[GUEST EDITORIAL]

Regional Interdependence: A Musculoskeletal Examination Model Whose Time Has Come

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The term *regional interdependence* may conjure up in the minds of readers the thought of interrelated geography, culture, or commerce, whereby one event in one of these areas affects events in a separate and possibly distant region. With respect to musculoskeletal problems, regional interdependence refers to the concept that seemingly unrelated impairments in a remote anatomical region may contribute to, or be associated with, the patient's primary complaint.[25]

The regional-interdependence examination model and its role in the management of patients with musculoskeletal disorders have to be considered within the context of the biomedical model of disease that characterizes Western medicine. The traditional biomedical model of disease was certainly a leap forward in the development of medicine and has served mankind well by radically reducing, and in some cases eradicating, various infectious diseases and the human suffering they cause. However, the biomedical model does not appear to be equally well suited for managing the most common nonoperative musculoskeletal disorders that physical therapists treat.[23] Indeed, the relevant contributors to these musculoskeletal disorders may not always be as straightforward as they initially appear. The biomedical model of disease mandates that a diagnostic label be identified in order to proceed with treatment. Hence providers too often oblige with descriptors such as "neck strain," "facet syndrome," "disc herniation," and "myofascial dysfunction" in the absence of clear diagnostic criteria or even evidence that these entities, if present (or in some cases, if they exist), are the cause of a patient's symptoms. In some instances we have relinquished our fixation on comfortable diagnostic labels and adapted our disease construct in an attempt to be consistent with current data. For example, the lack of a clear inflammatory response in many disorders that are labeled as "-itises" of tendons and bursae has lead to the diagnostic label or explanation of "chronic" inflammation,[18] including the terms *tendinalgia* or *tendinopathy*. In the area of low back pain, the limitations of the biomedical model have been recognized and the biopsychosocial model has been proposed as a useful alternative; but there still remains a large amount of unexplained variability related to patient-oriented outcomes.[24] It appears that the current models of disease and adverse health are not entirely adequate for the management of patients with common musculoskeletal complaints. Other factors need to be considered and regional interdependence is arguably one of those factors.

What evidence is there to support the regional-interdependence examination model in the management of musculoskeletal disorders? Surprisingly plenty. There have been numerous reports of hip involvement in patients with primary complaints of low back pain[7,9,19,27] and knee osteoarthritis.[12-14] These studies include descriptive work and case reports,[6,9,12,19] as well as randomized controlled trials in which a large proportion,[13,14] if not all patients,[27] with primary low back pain and knee complaints received treatment directed at the hip and experienced positive outcomes. Conversely, intervention targeting the lumbar spine has been reported in the

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management of patients who have primary complaints of hip[8] and knee pain.[22] Upper quarter examples include primary treatment of the thoracic spine and ribs for patients with primary complaints of neck pain[11] and shoulder impingement,[2,3] and treatment of the cervical spine for patients with lateral epicondylalgia. Keep in mind that the examples cited are not of patients with referred or radiating pain reproduced by provocative maneuvers of structures distant to the site of symptoms. Although pain referral patterns related to spine have been reported,[1,20] the regional-interdependence model focuses primarily on impairments present in proximal or distal segments and is distinct from the phenomenon of referred pain.

Over the past 10 years, the physical therapy profession has made significant progress in the area of managing musculoskeletal conditions, the financial cost of which now rivals the amount spent by some insurers on the high-profile diseases of cardiovascular disease and diabetes. This progress is evident in the development and validation of various clinical prediction rules for diagnosing pathoanatomic disorders[21,26] and predicting clinical outcomes,[7,10] as well as the ability to predict which patients are likely to return to work.[17] Incorporating the concept of classification into clinical research studies has reduced unexplained variability in practice patterns[4,15] and helped identify subcategories of patients who respond best to a selected intervention, while application in the clinical setting has resulted in improved outcomes, as well as fewer visits and lower costs.[16] With regard to the regional-interdependence examination model, there have been a number of high-quality randomized clinical trials dealing with various musculoskeletal problems in which this model has been incorporated (whether defined as such or not) as an impairment-based treatment approach resulting in positive patient-centered outcomes.[2,3,5,13,14,27] Therefore, it seems time to at least consider systematically incorporating the regional-interdependence model into future clinical trials. Further defining the relevant relationships and interdependence between anatomical regions and expected outcomes could lay the foundation for confidently incorporating regional interdependence into current musculoskeletal management models. In fact, the optimum management model may be a coherent rubric governed by evidence-based clinical reasoning and decision making that incorporates key elements of existing models, clinical prediction rules, and the regional-interdependence examination model.

Back to the present... We need to disabuse ourselves of the notion that current management models are wholly adequate for managing musculoskeletal problems. A best-practice model for managing patients with musculoskeletal complaints has yet to be identified. Until such a model exists, considering the regional-interdependence musculoskeletal examination model along with the current models of disease is another step forward toward providing rational, evidence-based physical therapy care. The regional-interdependence model and implications for research have already been discussed. But what about your current clinical practice? Just to be clear, we do not advocate ignoring the primary region or area of complaint to embark on what might appear to some to be a wild goose chase across the body. There is no question the patient's local area of primary complaint should be examined initially and treated as indicated in accordance with current best evidence. However, we argue that it is also pertinent and evidence based to screen the regions above and below the area of primary dysfunction within the first 2 visits, and then work to determine proper prioritization of intervening in these other regions during the patient's course of care. For example, do you routinely examine the hip region for impairments in patients you are treating for complaints of low back pain or knee pain? Likewise, are you examining the lumbar spine for impairments in patients with primary hip and knee complaints? If not, we would argue that the evidence suggests that you should start. These same questions could be asked with regard to the cervical spine, thoracic spine and ribs, and shoulder and elbow regions in patients with primary upper quarter complaints. Current evidence supports clinically relevant relationships between these regions, and clinically important outcomes are achieved when the concept of regional interdependence is utilized to guide physical therapist decision making.[3,5,7,11,13,14,27]

Let's face it, for physical therapists to justify our services for patients with musculoskeletal problems, we need to achieve clinical outcomes superior to those associated with natural history or due to the passage of time. If a patient's presentation is unclear or if the response to intervention is less favorable than expected, practical application of the regional-interdependence model may add clarity to the patient's clinical picture and guide subsequent interventions. Likewise, further investigation of the regional-interdependence concept in a systematic fashion may add clarity to the nature of many musculoskeletal problems and guide subsequent decision making in clinical care. Regional interdependence is a model whose time has come.

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