

MASTERCLASS

Diagnosis and treatment of movement system impairment syndromes



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KEYWORDS

Classification;
Movement system;
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Musculoskeletal;
Pain

Abstract

Background: Diagnoses and treatments based on movement system impairment syndromes were developed to guide physical therapy treatment.

Objectives: This masterclass aims to describe the concepts on that are the basis of the syndromes and treatment and to provide the current research on movement system impairment syndromes.

Results: The conceptual basis of the movement system impairment syndromes is that sustained alignment in a non-ideal position and repeated movements in a specific direction are thought to be associated with several musculoskeletal conditions. Classification into movement system impairment syndromes and treatment has been described for all body regions. The classification involves interpreting data from standardized tests of alignments and movements. Treatment is based on correcting the impaired alignment and movement patterns as well as correcting the tissue adaptations associated with the impaired alignment and movement patterns. The reliability and validity of movement system impairment syndromes have been partially tested. Although several case reports involving treatment using the movement system impairment syndromes concept have been published, efficacy of treatment based on movement system impairment syndromes has not been tested in randomized controlled trials, except in people with chronic low back pain.

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Introduction

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Since 1980, Sahrman^{1,2} and associates have been developing movement system impairment (MSI) syndromes to describe conditions that can be diagnosed by physical therapists and that guide treatment and inform prognosis.^{1,2} The

The human movement system

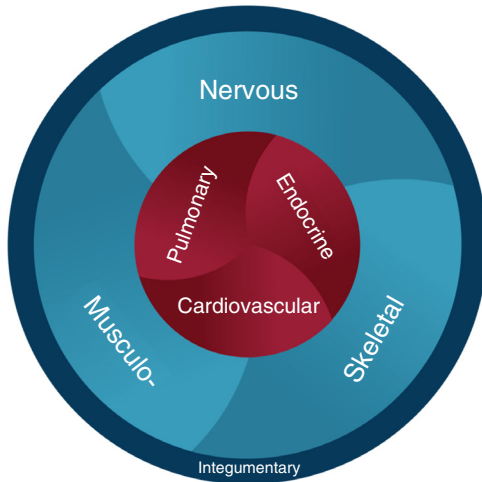


Figure 1 Graphic of the human movement system. Developed by the faculty of the Program in Physical Therapy, Washington University School of Medicine in St. Louis.

movement system was adopted as the identity of physical therapy by the American Physical Therapy Association in 2013. The definition of the movement system developed at Washington University is “a system of physiological organ systems that interact to produce movement of the body and its parts.” Fig. 1 depicts the key component systems. The conceptual framework that serves as the basis for the proposed MSI syndromes is the kinesiopathologic model (KPM) (Fig. 2). A basic premise of the KPM is that repetitive movement and sustained alignments can induce pathology. MSI

syndromes are proposed to result from the repetitive use of alignments and movements that over time are proposed to become impaired and eventually induce pathoanatomical changes in tissues and joint structures. The model emphasizes the contribution of (1) the musculoskeletal system as the effector of movement, (2) the nervous system as the regulator of movement, and (3) the cardiovascular, pulmonary, and endocrine systems as providing support for the other systems, but that also are affected by movement.^{1,2} For example, metabolic syndrome is known to be associated with insufficient physical activity.³ The prevailing theory, for which there is some evidence, is that the sustained alignments and repetitive movements during daily activities are the inducers of change in all the systems.⁴⁻⁷ The modifiers of the changes are intrinsic factors such as the characteristics of the individual and extrinsic factors such as the degree and type of physical activity (work and fitness) in which a person participates. The key concept is that the body, at the joint level, follows the laws of physics and takes the path of least resistance for movement, typically in a specific direction such as flexion, extension or rotation. Determinants of the path are (1) both intra- and inter-joint relative flexibility, (2) relative stiffness of muscle and connective tissue, and (3) motor performance that becomes motor learning.^{1,2} The result of a joint moving more readily in a specific direction is the development over time of hypermobility of accessory motion or micro-instability. The micro-instability causes tissue microtrauma that with repetition can become macro-trauma.

The concepts incumbent in the KPM not only suggest that there are signs before there are symptoms, but that correction of the impaired alignments and movements and the contributing factors is also the most effective treatment of musculoskeletal pain conditions. The KPM places

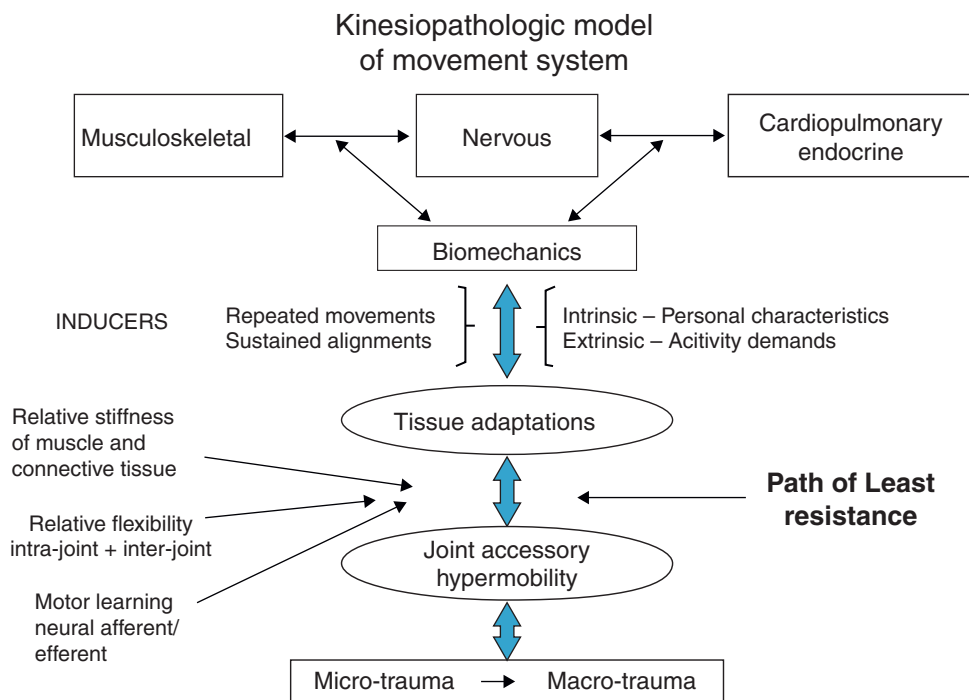


Figure 2 The kinesiopathologic model of the movement system.

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