacuum.

Further preventative measures – Increasing awareness

- Maintaining good posture when standing and sitting reduces stress on the back. Slouching should be avoided. Chair seats can be adjusted to a height that allows the feet to be flat on the floor, with the knees bent up slightly and the lower back flat against the back of the chair.

If a chair does not support the lower back, a pillow can be used behind the lower back. Sitting with the feet on the floor rather than with the legs crossed is advised. People should avoid standing or sitting for long periods. Changing positions frequently may reduce stress on the back.

- Learning to lift correctly helps prevent back injuries. Facing the object is important with the hips facing forward aligned with the shoulders. Bending at the hips and knees at the same time will help to keep the back straighter. Finally the object should be kept close to the body, lifting it by straightening the legs and hips. This way, the legs, not the back, lift the object

Conclusion

Once postural misalignment, low back hypermobility or an excessive lordotic curve from normal has been identified, trainers should address the factors that contribute to this faulty posture. In general, there are several approaches used to help with this like awareness of once postures, behavioral changes and correct movement are fundamental to restore a neutral alignment and help the spine to remain or return in to the neutral zone. Stretching tight mobilizer muscle around the hips and strengthening weak stabilizer muscles that are attaching to the hips and linking the spinal segments together is critical for rebalancing the spine. .

The main focus at this stage is to integrate the local and global muscles with the body in action. In the authors opinion, hip conditioning programs, with core activation in mind, isolated and integrated, should be carried out every time prior to exercise regardless of the purpose of the session.

Although, exercise is the most important way to help retrain muscles, prevent disk injuries and low back pain, it is only performed for a limited part of the day; in the rest of the day awareness of own posture is fundamental to establishing good habits and good spinal health. It seems that 8-12 weeks of regular exercise, twice a week for 30 minutes has a fundamental positive effect on low back pain and perceived restriction of movement (1,27).

This effect can be maintain even without controlled exercise for 6-12 months, however if counter-measures aren't taken to

prevent poor posture the client with a history of low back pain tends to revert to previous bad patterns of movement and alignments, therefore some stretching and activation drills daily are advised.

Footnote

Forward stretching exercises can increase back pain in some people and therefore should be done carefully. Please consult with a doctor or physician if you have any unusual symptoms doing any of these exercises. Foam rolling should be avoided if you have unhealed wounds, bone fractures, skin cancer, osteoporosis, high blood pressure or any others strains or sprains. It is not advised to roll on an area that is affected by varicose veins and broken capillaries. While performing these exercises, please be aware of good body positioning and control of movement.

References

- Childs J.D., Teyhen D.S., Benedict T.M., Morris J.B., Fortenberry A.D., McQueen R.M., Preston J.B., Wright A.C., Dugan J.L., George S.Z. (2009): Effects of sit-up training versus core stabilization exercises on sit-up performance. *Med Sci Sports Exerc.* 41(11): 2072-83.
- Clark M.A. & Lucett S.C. (2011): *NASM Essentials of Corrective Exercise Training*. Lippincott Williams & Wilkins, United States. P108-139.
- Edwards R.H.T. (1988): Hypotheses of peripheral and central mechanisms underlying occupational muscle pain and injury. *European J Appl Physiol Occup Physiol.* 57(3): p275-281.
- Ferreira M.L., Ferreira P.H., Latimer J., Herbert R.D., Hodges P.W., Jennings M.D., Maher C.G., Refshauge K.M. (2007): Comparison of general exercise, motor control exercise and spinal manipulative therapy for chronic low back pain: A randomized trial. *Pain.* 131(1-2):31-7.
- Ferreira P.H., Ferreira M.L., Hodges P.W. (2004): Changes in recruitment of the abdominal muscles in people with low back pain: ultrasound measurement of muscle activity. *Spine.* 29(22): 2560-6.
- Ferreira P.H., Ferreira M.L., Maher C.G., Herbert R.D., Refshauge K. (2006): Specific stabilisation exercise for spinal and pelvic pain: a systematic review. *Aust J Physiother.* 52(2): 79-88.
- Hides J., Gilmore C., Stanton W., Bohlscheid E. (2008): Multifidus size and symmetry among chronic LBP and healthy asymptomatic subjects. *Man Ther.* 13(1):43-9.
- Hides J.A., Stanton W.R., MacMahon S., Sims K., Richardson C.A. (2008): Effect of stabilization training on multifidus muscle cross-sectional area among young elite cricketers with low back pain. *J Orthop Sports Phys Ther.* 38(3): 101-8.
- Hodges P.W. (1999): Is there a role for transversus abdominis in lumbopelvic stability? *Man Ther.* 4(2): 74-86.
- Hodges P.W., and Richardson C.A. (1996): Inefficient muscular stabilization of the lumbar spine associated with low back pain. A motor control evaluation of transversus abdominis. *Spine.* 21(22): 2640-50.
- Hodges P.W., and Richardson C.A. (1998): Delayed postural contraction of transversus abdominis in low back pain associated with movement of the lower limb. *J Spinal Disord.* 11: 46- 56.
- Holth H.S., Werpen H.K.B., Zwart J.A., Hagen K. (2008): Physical inactivity is associated with chronic musculoskeletal complaints 11 years later: Results from the Nord-Trøndelag Health Study. *BMC Musculoskelet Disord.* 9:159.
- Jackson C.P., Brown M.D. (1983): Analysis of current approaches and a practical guide to prescription of exercise. *Clinical Orthop Related Research.* 179:46-54.
- Janda V. (1987): *Muscles and motor control in low back pain: Assessment and management*. In *Physical Therapy of the low back*, ed. L.T. Twomey, Churchill Livingstone. New York. p253-78.
- Kritz, E. N. and Cronin J. (2008): Static Posture Assessment Screen of Athletes: Benefits and Considerations. *J Strength Cond.* p18-27.
- Luque-Suárez A., Díaz-Mohedo E., Medina-Porqueres I., and T. Ponce-García. (2012): Stabilization Exercise for the Management of Low Back Pain. *Low Back Pain*. (Ed.), ISBN: 978-953-51-0599-2, in Tech, Available from: <http://www.intechopen.com/books/low-back-pain/exercise-therapy-for-the-management-of-low-back-pain>
- O'Sullivan P.B. (2000): Lumbar segmental 'instability': clinical presentation and specific stabilizing exercise management. *Man Ther.* 5(1): 2-12.
- Page P., Clare C.F., and Lauder R. (2010): Assessment and Treatment of Muscle Imbalance. The Janda Approach. *Human Kinetics.*
- Panjabi M.M. (1992b): The stabilizing system of the spine. Part II. Neutral zone and instability hypothesis. *J Spinal Disord.* 5(4): 390-7.
- Panjabi M.M. The stabilizing system of the spine. (1992 a): Part I. Function, dysfunction, adaptation, and enhancement. *J Spinal Disord.* 5: 383-9
- Paris S.V. (1985): Physical signs of instability. *Spine.* 10(3): 277-9.
- Richardson C., Toppenberg R., Jull G. (1990): An initial evaluation of eight abdominal exercises for their ability to provide stabilization for the lumbar spine. *Aust J Physiother.* 36: 6-11.
- Richardson C., Jull G., Toppenberg R., Comerford M. (1992): Techniques for active lumbar stabilisation for spinal protection: A pilot study. *Aust J Physiother.* 38(2):105-12. doi: 10.1016/S0004-9514(14)60555-9.
- Taimela S., Diederich C., Hubsch M., and Heinrich M. (2000): The Role of Physical Exercise and Inactivity in Pain Recurrence and Absenteeism From Work After Active Outpatient Rehabilitation for Recurrent or Chronic Low Back Pain. *Spine* 25(14): p1809-1816.
- Valencia F.P. and Munro R.R. (1985): An electromyographic study of the lumbar multifidus in man. *Electromyogr Clin Neurophysiol.* 25(4):205-21.
- Waddell G., Feder G., Lewis M. (1997): Systematic reviews of bed rest and advice to stay active for acute low back pain. *Br J General Pract* 1997; 47: 647-52.
- Franca FR, Burke TN, Hanada ES, Marques AP. (2001): Segmental stabilization and muscular strengthening in chronic low back pain - a comparative study. *65(10): 1013-1017*. doi: 10.1590/S1807-59322010001000015



SZENTESI ÜDÜLŐKÖZPONT

6600 Szentes, Csallány Gábor part 4.
Tel.: +36 63/400-100
www.udulokozpont-szentes.hu

