[VIEWPOINT]

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Unraveling the Complexity of Low Back Pain

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Low back pain (LBP) is the leading cause of disability worldwide.[22] Various approaches to diagnose and manage LBP have arisen, leading to an exponential increase in health care costs.[12,16] Paradoxically, this trend has been associated with a concurrent increase in disability and chronicity.[12] Biomedical and structural beliefs largely underpin current clinical practice, with a focus on providing "magic bullet" treatments directed towards presumed damaged structures and biomechanical faults and/or on providing symptom palliation. Exponential increases in magnetic resonance imaging (MRI) scanning to identify these damaged structures have led to escalating rates of spinal fusions and disc replacements.[27,28] This is in spite of evidence that abnormal MRI findings are prevalent in asymptomatic populations and are poor predictors of future LBP and disability.[7,24] Indeed, providing a patient with a pathoanatomical diagnosis can result in increased fear and iatrogenic disability.[26,41] In terms of symptom palliation, there has also been an exponential increase in spine injections; pharmacology, including opioid prescriptions; and implanted spinal cord stimulators. All these interventions have limited long-term efficacy and carry significant health risks.[9,44]

In parallel, there has also been an expansion in physical therapies offered for LBP. Many of these therapies focus on symptom palliation and/or correcting supposed biomechanical faults, using spinal manipulation, soft tissue techniques, electrotherapy, dry needling, and taping, to name a few. These therapies, when tested, have only demonstrated small and at best short-term benefits,[2,30] while the mechanisms underlying them have been identified as neurophysiological rather than biomechanical and structural.[5]

At the same time, a wealth of specific exercise interventions have emerged to address presumed biomechanical and structural abnormalities. These include stabilization, muscle balance, and directional exercises that target presumed impairments such as hypermobilities, subluxations, instabilities, ring shifts, malalignments, and/or derangements. These so-called abnormalities are presumed to be the cause of LBP and communicated as such to patients. This practice persists without evidence that the abnormalities it addresses are strong predictors of LBP and associated disability. Furthermore, randomized controlled trials investigating these various interventions have failed to demonstrate clinically meaningful long-term effects or that one form of exercise therapy is superior to another.[19,43] Indeed, there is also growing evidence that nonspecific factors, such as therapeutic alliance, patient beliefs and expectations, therapist confidence, pain catastrophizing, and self-efficacy, are more predictive of clinical outcomes than changes to the target of the therapy (ie, changes in muscle timing, posture, joint position).[17,42,45] Also in this paradigm, the ergonomic industry continues to reinforce the belief that backs need to be protected, teaching people to sit upright, avoid bending, and lift with a braced abdominal wall and a straight back. This is in spite of a lack of evidence that ergonomic interventions reduce the risk of LBP,[13] or that the way you bend increases the risk of LBP.[50]

This commonly "threatening" clinical climate frequently leaves the patient with LBP confused and fearful that his or her spine is frail, vulnerable, and damaged.[11] This in turn reinforces protective and avoidant behaviors, leaving people with few active coping strategies to manage their pain and maintain quality of life. This commonly leads to health care shopping and stepped care, in which patients progress to more invasive and risky treatments. Sadly, this current practice is often discordant with patient expectations regarding the importance of clear

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communication about their disorder, their desire for individualized self-management strategies to control their pain,[32] and goals relating to functional restoration and maintaining quality of life.[23] Patients with persistent LBP describe this process as having their "life on hold," in which they don't understand their pain problem, have few active coping strategies to manage it, and lose their ability to do the things in life that they value.[8] This is often associated with escalating distress, disability, and depression.[8]

CONTEMPORARY UNDERSTANDING OF LBP

In contrast, there is growing evidence that LBP is a multidimensional disorder.[36] It is increasingly clear that persistent and disabling LBP is not an accurate measure of local tissue pathology or damage alone.[7,24] Rather, it is best seen as a protective mechanism produced by the neuro-immune-endocrine systems in response to the individual's perceived level of danger, threat, or disruption to homeostasis.[29,31,51] These systems constantly interact and are influenced by an interplay of physical (loading exposures and levels of conditioning),[35] psychological (cognitions and emotions),[37,49] social (socioeconomic, cultural, work, home environment, and stress),[20,21] lifestyle (sleep, activity levels),[6,25] comorbid health (mental health, obesity),[37,40] and nonmodifiable (genetics, sex, life stage)[3,4,14] factors. Interestingly, the emerging evidence reveals that many of these factors are interrelated, rather than being mutually exclusive.[10,15,46] The relative contribution from these different factors and their interactions with each other is variable, fluctuating, and unique to each individual with LBP.[36] As a result, patients with LBP can range from low to high levels of complexity. This is reflected in their levels of pain, distress, and coping (behavioral) responses, all of which, in turn, influence their levels of disability.[1,18]

This interplay between multiple systems and factors restricts reductionist approaches that attempt to neatly categorize or subgroup people with LBP in order to target treatment.[38] It also highlights why magic bullets and symptom palliation have largely failed, as the capacity of these approaches to positively impact this interplay is limited.[33] While subgrouping within some of these dimensions has been considered (eg, neurophysiological, pain-related movement behaviors, psychological and lifestyle profiles), randomized controlled trials testing subgroup-targeted care have failed to demonstrate greater benefits.[39,47] "Boxing" patients into rigid subgroups may miss the crucial interrelationships between factors for an individual.[38]

This knowledge underpins the need for a multidimensional clinical-reasoning approach to patient examination and management in order to identify the various and relevant underlying drivers of pain and disability for each individual.[34,48] This approach enables the clinician to recognize the relative weighting and dominance of the various factors that are unique to each person's presentation (**FIGURE**). The interplay between different factors for an individual may vary on a temporal basis, highlighting the need to regularly reassess their contribution. For example, pain and behavioral responses may fluctuate based on a person's perception of threat, levels of attention to pain, mood, contextual social stressors, sleep, and activity levels. Some of these factors may be modifiable (eg, beliefs, mood, behavioral responses, sleep, and activity levels), whereas others may not be (eg, socioeconomic and social circumstances). The challenge for the clinician is to consider the relative contribution of modifiable versus nonmodifiable factors associated with the disorder to target care. The dominance of nonmodifiable factors may moderate outcomes and require additional targeted multidisciplinary care.

This contemporary understanding demands a shift away from providing a simplistic structural and/or biomechanical diagnosis and treatment for LBP. Rather, this process empowers the patient to develop a clear understanding of the contributing factors that promote pain and disability.[34,48] This enables the patient to become a partner in a therapeutic journey that aims to lower the threat of pain, develop active coping strategies to self-manage the disorder, and engage in value-based activities.[34,48] Within this context, hands-on care can be used as a tool to validate the individual, educate the patient regarding tissue sensitivity and protective muscle guarding, lower the threat of the patient's pain and fear of movement, provide guidance, and direct the patient toward behavior change.

This understanding is illustrated in the following case. A 55-year-old man presented with pain in the buttock that was referred into the right leg. He reported an episode of sciatica 9 months earlier, after repeated lifting while moving house. Based on an MRI scan, he had been given a diagnosis of a disc protrusion at L4-5 without nerve compression. He had been nonresponsive to traditional biomedical approaches, including dry needling, spine manipulation, stabilization training, and nerve root sleeve injections. He was taking anti-inflammatory medication and strong analgesics. His pain was now persistent, distressing, and disabling, and he had been advised that a discectomy was his only management option and that he should avoid bending, lifting, and exercise.

Multidimensional screening at his initial visit identified high levels of stress, anxiety, depressed mood, and fear-avoidance beliefs. He reported that his symptoms developed at a time of high levels of work and financial stress, which was still ongoing and which disrupted his sleep. He reported that he avoided physical activity and lifting, due to the advice he had received, for fear of doing further "damage." He had a sedentary job.

On physical examination, he presented with high levels of abdominal obesity and had guarding responses to forward bending (he held his back in lordosis and propped himself up with his hands). A straight leg raise (50°) reproduced his pain, but he had normal neurology. He

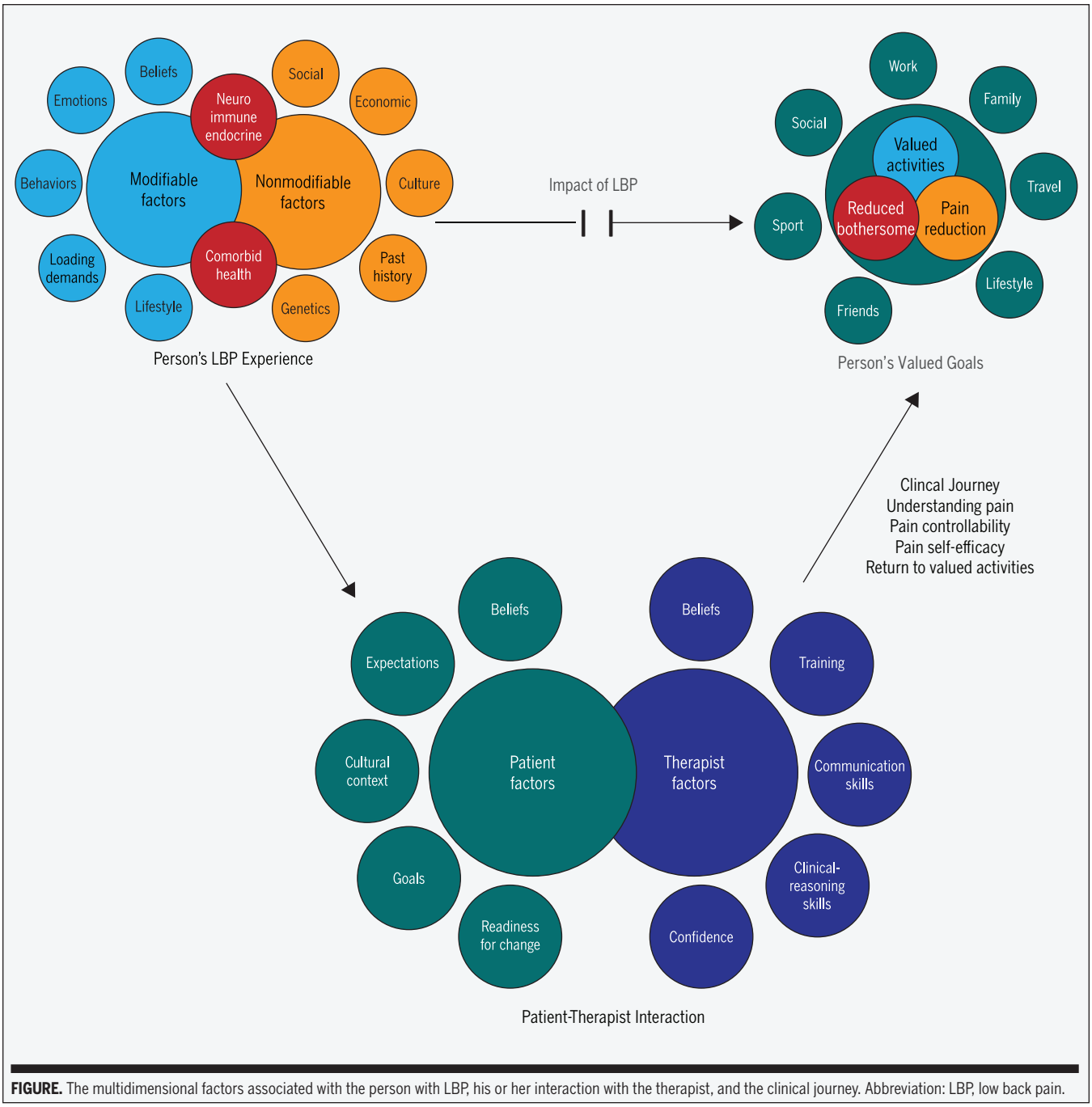

FIGURE. The multidimensional factors associated with the person with LBP, his or her interaction with the therapist, and the clinical journey. Abbreviation: LBP, low back pain.

was physically deconditioned (sit-to-stand was difficult without assistance of his hands). He reported his general health to be poor, being overweight, feeling run-down, and having high blood pressure and high cholesterol. His goals were to avoid surgery, reduce his medication, and develop pain-control strategies so he could return to cycling, walking, and gardening. He felt this would improve his general health.

Multidimensional profiling identified modifiable risk factors that became targets for care.[34,48]

1. Making sense of his pain: a diagram was drawn to show how the combination of avoidance and protective responses due to fear of doing damage to his spine, coupled with high levels of contextual stress, poor sleep, inactivity, abdominal obesity, and sedentary lifestyle, had resulted in a vicious cycle of pain and disability.
2. Graduated exposure (with control) to feared movements/activities: guided behavioral experiments were used in a graduated manner (ie, progressed

from supine to sitting to standing) to demonstrate to him that when he relaxed his back into flexion without protective guarding and propping himself up with his hands, he had less pain. This was progressed into conditioning exercises based on activities of daily living in accordance with his goals (ie, lifting and gardening). During this process, hands-on therapy was used to demonstrate how sensitive and tense his back muscles were when standing and bending, as well as to guide him to relax and flex his spine. This was assisted with the use of visual feedback using a mirror.

3. Lifestyle change: this consisted of a graduated physical activity program of his preference to be carried out on a daily basis (bike and walk), as well as developing better sleep and dietary habits.

The experiential learning demonstrated to him that relaxing and moving, regular physical activity, and sleep provided him with active coping strategies that quickly and positively impacted his pain, reduced his fear, and improved his physical and mental health. These strategies enabled him to cease his medication, avoid surgery, and attain his goals (within 5 sessions over 3 months).

OPPORTUNITIES

There is growing evidence that the management of LBP needs a paradigm shift. This perspective considers LBP (after screening for red flags) as a protective mechanism that emerges in response to perceived threats from multiple domains in the individual context. In this context, negative societal beliefs and fear about the meaning of LBP can escalate pain and lead to unhelpful behavioral responses, leaving patients distressed and disabled.

This perspective provides new opportunities to gain clinical skills in:

- Motivational, reflective, and validating communication techniques
- The sensitive exploration of patient beliefs, emotional and behavioral responses to pain, and their social context
- Critical thinking and multidimensional clinical reasoning
- The examination of behavioral responses to pain (protective guarding and avoidance), while considering patterns of tissue sensitivity
- Helping individuals to make sense of their pain by delivering positive and nonthreatening patient-centered education regarding their contributing factors for pain and disability
- Developing behavioral approaches to enhance pain controllability, normalize function, and focus on valued life activities
- Integrating hands-on therapy to provide validation and reassurance about the spine, thereby dethreatening the pain experience and directing the patient toward active behavior-change strategies
- Reinforcing healthy lifestyle behaviors based on patient preference
- Building patients' self-efficacy and their ability to self-manage their disorder

This approach places patients at the center of their care, validating them while understanding their goals and expectations. It also provides new opportunities for pain researchers exploring the clinical-reasoning processes of the health care providers, the therapeutic alliance, and the clinical journey of the patient while considering their relevant and fluctuating multidimensional factors in their life context.

The health care system faces enormous challenges, with both the disability burden and financial impact relating to LBP escalating. Growing evidence suggests that current practice is discordant with contemporary evidence, and is in fact often exacerbating the problem. Change will demand a cultural shift in LBP beliefs and practice. ◉

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