

## Guest Editorial

*Critical Reviews™ in Physical and Rehabilitation Medicine* explores questions from a variety of disorders in physical medicine, which can be characterized by statistical modeling, and which can be ameliorated by novel techniques ranging from exercise interventions to various physiotherapy modalities. This issue of the journal presents peer-reviewed original articles and review papers that focus on learning motor skills in various neurological conditions, tibial stress fractures in runners, postural and segmental trunk control in children with cerebral palsy, effect of strength training on running kinematics, and efficacy of manual therapy in patients with chronic low back pain.

Learning motor skills to produce an optimal performance requires practice. Kumar et al. present a literature review studying various practice conditions in patients following stroke, Parkinson's disease, and healthy controls. A total of nine studies were included for data synthesis. They reported that blocked practice improved continuous tasks in the acquisition, and random practices improved performance in retention tests. Massed practice and distributed practice had similar effects on learning and performance in most studies, but the distributed practice had the added effect of reduced participant fatigue. It is concluded that varying the practice schedule influences motor learning and may be observed in motor performance, and it significantly differs in healthy and diseased populations. The authors suggest that future research should explore the various factors influencing motor learning, such as cognitive potential, level of motivation, and contextual interference, especially in those with severe neurological conditions.

Stress fractures of the lower limbs are a common musculoskeletal injury in sports that can occur due to overuse, overtraining of the athlete, and poor technique. The review by Lytras et al. suggests that restoring stress fractures of the tibia requires cessation of bone strain and abstinence from any sports activity. The return to activity is achieved gradually and includes therapeutic means and modified exercise in conditions of reduced bone load. Authors conclude that physiotherapy treatment can positively affect the treatment of stress fractures of the tibia. The use of ultrasound waves, shockwaves, and casts contributes to faster healing of the fracture, while physiotherapy interventions such as using the antigravity treadmill, hydrotherapy, therapeutic ultrasound, and modified retraining have positive effects in the early stages of rehabilitation.

Cerebral palsy (CP) is a disorder characterized by poor neuromuscular control. A team led by Doctor et al. present the results of 11 studies where 481 children were evaluated. Children with CP are unable to sit down due to lack of postural and segmental control. The present review suggests that therapists should consider encouraging variability and multiple postural strategies as part of early intervention strategies designed to address goals related to the achievement of independent sitting in children with CP. Authors suggest that future longer-term studies evaluating the effects of postural control and segmental trunk control deficits on motor functions in children with CP can lead to better treatments.

Since running kinematics has been related to injury and can potentially help develop injury prevention techniques and rehabilitation. Vannatta et al. present a literature review on the effect of strengthening exercise on running kinematics in experienced runners. A broad spectrum of results emerge from their investigation, and it is observed that specific exercises may increase trunk rotation excursion, decrease peak hip adduction, increase hip adduction excursion, decrease peak knee internal rotation, increase plantarflexion excursion, or decrease eversion excursion.

Chronic low back pain in patients negatively affects motor control dysfunction of trunk muscles and results in poor respiratory mechanics. To determine if manual therapy results in improved outcome for such patients, Tatsios et al. found 21 randomized controlled clinical trials in the literature, which met their criteria for methodological quality. They found evidence that manual therapy of low back joints or exercises for diaphragmatic release and respiratory exercises can help patients with low back pain.

To summarize, the current issue reviews specific challenges in the rehabilitation of motor skills in neurological conditions, stress fractures, cerebral palsy, kinematic analysis during strength training, and treating chronic low back pain using manual therapy. These papers contain rich learning resources for health-care professionals, which would be useful in their clinical practice.

Guest Editor:

Dr. Sampath Kumar Amaravadi, PT, PhD,  
Assistant Professor, Department of Physiotherapy,  
College of Health Sciences, Gulf Medical University,  
Ajman, United Arab Emirates