

REFERENCES

- 1. Ikeda DM, McGill SM. Can Altering Motions, Postures, and Loads Provide Immediate Low Back Pain Relief. *Spine* (Phila. Pa. 1976). 2012;37:E1469-E1475.
- 2. Lett KK, McGill SM. Pushing and pulling: personal mechanics influence spine loads. *Ergonomics* 2006;49:895-908.
- 3. Scannell JP, McGill SM. Lumbar posture--should it, and can it, be modified? A study of passive tissue stiffness and lumbar position during activities of daily living. *Phys. Ther.* 2003;83:907-917.
- 4. Bazrgari B, Shirazi-Adl A, Arjmand N. Analysis of squat and stoop dynamic liftings: Muscle forces and internal spinal loads. *Eur. Spine J.* 2007;16:687-699.
- 5. Davis KG, Marras WS, Heaney CA, Waters TR, Gupta P. The impact of mental processing and pacing on spine loading: 2002 Volvo Award in biomechanics. *Spine* (Phila. Pa. 1976). 2002;27:2645-2653.
- 6. Igic I, Ryser S, Elfering A. Does work stress make you shorter? An ambulatory field study of daily work stressors, job control, and spinal shrinkage. *J. Occup. Health Psychol.* 2013;18:469-80.
- 7. McGill S, Grenier S, Bluhm M, Preuss R, Brown S, Russell C. Previous history of LBP with work loss is related to lingering deficits in biomechanical, physiological, personal, psychosocial and motor control characteristics. *Ergonomics* 2003;46:731-746.
- 8. Dolan P, Adams MA. Repetitive lifting tasks fatigue the back muscles and increase the bending moment acting on the lumbar spine. *J. Biomech.* 1998;31:713-721.
- 9. Cholewicki J, McGill SM. Mechanical stability of the in vivo lumbar spine: Implications for injury and chronic low back pain. *Clin. Biomech.* 1996;11:1-15.
- 10. Cholewicki J, McGill SM. Lumbar posterior ligament involvement during extremely heavy lifts estimated from fluoroscopic measurements. *J. Biomech.* 1992;25:17-28.
- 11. Cao D-Y, Pickar JG. Lengthening but not shortening history of paraspinal muscle spindles in the low back alters their dynamic sensitivity. *J. Neurophysiol.* 2011;105(1):434-41.
- 12. Gill KP, Callaghan MJ. The Measurement of Lumbar Proprioception in Individuals with and without Low Back Pain. *Spine* (Philla Pa 1976)1998 1;23(3):371-7
- 13. Crombez G, Vlaeyen JWS, Heuts PHTG, Lysens R. Pain-related fear is more disabling than pain itself: Evidence on the role of pain-related fear in chronic back pain disability. *Pain* 1999;80:329-339.
- 14. Granata KP, Slota GP, Bennett BC. Paraspinal muscle reflex dynamics. *J. Biomech.* 2004;37:241-247.
- 15. Brumagne S, Cordo P, Lysens R, Verschueren S, Swinnen S. The role of paraspinal muscle spindles in lumbosacral position sense in individuals with and without low back pain. *Spine* (Phila. Pa. 1976). 2000;25:989-994.

- 16. Pirouzi S, Emami F, Taghizadeh S, Ghanbari A. Is abdominal muscle activity different from lumbar muscle activity during four-point kneeling? Iran. *J. Med. Sci.* 2013;38:327-333.
- 17. Stevens VK, Vleeming A, Bouche KG, Mahieu NN, Vanderstraeten GG, Danneels LA. Electromyographic activity of trunk and hip muscles during stabilization exercises in four-point kneeling in healthy volunteers. *Eur. Spine J.* 2007;16:711-718.
- 18. Hubley-Kozey CL, Vezina MJ. Muscle activation during exercises to improve trunk stability in men with low back pain. *Arch. Phys. Med. Rehabil.* 2002;83:1100-1108.
- 19. Massé-Alarie H, Schneider C. Cerebral reorganization in chronic low back pain and neurostimulation to improve motor control. *Neurophysiol. Clin.* 2011;41:51-60.
- 20. Marshall PWM, Patel H, Callaghan JP. Gluteus medius strength, endurance, and co-activation in the development of low back pain during prolonged standing. *Hum. Mov. Sci.* 2011;30:63-73.
- 21. McGill S, Juker D, Kropf P. Quantitative intramuscular myoelectric activity of quadratus lumborum during a wide variety of tasks. *Clin. Biomech.* 1996;11:170-172.
- 22. Ekstrom RA, Osborn RW, Hauer PL. Surface electromyographic analysis of the low back muscles during rehabilitation exercises. *J. Orthop. Sports Phys. Ther.* 2008;38:736-745.
- 23. Biering-Sørensen F, Thomsen CE, Hilden J. Risk indicators for low back trouble. *Scand. J. Rehabil. Med.* 1989;21:151-157.
- 24. Renkawitz T, Boluki D, Grifka J. The association of low back pain, neuromuscular imbalance, and trunk extension strength in athletes. *Spine J.* 2006;6:673-683.
- 25. Barati, Safarcherati, Aghayari, Azizi A. Evaluation of Relationship between Trunk Muscle Endurance and Static Balance in Male Students. *Asian J Sport. Med.* 2013;4(4):289-94.
- 26. Penney T, Ploughman M, Austin MW, Behm DG, Byrne JM. Determining the Activation of Gluteus Medius and the Validity of the Single Leg Stance Test in Chronic Non-specific Low Back Pain. *Arch. Phys. Med. Rehabil.* 2014.
- 27. Conneely M, O'Sullivan K. Gluteus maximus and gluteus medius in pelvic and hip stability: isolation or synergistic activation? *Physiotherapy Ireland*, 29(1), pp. 6-10 2008.
- 28. Boudreau S, Romaniello A, Wang K, Svensson P, Sessle BJ, Arendt-Nielsen L. The effects of intra-oral pain on motor cortex neuroplasticity associated with short-term novel tongue-protrusion training in humans. *Pain* 2007;132:169-178.
- 29. Apkarian AV, Sosa Y, Sonty S, et al. Chronic back pain is associated with decreased prefrontal and thalamic gray matter density. *J. Neurosci.* 2004;24:10410-10415.



- 30. Schmidt-Wilcke T, Leinisch E, Gänßbauer S, et al. Affective components and intensity of pain correlate with structural differences in gray matter in chronic back pain patients. *Pain* 2006;125:89-97.
- 31. Seminowicz DA, Wideman TH, Naso L, et al. Effective treatment of chronic low back pain in humans reverses abnormal brain anatomy and function. *J. Neurosci.* 2011; 31:7540-7550.
- 32. Strutton PH, Theodorou S, Catley M, McGregor AH, Davey NJ. Corticospinal excitability in patients with chronic low back pain. *J. Spinal Disord. Tech.* 2005;18:420-424.
- 33. Tsao H, Galea MP, Hodges PW. Driving plasticity in the motor cortex in recurrent low back pain. *Eur. J. Pain* 2010;14:832-839.



REFERENCES

- 1. Nelson-Wong E, Alex B, Csepe D, Lancaster D, Callaghan JP. Altered muscle recruitment during extension from trunk flexion in low back pain developers. *Clin Biomech.* 2012;27(10):994-998.
- 2. Marshall PWM, Patel H, Callaghan JP. Gluteus medius strength, endurance, and co-activation in the development of low back pain during prolonged standing. *Hum Mov Sci.* 2011;30(1):63-73.
- 3. Ropponen A, Gibbons LE, Videman T, Battié MC. Isometric back extension endurance testing: reasons for test termination. *J Orthop Sports Phys Ther.* 2005;35(7):437-442.
- 4. Moreau CE, Green BN, Johnson CD, Moreau SR. Isometric back extension endurance tests: A review of the literature. *J Manipulative Physiol Ther.* 2001;24(2):110-122.
- 5. Vincent HK, Seay AN, Montero C, Conrad BP, Hurley RW, Vincent KR. Kinesiophobia and fear-avoidance beliefs in overweight older adults with chronic low-back pain: relationship to walking endurance--part II. *Am J Phys Med Rehabil.* 2013;92(5):439-445.
- 6. Silfies SP, Mehta R, Smith SS, Karduna AR. Differences in Feedforward Trunk Muscle Activity in Subgroups of Patients With Mechanical Low Back Pain. *Arch Phys Med Rehabil.* 2009;90(7):1159-1169.
- 7. Dickx N, Cagnie B, Parlevliet T, Lavens A, Danneels L. The effect of unilateral muscle pain on recruitment of the lumbar multifidus during automatic contraction. An experimental pain study. *Man Ther.* 2010;15(4):364-369.
- 8. Laird RA, Kent P, Keating JL. Modifying patterns of movement in people with low back pain -does it help? A systematic review. *BMC Musculoskelet Disord*. 2012;13:169.
- 9. Hodges PW, Richardson CA. Inefficient muscular stabilization of the lumbar spine associated with low back pain. A motor control evaluation of transversus abdominis. *Spine (Phila Pa 1976).* 1996;21(22):2640-2650.
- 10. Hodges PW, Richardson CA. Delayed postural contraction of transversus abdominis in low back pain associated with movement of the lower limb. *J Spinal Disord.* 1998;11(1):46-56.
- 11. Descarreaux M, Blouin JS, Teasdale N. Repositioning accuracy and movement parameters in low back pain subjects and healthy control subjects. *Eur Spine J.* 2005;14(2):185-191.
- 12. Ebenbichler GR, Oddsson LI, Kollmitzer J, Erim Z. Sensory-motor control of the lower back: implications for rehabilitation. *Med Sci Sports Exerc.* 2001;33(11):1889-1898.
- 13. Cresswell AG, Oddsson L, Thorstensson A. The influence of sudden perturbations on trunk muscle activity and intra-abdominal pressure while standing. *Exp Brain Res.* 1994;98(2):336-341.

- 14. Grillner S, Nilsson J, Thorstensson A. Intra-abdominal pressure changes during natural movements in man. *Acta Physiol Scand.* 1978;103(3):275-283.
- 15. Hemborg B, Moritz U, Lowing H. Intra-abdominal pressure and trunk muscle activity during lifting. IV. The causal factors of the intra-abdominal pressure rise. *Scand J Rehabil Med.* 1985;17(1):25-38.
- 16. Cholewicki J, Juluru K, McGill SM. Intra-abdominal pressure mechanism for stabilizing the lumbar spine. *J Biomech.* 1999;32(1):13-17.
- 17. Daggfeldt K, Thorstensson A. The role of intra-abdominal pressure in spinal unloading. *J Biomech.* 1997;30(11-12):1149-1155.
- 18. Hodges P, van den Hoorn W, Dawson A, Cholewicki J. Changes in the mechanical properties of the trunk in low back pain may be associated with recurrence. *J Biomech.* 2009;42(1):61-66.
- 19. Van Daele U, Hagman F, Truijen S, Vorlat P, Van Gheluwe B, Vaes P. Decrease in postural sway and trunk stiffness during cognitive dual-task in nonspecific chronic low back pain patients, performance compared to healthy control subjects. *Spine (Phila Pa 1976).* 2010;35(5):583-589.
- 20. Dunk NM, Callaghan JP. Lumbar spine movement patterns during prolonged sitting differentiate low back pain developers from matched asymptomatic controls. *Work.* 2010;35(1):3-14.
- 21. Williams MM, Hawley JA, McKenzie RA, van Wijmen PM. A Comparison of the Effects of Two Sitting Postures on Back and Referred Pain. *Spine*1991;16(10):1185-1191
- 22. Gregory DE, Callaghan JP. Prolonged standing as a precursor for the development of low back discomfort: An investigation of possible mechanisms. *Gait Posture*. 2008;28(1):86-92.
- 23. Van Tulder MW, Koes BW, Bouter LM. Conservative treatment of acute and chronic nonspecific low back pain. A systematic review of randomized controlled trials of the most common interventions. *Spine (Phila Pa 1976)*. 1997;22(18):2128-2156.
- 24. Van Tulder M, Malmivaara A, Esmail R, Koes B. Exercise therapy for low back pain: a systematic review within the framework of the cochrane collaboration back review group. *Spine (Phila Pa 1976).* 2000;25(21):2784-2796.
- 25. Daniel M, Martin AD, Carter J. Opiate Receptor Blockade by Naltrexone and Mood State after Acute Physical Activity. *British J Sports Med.* 1992;26(2)111-115
- 26. Adlard PA, Cotman CW. Voluntary exercise protects against stress-induced decreases in brain-derived neurotrophic factor protein expression. *Neuroscience*. 2004;124(4):985-992.
- 27. Smith BE, Littlewood C, May S. An update of stabilisation exercises for low back pain: a systematic review with meta-analysis. *BMC Musculoskelet Disord*. 2014;15:416.



- 28. May S, Johnson R. Stabilisation exercises for low back pain: a systematic review. *Physiotherapy.* 2008;94(3):179-189.
- 29. Macedo LG, Maher CG, Latimer J, McAuley JH. Motor control exercise for persistent, nonspecific low back pain: a systematic review. *Phys Ther.* 2009;89(1):9-25.
- 30. Wang X-Q, Zheng J-J, Yu Z-W, et al. A meta-analysis of core stability exercise versus general exercise for chronic low back pain. *PLoS One.* 2012;7(12):1-7.
- 31. Byström MG, Rasmussen-Barr E, Johannes W, Grooten A, Grooten WJA. Motor Control Exercises Reduces Pain and Disability in Chronic and Recurrent Low Back Pain: A Meta-Analysis. *Spine (Phila Pa 1976)*. 2013;38(6):E350-E358.
- 32. Queiroz BC, Cagliari MF, Amorim CF, Sacco IC. Muscle Activation During Four Pilates Core Stability Exercises in Quadruped Position. *Arch Phys Med Rehabil.* 2010;91(1):86-92.
- 33. McGill SM, Karpowicz A. Exercises for spine stabilization: motion/motor patterns, stability progressions, and clinical technique. *Arch Phys Med Rehabil.* 2009;90(1):118-126.
- 34. Pirouzi S, Emami F, Taghizadeh S, Ghanbari A. Is abdominal muscle activity different from lumbar muscle activity during four-point kneeling? *Iran J Med Sci.* 2013;38:327-333.
- 35. Stevens VK, Vleeming A, Bouche KG, Mahieu NN, Vanderstraeten GG, Danneels LA. Electromyographic activity of trunk and hip muscles during stabilization exercises in four-point kneeling in healthy volunteers. *Eur Spine J.* 2007;16:711-718.
- 36. Kim J-S, Kang M-H, Jang J-H, Oh J-S. Comparison of selective electromyographic activity of the superficial lumbar multifidus between prone trunk extension and fourpoint kneeling arm and leg lift exercises. *J Phys Ther Sci.* 2015;27(4):1037-1039.
- 37. Thorstensson A, Carlson H. Fibre types in human lumbar back muscles. *Acta Physiol Scand.* 1987;131(2):195-202.
- 38. Jørgensen K. Human Trunk Extensor Muscles Physiology and Ergonomics. Acta Physiol Scand. 1997; 637:1-58
- 39. Jørgensen K, Nicholaisen T, Kato M. Muscle fiber distribution, capillary density, and enzymatic activities in the lumbar paravertebral muscles of young men. Significance for isometric endurance. *Spine (Phila Pa 1976)*. 1993;18(11):1439-1450.
- 40. Mazis N, Papachristou DJ, Zouboulis P, Tyllianakis M, Scopa CD, Megas P. The effect of different physical activity levels on muscle fiber size and type distribution of lumbar multifidus. A biopsy study on low back pain patient groups and healthy control subjects. *Eur J Phys Rehabil Med.* 2009;45(4):459-467.

- 41. Mannion a F, Kaser L, Weber E, et al. Influence of age and duration of symptoms on fibre type distribution and size of the back muscles in chronic low back pain patients. *Eur Spine J.* 2000;9(4):273-281.
- 42. Crossman K, Mahon M, Watson PJ, Oldham JA, Cooper RG. Chronic low back pain-associated paraspinal muscle dysfunction is not the result of a constitutionally determined "adverse" fiber-type composition. *Spine (Phila Pa 1976)*. 2004;29(6):628-634.
- 43. Mannion AF, Dolan P. Electromyographic median frequency changes during isometric contraction of the back extensors to fatigue. *Spine (Phila Pa 1976)*. 1994;19(11):1223-1229.
- 44. Luoto S, Heliövaara M, Hurri H, Alaranta H. Static back endurance and the risk of low-back pain. *Clin Biomech.* 1995;10(6):323-324.
- 45. Ekstrom RA, Donatelli RA, Carp KC. Electromyographic analysis of core trunk, hip, and thigh muscles during 9 rehabilitation exercises. *J Orthop Sports Phys Ther.* 2007;37(12):754-762.
- 46. Beith ID, Synnott RE, Newman SA. Abdominal muscle activity during the abdominal hollowing manoeuvre in the four point kneeling and prone positions. *Man Ther.* 2001;6(2):82-87.
- 47. Bjerkefors A, Ekblom MM, Josefsson K, Thorstensson A. Deep and superficial abdominal muscle activation during trunk stabilization exercises with and without instruction to hollow. *Man Ther.* 2010;15(5):502-507.
- 48. Chanthapetch P, Kanlayanaphotporn R, Gaogasigam C, Chiradejnant A. Abdominal muscle activity during abdominal hollowing in four starting positions. *Man Ther.* 2009;14(6):642-646.
- 49. O'Sullivan PB, Twomey LT, Allison GT. Evaluation of specific stabilizing exercise in the treatment of chronic low back pain with radiologic diagnosis of spondylolysis of spondylolisthesis. *Spine (Phila Pa 1976).* 1997;22(24):2959-2967.
- 50. Harts CC, Helmhout PH, de Bie RA, Staal JB. A high-intensity lumbar extensor strengthening program is little better than a low-intensity program or a waiting list control group for chronic low back pain: a randomised clinical trial. *Aust J Physiother.* 2008;54(1):23-31.
- 51. Moon HJ, Choi KH, Kim DH, et al. Effect of lumbar stabilization and dynamic lumbar strengthening exercises in patients with chronic low back pain. Ann Rehabil Med. 2013;37(1):110-117.
- 52. Rissanen A, Kalimo H, Alaranta H. Effect of intensive training on the isokinetic strength and structure of lumbar muscles in patients with chronic low back pain. *Spine (Phila Pa 1976).* 1995;20(3):333-340.
- 53. Hides JA, Stokes MJ, Saide M, Jull GA, Cooper DH. Evidence of lumbar multifidus muscle wasting ipsilateral to symptoms in patients with acute/subacute low back pain. *Spine (Phila Pa 1976).* 1994;19(2):165-172.



- 54. Hodges P, Holm AK, Hansson T, Holm S. Rapid atrophy of the lumbar multifidus follows experimental disc or nerve root injury. *Spine (Phila Pa 1976)*. 2006;31(25):2926-2933.
- 55. Fitts RH, Riley DR, Widrick JJ. Functional and structural adaptations of skeletal muscle to microgravity. *J Exp Biol.* 2001;204(Pt 18):3201-3208.
- 56. Hides JA, Jull GA, Richardson CA. Long-Term Effects of Specific Stabilizing Exercises for First-Episode Low Back Pain. Spine. 2001;26(11)E243-E248
- 57. Marshall PWM, Patel H, Callaghan JP. Gluteus medius strength, endurance, and co-activation in the development of low back pain during prolonged standing. *Hum Mov Sci.* 2011;30:63-73.
- 58. McGill S, Juker D, Kropf P. Quantitative intramuscular myoelectric activity of quadratus lumborum during a wide variety of tasks. *Clin Biomech.* 1996;11:170-172.
- 59. Ekstrom RA, Osborn RW, Hauer PL. Surface electromyographic analysis of the low back muscles during rehabilitation exercises. *J Orthop Sports Phys Ther.* 2008;38:736-745.
- 60. Biering-Sørensen F, Thomsen CE, Hilden J. Risk indicators for low back trouble. *Scand J Rehabil Med.* 1989;21:151-157.
- 61. Renkawitz T, Boluki D, Grifka J. The association of low back pain, neuromuscular imbalance, and trunk extension strength in athletes. *Spine J.* 2006;6:673-683.
- 62. Barati , Safarcherati, Aghayari, Azizi A. Evaluation of Relationship between Trunk Muscle Endurance and Static Balance in Male Students. *Asian J Sport Med.* 2013;4(4):289-294.
- 63. Nelson-Wong E, Gregory DE, Winter DA, Callaghan JP. Gluteus medius muscle activation patterns as a predictor of low back pain during standing. *Clin Biomech.* 2008;23(5):545-553.
- 64. Nelson-Wong E, Callaghan JP. Is muscle co-activation a predisposing factor for low back pain development during standing? A multifactorial approach for early identification of at-risk individuals. *J Electromyogr Kinesiol.* 2010;20(2):256-263.
- 65. Navalgund A, Buford JA, Briggs MS, Givens DL. Trunk muscle reflex amplitudes increased in patients with subacute, recurrent LBP treated with a 10-week stabilization exercise program. *Motor Control.* 2013;17(1):1-17.
- 66. Hodges PW. Changes in motor planning of feedforward postural responses of the trunk muscles in low back pain. *Exp brain Res.* 2001;141(2):261-266.
- 67. Radebold A, Cholewicki J, Panjabi MM, Patel TC. Muscle response pattern to sudden trunk loading in healthy individuals and in patients with chronic low back pain. *Spine (Phila Pa 1976)*. 2000;25(8):947-954.
- 68. Wilder DG, Aleksiev AR, Magnusson ML, Pope MH, Spratt KF, Goel VK. Muscular response to sudden load. A tool to evaluate fatigue and rehabilitation. *Spine (Phila Pa 1976)*. 1996;21(22):2628-2639.

- 69. Radebold A, Cholewicki J, Polzhofer GK, Greene HS. Impaired Postural Control of the Lumbar Spine Is Associated With Delayed Muscle Response Times in Patients With Chronic Idiopathic Low Back Pain. *Spine (Phila Pa 1976)*. 2001;26(7):724-730.
- 70. Granata KP, Orishimo KF. Response of trunk muscle coactivation to changes in spinal stability. *J Biomech.* 2001;34(9):1117-1123.
- 71. Monfort-Pañego M, Vera-García FJ, Sánchez-Zuriaga D, Sarti-Martínez MÁ. Electromyographic Studies in Abdominal Exercises: A Literature Synthesis. *J Manipulative Physiol Ther.* 2009;32(3):232-244.
- 72. Karst GM, Willett GM. Effects of Specific Exercise Instructions on Abdominal Muscle Activity during Trunk Curl Exercises. *J Orthop Sports Phys Ther* 2004;34(1) 4-12
- 73. Vera-Garcia FJ, Flores-Parodi B, Elvira JLL, Sarti MA. Influence of trunk curl-up speed on muscular recruitment. *J Strength Cond Res.* 2008;22(3):684-690.
- 74. George SZ, Childs JD, Teyhen DS, et al. Brief psychosocial education, not core stabilization, reduced incidence of low back pain: results from the Prevention of Low Back Pain in the Military (POLM) cluster randomized trial. *BMC Med.* 2011;9:128.
- 75. Koumantakis GA, Watson PJ, Oldham JA. Trunk Muscle Stabilization Training plus General Exercise versus General Exercise Only: Randomized Controlled Trial of Patients with Recurrent Low Back Pain. *Phys Ther* 2005;85(3)209-225
- 76. Inani SB, Selkar SP. Effect of core stabilization exercises versus conventional exercises on pain and functional status in patients with non-specific low back pain: A randomized clinical trial. *J Back Musculoskelet Rehabil.* 2013;26(1):37-
- 77. Axler CT, McGill SM. Low back loads over a variety of abdominal exercises: searching for the safest abdominal challenge. *Med Sci Sports Exerc.* 1997;29(6):804-811.
- 78. McGill S. Low Back Disorders. Evidence-Based Prevention and Rehabilitation, 2nd Edition. Hum Kinet. 2007. www.humankinetics.com
- 79. Application Manual for the Revised Niosh Lifting Equation. Diane Publishing company; 1995.
- 80. Riemann BL, Lapinski S, Smith L, Davies G. Biomechanical analysis of the anterior lunge during 4 external-load conditions. *J Athl Train*. 2012;47(4):372-378.
- 81. Begalle RL, DiStefano LJ, Blackburn T, Padua DA. Quadriceps and hamstrings coactivation during common therapeutic exercises. *J Athl Train*. 2012;47(4):396-405.
- 82. Stuart MJ, Meglan DA, Lutz GE, Growney ES, An KN. Comparison of intersegmental tibiofemoral joint forces and muscle activity during various closed kinetic chain exercises. *Am J Sports Med.* 24(6):792-799.
- 83. Ebben WP, Feldmann CR, Dayne A, Mitsche D, Alexander P, Knetzger KJ. Muscle activation during lower body resistance training. *Int J Sports Med.* 2009;30(1):1-8.



- 84. Boudreau SN, Dwyer MK, Mattacola CG, Lattermann C, Uhl TL, McKeon JM. Hip-muscle activation during the lunge, single-leg squat, and step-up-and-over exercises. *J Sport Rehabil.* 2009;18(1):91-103.
- 85. Flanagan SP, Wang M-Y, Greendale GA, Azen SP, Salem GJ. Biomechanical Attributes of Lunging Activities for Older Adults. *J Strength Cond Res.* 2004;18(3)599-605
- 86. Crill Matthew. Kolba Christopher. Chleboun Gary. Using Lunge Measurements for Baseline Fitness Testing. *J Sport Rehabil.* 2004;13(1):44-53.
- 87. Escamilla RF, Zheng N, Macleod TD, et al. Patellofemoral joint force and stress between a short- and long-step forward lunge. *J Orthop Sports Phys Ther.* 2008;38(11):681-690.
- 88. Alkjaer T, Simonsen EB, Peter Magnusson SP, Aagaard H, Dyhre-Poulsen P. Differences in the movement pattern of a forward lunge in two types of anterior cruciate ligament deficient patients: copers and non-copers. *Clin Biomech (Bristol, Avon).* 2002;17(8):586-593.
- 89. Crombez G, Vlaeyen JWS, Heuts PHTG, Lysens R. Pain-related fear is more disabling than pain itself: Evidence on the role of pain-related fear in chronic back pain disability. *Pain.* 1999;80:329-339.
- 90. Vlaeyen JWS, Linton SJ. Fear-avoidance and its consequences in chronic musculoskeletal pain: A state of the art. *Pain.* 2000;85(3):317-332.
- 91. Verbunt JA, Seelen HA, Vlaeyen JW, et al. Pain-related factors contributing to muscle inhibition in patients with chronic low back pain: an experimental investigation based on superimposed electrical stimulation. *Clin J Pain.* 21(3):232-240.
- 92. Hutten MM, Hermens HJ, Ijzerman MJ, Lousberg R, Zilvold G. Distribution of psychological aspects in subgroups of chronic low back pain patients divided on the score of physical performance. *Int J Rehabil Res.* 1999;22(4):261-268.
- 93. Lee JH, Ooi Y, Nakamura K. Measurement of muscle strength of the trunk and the lower extremities in subjects with history of low back pain. *Spine (Phila Pa 1976)*. 1995;20(18):1994-1996.
- 94. Cooper NA, Scavo KM, Strickland KJ, et al. Prevalence of gluteus medius weakness in people with chronic low back pain compared to healthy controls. *Eur Spine J.* 2015. Epub
- 95. Penney T, Ploughman M, Austin MW, Behm DG, Byrne JM. Determining the Activation of Gluteus Medius and the Validity of the Single Leg Stance Test in Chronic Non-specific Low Back Pain. *Arch Phys Med Rehabil.* 2014.95(10)1969-76
- 96. Ayotte NW, Stetts DM, Keenan G, Greenway EH. Electromyographical analysis of selected lower extremity muscles during 5 unilateral weight-bearing exercises. *J Orthop Sports Phys Ther.* 2007;37(2):48-55.

- 97. McGill SM, Karpowicz A, Fenwick CMJ, Brown SHM. Exercises for the torso performed in a standing posture: spine and hip motion and motor patterns and spine load. *J Strength Cond Res.* 2009;23(2):455-464.
- 98. Farrokhi S, Pollard CD, Souza RB, Chen Y-J, Reischl S, Powers CM. Trunk position influences the kinematics, kinetics, and muscle activity of the lead lower extremity during the forward lunge exercise. *J Orthop Sports Phys Ther.* 2008;38(7):403-409.
- 99. Fuchs E, Holmes P, David I, Ayali A. Proprioceptive feedback reinforces centrally generated stepping patterns in the cockroach. *J Exp Biol.* 2012;215(11):1884-1891.
- 100. Marder E, Bucher D. Central pattern generators and the control of rhythmic movements. *Curr Biol.* 2001;11(23).
- 101. MacKay-Lyons M. Central pattern generation of locomotion: a review of the evidence. *Phys Ther.* 2002;82(1):69-83.
- 102. Clark KM, Holt LE, Sinyard J. Electromyographic comparison of the upper and lower rectus abdominis during abdominal exercises. *J Strength Cond Res.* 2003;17(3):475-483.
- 103. Hildenbrand K, Noble L. Abdominal Muscle Activity while Performing Trunk-Flexion Exercises Using the Ab Roller, ABslide, FitBall, and Conventionally Performed Trunk Curls. *J Athl Train.* 2004;39(1):37-43.
- 104. Duncan M. Muscle activity of the upper and lower rectus abdominis during exercises performed on and off a Swiss ball. *J Bodyw Mov Ther.* 2009;13(4):364-367.
- 105. Behm DG, Leonard AM, Young WB, Bonsey WAC, MacKinnon SN. Trunk muscle electromyographic activity with unstable and unilateral exercises. *J Strength Cond Res.* 2005;19(1):193-201.
- 106. Mercier C, Léonard G. Interactions between pain and the motor cortex: Insights from research on phantom limb pain and complex regional pain syndrome. *Physiother Canada*. 2011;63(3):305-314.
- 107. Youdas JW, Guck BR, Hebrink RC, Rugotzke JD, Madson TJ, Hollman JH. An electromyographic analysis of the Ab-Slide exercise, abdominal crunch, supine double leg thrust, and side bridge in healthy young adults: implications for rehabilitation professionals. *J Strength Cond Res.* 2008;22(6):1939-1946.
- 108. Simmonds MJ, Moseley GL, Vlaeyen JWS. Pain, mind, and movement: an expanded, updated, and integrated conceptualization. *Clin J Pain*. 2008;24(4):279-280.
- 109. Loeser JD, Melzack R. Pain: an overview. *Lancet (London, England).* 1999;353(9164):1607-1609.
- 110. Ashburn MA, Staats PS. Management of chronic pain. *Lancet.* 1999;353(9167):1865-1869.