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How Do Resilience and Low Back Dysfunction Matter?

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Resilience is an individual's ability to adapt to stress and adversity that allows the individual to tolerate their quality of life in a dynamic process (Garcia-Dia et al., 2013; Masten & Obradovic, 2006). However, resilience seems to be more than just "tolerating" life; it is "reacting positively" to adversity. According to a psychologist named Boris Cyrulnik, modern neuroscience techniques have confirmed that the absence of sensory stimulation during periods of maximal synaptic expansion provides the substrate for a subsequent mood disorder (Cyrulnik, 1992; 2005). He argued that people can use resilience in every difficult circumstance, whether that could be a physical or psychological challenge. It is also important to understand how those people can triumph over adversity, especially in the case of children reared in orphanages and children who are abused, due to their ability to react positively to challenging situations. The characteristics of resilience are most often identified within the context of disruptive life events in the area of psychiatry and social behavior (Holaday & McPhearson, 1997); however, the emphasis can also be applied to musculoskeletal injuries.

A recent study indicated a balance should be established between defended and resilience-based conceptions of health and safety (Leclercq, Cuny-Guerrier, Gaudez & Aublet-Cuvelier, 2015). As the majority of musculoskeletal injuries manifest themselves through slips, trips and falls, these events have a strong impact on risk perception and on approaches necessary to ensure sustainable prevention. Research should also be extended to enhance an in-depth understanding of controls impacting worker movements when performing a task, while safeguarding health and safety (Leclercq, Cuny-Guerrier, Gaudez & Aublet-Cuvelier, 2015). It is evident that a greater resilience possibly allows for a decrease in these events or a greater ability to cope with the events. This commentary provides consideration for future clinical research on low back pain (LBP), resilience and interactions with psychosomatic as well as somatopsychic aspects to improve quality of life.

One of the most common musculoskeletal dysfunctions is LBP. There is a 24% to 87% rate of recurrence within one year in those who have recovered from an episode of LBP (Pengel, Herbert, Maher & Refshauge, 2003; Stanton et al., 2008). Several studies have reported poor coordination of balance performance in subjects with recurrent LBP (Brumagne et al., 2000; Sung and Park, 2009; Tsao et al., 2010). It is generally accepted that individuals with recurrent LBP possess altered proprioceptive postural control as well as less refined positional sense (Brumagne et al., 2008; Sung, 2013; Tsao & Hodges, 2008). In addition, those who are distressed from LBP could be characterized by psychological factors corresponding to pain-related coping strategies (Viniol et al., 2013). For example, those who have a low resilience might respond poorly to adversity and to treatment strategies for LBP. However, there is a lack of understanding about altered kinematic and kinetic changes related to resilience in subjects with LBP.

Although instruments were designed to quantify facets of resilience, few scales have been implemented to measure resilience as a process (Friborg et al., 2003; Smith et al., 2008). A person with an increasing number of health-related stressors encounters the risk of poor mental health caused by more depression/anxiety, but also somatic health due to symptoms of severe musculoskeletal pain (Friborg et al., 2015). It was suggested that those who are more resilient might endure various psychosomatic or mental health challenges with proper adjustment strategies (Ponce-Garcia, Madewell & Kennison, 2015). Their results indicated that the low-resilient group scored significantly lower on all subscales of the protective factor with marked differences in prioritizing and planning behavior. However, there are a couple of ways to quantify changes for a better quality of life-not only through a psychological point of view, but also a physical approach to functional activities.

First, the importance of physical performance and its influence on predicting future disability has been suggested for multidimensional models of risk and resilience (Yates & Grey, 2012). Those who possess good resilience often demonstrate good mental health, but they also exhibit slightly elevated symptoms of severe musculoskeletal pain (Friborg et al., 2015). Resilience is not an all-or-nothing matter since physical ailments may characterize individuals as adapting well following encounters with health-related stressors.

Although exploratory analyses for etiological differences across profiles do not provide cause or effect of individual characteristics, those previous findings highlight the need for multidimensional models of risk and resilience that consider physical performance. For example, the positive relationship between resilience and gait speed is an important finding because it reinforces the connection between physical and emotional health (Wells, Avers & Brooks, 2012). The resilient people who adjust to challenges better feel less alone and less entrenched in pain with other support. However, the resilience levels need to be identified with physical performance in order to be helpful in promoting independence.

The association between resilience and physical performance can predict future disability ((Wells, Avers & Brooks, 2012), and it is important to investigate the ability to recover physical or emotional health after illness or loss. As resilience is developed through functioning in the presence of adversity, resilience might be an important factor in the ability to cope with traumatic injuries as individuals are more likely to successfully adapt to disruptive events if they are resilient (White et al., 2010). Further research is needed to determine if resilience and dynamic standing performance can serve as predictors of disability in a broader sample of indivivuals. If this is the case, resilience could be targeted as a means of improving physical performance in those who have balance deficits. The major risk factors for balance deficits could be impaired balance and gait, polypharmacy, and history of previous falls (Ambrose, Cruz & Paul, 2015; Ambrose, Paul & Hausdorff, 2013). Other risk factors include advancing age, female gender, visual impairments, cognitive decline (especially attention and executive dysfunction), and environmental factors. As a result, no single factor seems to be accurate enough to stand as the sole predictor of fall risk or fall injury risk because so many diverse factors are involved in standing balance.

Second, there is growing scientific evidence supporting the one leg balance test as a significant and easy-to-administer predictor

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of injurious falls (Sung & Leininger, 2015; Sung, Yoon & Lee, 2010). The capability to tolerate single leg standing balance challenges and a level of resilience to stabilize posture might be correlated. The ultimate goal was to use the resilience concept as a means to improve a patient's balance deficits. An objective tool to evaluate comprehensive postural sway was implemented for the one leg standing test (Ham et al., 2010; Jo et al., 2011; Lee, Ham & Sung, 2012; Sung, Yoon & Lee, 2010). The measurements of relative holding time and relative standstill time during one leg standing might be good postural measurement tools to quantify outcomes from resilience training interventions. There is a potential mechanism of kinetic and kinematic indices in individual balance deficits. These measurement tools will provide useful information for those interested in assessing dynamic activities among indivivuals who lack resilience. These indices might be different between high resilience and low resilience groups. Understanding the mechanisms and responses associated with standing balance will ultimately enhance resiliency for better quality of life.

Third, resilience training could increase positive life outcomes (Bradshaw et al., 2007). Interventions to foster resilience among people with LBP will have the potential to make an important contribution to increasing positive life outcomes. However, none of the available exercise interventions have emerged as the most commonly accepted treatment approach for LBP. This problem may not be entirely the result of the ambiguity of the effectiveness of the methods, but could be at least partially due to a lack of an outcome measure that serves as a meaningful, commonly accepted gold standard by which to compare the effectiveness of the various methods. There is conflicting evidence concerning the effectiveness of specific interventions for specific conditions caused by the individual having different goals, directions, and individual characteristics. For example, a recent study indicated that yoga exercise decreases functional disability, pain intensity, and depression at the 6-month follow-up in subjects with LBP (Williams et al., 2009) and another study indicated an incremental cost-effectiveness intervention for treating subjects with chronic and recurrent LBP (Chuang et al., 2012).

Resilience is the ability to recover and improve in order to prevent physical insults. Clinicians are concerned about individuals who experience physical and mental dysfunction/pain in the process of moving through adversity. However, when one examines the literature on resilience for insight into its nature, inconsistencies emerge, suggesting that further theoretical delineation of the concept is needed, especially in individuals with physical disabilities. The stability indices in sensitive detection and prevention of fall injuries were implemented during one leg balance as a predictor of falls (Sung & Leininger, 2015). Further research into sensitive measures is vital prior to wider implementation of resilience concepts in rehabilitation practice.

In summary, since there is no current 'gold standard' amongst resilience measures, the single leg standing test could be considered as a possible objective tool. The objective measure could be further improved by a physical performance test, which might improve the sensitivity of measures and produce valid and reliable intervention protocols. Furthermore, sensitive kinetic and kinematic measurements are needed to compare the resilience measurements following a specific intervention protocol.

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