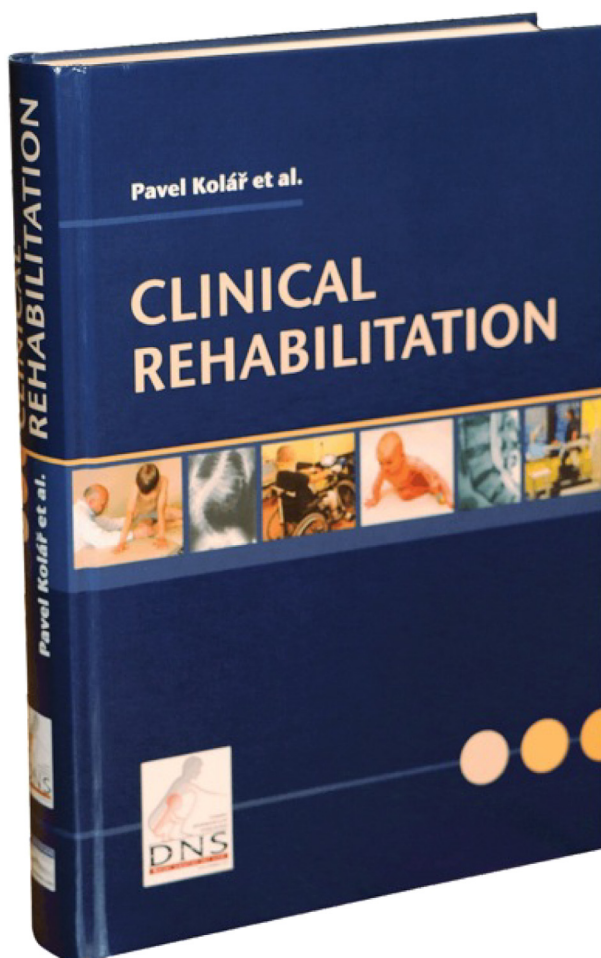




BOOK REVIEW

P. Kolář, et al., *Clinical Rehabilitation* (2013), Hardback (shipping included) € 109 (e-Book € 82.99). Also available: set of 2 posters illustrating developmental positions for DNS exercises: € 65 (including shipping). Both available at: www.rehabps.com.



Twenty years ago, on a cold morning in Prague, I found myself holding the elbow of a desperately stricken woman. She was an in-patient in the hospital's rehabilitation department; my colleagues and I were observing one of her daily treatments. Physiotherapists had carefully transferred her limp body from a wheelchair onto a treatment mat and I had been instructed to precisely press the woman's elbow after they molded her into a fully slumped kneeling posture (similar to the Child's Pose in yoga but with her toes hanging over the mat's edge). With gentleness and specificity, they pressed areas of the woman's body. Within a minute or so the patient's shallow breathing became audible and increased in frequency and excursion.

Suddenly, I felt a jolt of strength surge up her back and pass into the elbow I was holding. Her efforts partially raised her torso to an upright kneeling position. She stayed there, as if pinned in space, and then she sagged back onto the mat as the therapists released their contacts. This seemingly involuntary muscle effort was repeatedly invoked during her session.

It was startling to feel raw power arise out of listless muscle and yet, her movements resembled those of a newborn colt. The treatment itself was puzzling. The therapists' meticulous manual pressures lacked the improvisational quality of massage. Instead of searching for knotted muscle, their patient positioning was as exact, formalized and pre-determined as was their touch. And, inexplicably, the movements they elicited appeared pre-determined and predictable.

Two years later, my friends and I were amazed to see the woman walking assisted only by crutches. We were informed she had moved out of the hospital and now lived independently. That was our introduction to Reflex Locomotion, an innovative technique developed by Professor Vojta and further refined by Professor Kolář and his colleagues.

What is the Prague School of Rehabilitation?

In response to the suffering due to the effects of polio and World War II, Academician Kamil Henner initiated the Neurology Department in Prague's Charles University School of Medicine. Among his first students were Vaclav Vojta, Karel Lewit, Vladimir Janda, Karel Obrda, Frantisek Vele, and Jan Jirout. All became professors and they and their students developed new clinical rehabilitation methods. Rooted in neurology, the Prague School developed

diagnostic testing, therapeutic exercises and manual therapy methods emphasizing the role of information processing in rehabilitation.

As we shall see, Professor Vojta elaborated a model of developmental motor control that went beyond the level of cortex. His interest in the spinal cord, brainstem and subcortical structures directly led to the reflex locomotion procedures illustrated in this textbook. Professor Lewit synthesized an approach to palpation, assessment and manual treatment. Professor Janda codified a new way of analyzing muscle function and emphasized the importance of sensorimotor training. Professor Jirout systematically studied functional radiology of the cervical spine. Associate Professor Vêle investigated motor learning and the effect of respiratory movements on posture. Associate Professor Obrda developed EMG techniques and (with J. Karpisek) wrote the first Czech textbook of neurological rehabilitation. These accomplishments are explained in this remarkable text.

Recent English-language scientific publications of the Prague School include: Kolář et al. (2009) whose study (using supine MRI and spirometry) found that, although their 16 healthy subjects' diaphragms moved with different amplitudes, synchronicity was seen of the diaphragmatic apex and the dorsal costophrenic angles. Using a similar experimental design, Kolář et al. (2010) observed supine subjects isometrically contract the lower limb against external resistance. They found this effort was accompanied by significant changes in diaphragm position and excursion compared to tidal breathing in the relaxed supine position. In a follow-up pilot study, Kolář et al. (2012), studied 47 subjects (with and without chronic low back pain and all with normal pulmonary function tests) and found their chronic low back pain subjects had a steeper diaphragmatic slope, higher diaphragm position and smaller excursions than normal subjects. These three studies break new ground in the understanding the diaphragm's role in spinal stabilization.

Other English-language publications exemplifying the work of the current generation of Prague School researchers include Kobesová et al. (2012). Using stabilometry, they studied a patient with hereditary motor and sensory neuropathy. Three weeks of treatment produced improved gait and balance and reduced back pain despite the patient's total atrophy of tibialis anterior and peroneal muscles. Kobesová et al. (2007) in a case history involving a man with 20 years of post-appendectomy pain achieved immediate pain reduction with manual mobilization of the scar's superficial and deep layers.

This journal has featured papers authored by Prague School practitioners: two case studies of Dynamic Neuromuscular Stabilization (an umbrella term describing the conceptual principles, observational and palpatory skills, functional assessment tests, treatment techniques and therapeutic exercises developed by Kolář and his colleagues). Oppelt et al. (2014) discusses rehabilitation (32 weeks of spinal manipulation, Dynamic Neuromuscular Stabilization, modified constraint induced movement therapy and personal training) of a 31 year-old male 48 months after a hemorrhagic stroke resulting in left hemiparesis. Improvements were noted in sleep pattern, mobility and body mechanics and emotional outlook. Juehring and

Barber (2011) describe a 49 year-old woman with a 40 year history of disabling migraine symptoms. She was treated with a 12-week period of Vojta/Dynamic Neuromuscular Stabilization. Improvements were substantial; symptom frequency, intensity and duration were each reduced to one-fifth of the level of her presenting symptoms.

In addition, Kobesová and Kolář (2014) outline developmental kinesiology (the study of how infants normally grow to access motor control at three levels: brainstem/spinal cord; subcortical and cortical brain structures) and how to use this approach in the assessment and treatment of the motor system. This article highlights the importance of proper breathing mechanics to creating sufficient intra-abdominal pressure to ensure spinal stabilization. This stabilization is seen as an essential pre-requisite to all other movements.

What is the book about?

Professor Kolář is the main author and editor of the recently published Czech textbook: *Rehabilitace v kinické praxi*. In 2013 an English translation became available. He designed this 764 page textbook as an outline of physical and rehabilitation medicine in Europe. It applies rehabilitation principles to challenges faced in orthopedic and neurological rehabilitation as well as in the specialties of obstetrics & gynecology, pulmonology, internal medicine, oncology, pain-management, psychology and psychiatry. The 70 authors are all Czech specialists. Kolář begins the book by noting many common medical conditions are diagnosed without consideration of postural, breathing or movement pattern influences.

This book attempts to remedy this situation. On p. 27, he reminds us that in movement system dysfunction, the majority of patients have non-specific pain (with essentially normal objective signs, imaging and lab tests) and that "these are patients with abundant clinical findings; many of which can be discovered in knowledgeable history-taking and in careful observation of the patient's quality of neuromuscular control."

On p. 261, he notes a javelin thrower (this applies to any action based upon maximal and mature unilateral arm exertion) moves eyes and tongue in the direction of the release as well as changing the breath and positioning of the contralateral limb. There are many scintillating treats in this book but, this limited review will focus on reflex locomotion and developmental kinesiology.

A central principle informing the text was stated by Janda (1988) "Muscles lie on a functional crossroad being strongly influenced by stimuli coming from both the central nervous system and the osteoarticular system." The book begins a functional assessment of the patient's breathing, postural and movement patterns.

The outstanding contribution of this book is a robust, scalable, explanatory and predictive model of spinal stabilization. The model is robust in that it applies equally to those in sickness and in health. It is scalable across gender, occupation and lifespan. It is explanatory because (using the Prague School innovations of developmental kinesiology, reflex locomotion and sensorimotor stimulation) it gives new

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