LOW BACK PAIN AND MOTOR CONTROL

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According to Vos et al., musculoskeletal disorders in the overall population were the cause of nearly 166 million years lived with disability in 2010, with low back pain (LBP) accounting for 50% of the total.[1] Although in most cases LBP may recover without any medical intervention, the recurrence rate is high.[2] One hypothesis for the persistence or recurrence of non-specific LBP is impaired motor control. Indeed, recurrent and chronic non-specific LBP are associated with changes in morphology and behavior of several muscles, this commonly includes the deep trunk muscles (transversus abdominis, multifidus and pelvic floor muscles).[3]

Motor control changes take place at many levels of the nervous system. Studies reported differences between individuals with and without LBP in voluntary trunk muscle activation[4], trunk muscle reflexes[5], trunk kinematics[6] and in cortical mapping of sensory inputs from the trunk[7], and motor outputs to the trunk.[8] Although these adaptations may have short-term benefits in providing a more robust control[9], changes may have adverse long-term consequences, such as increased joint loading[10–12], increased muscle fatigue[13], decreased movement quality[14,15] which might favor/explain recurrent/persisting pain. Furthermore, pain may coincide with a reduction in motor variability, generating a rigid repertoire of motor strategies.[16,17]

Guidelines regarding the management of recurrent and chronic LBP are consistent in recommending exercise therapy.[18] Core stabilization and motor-control exercises are commonly used in the treatment of LBP. Previous studies indicate that such interventions may increase motor control quality, thus decreasing pain and improving function[19–21]. However, the relative contribution of the intervention to clinical outcomes will differ from one individual to another . In view of the individual-specific nature of the motor control changes, comprehensive rehabilitation will require an individualized assessment, and a tailored motor learning approach.

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