The Prague School of Rehabilitation

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This issue contains abstracts from the meeting of the Czech and Slovak Society for Myoskeletal Medicine held last year on 'The Stabilizing System of the Spine and Comprehensive Modern Approaches to Back Pain': that special congress was arranged in recognition of the continuing contribution to the Prague School made by Professor Karel Lewit, and in his honor. And this issue also contains a new piece of research from him and Magdaléna Lepšíková.

The Prague School of Rehabilitation is a model based upon an understanding of the neurological organization of the nervous system. It has its roots in the Medical Faculty of Prague's Charles University and began to emerge in the 1950s under Professor Henner, who introduced a 'functional neurological examination'. Three neurologists in the same department continued this work and, perhaps due to the relative isolation imposed due to the Cold War of the time, their methods were allowed to thrive in traditional skills of empirical science and experiential learning, which, in the musculoskeletal disciplines, meant that a model was borne from little more than observation, palpation, and intuition.

In the 1950s, Czech neurologist Vladimir Janda noted that, in chronic pain patients, there was a tendency for the tone of certain muscles to increase, and for others to decrease, leading to a series of predictable postural syndromes.[1–3] He described such entities as the lower crossed syndrome (LCS) (hypertonic thoracolumbar erector spinae, iliopsoas, and rectus femoris, along with hypotonic abdominal muscles and glutei leading to an increased lumbar lordosis) and suggested it to be an adaptation to the demands imposed upon the musculoskeletal system (MS) – as it is the posture of the deconditioned and of the office worker. Janda probably made his greatest contribution with his realization that there was concurrent movement dysfunction in such cases as the LCS, perhaps due to such aberrant changes in muscle dominance. His colleague, Karel Lewit, originally concerned himself with the assessment of the movement of joints and with passive interventions, developing many of the soft tissue and mobilization techniques subsequently adopted and taught around the world.[4] While retaining such techniques, Lewit also aligned himself with Janda's concepts, expanding the field by observing and palpating gross and local tissue tone; and developing further active treatment techniques as the 'patient's muscles always do a better job than those of the best therapist'.

These two great pioneers took manual medicine to a new level: in addition to their own concepts and research, they studied components of other professional teachings of the day (such as osteopathy and chiropractic) and began to build a broad model of MS pain: and so the model for the Prague School was seeded.

The skill of observation was perhaps the most influential tool upon which they relied. Observing movement patterns in a body-wide situation led to an understanding of the influence along the entire kinematic chain. Lewit described the importance of identifying the 'key link' finding and treating the major mechanical failing in the kinematic chain for a given movement, irrespective of the pain site.[4] He notes that this would often ease the symptoms experienced, adding that 'he who treats the site of pain is lost'. The concept here is a simple one, and it is doubtful that many would disagree that the prescription of an orthotic for an asymptomatic *pes planus* may make tremendous changes to an individual with low back pain. But how subtle can these findings be? And how reasonable is it to treat asymptomatic areas? Lewit argues that faulty breathing patterns can often be the key link in chronic pain syndromes. This is a seemingly improbable view, but in recent years there has been greater focus upon the role of breathing patterns in chronic pain syndromes[5,6] posture[7] and in spinal stability.[8,9]

Gray Cook's functional movement screen (FMS) is a simple, yet brilliant, tool for assessing movement via a seven-point scoring system.[10] By looking at the failures along the kinematic chain and introducing levels of challenge to the MS system through standardized movements, Cook developed a grading system which has been widely adopted.[11,12] Although less known, and not systematized in the same way, the concept is similar to that proposed by Janda.[1–3]

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Both Janda and Lewit had an advantage over their colleagues in the area of manual medicine as they were both professors of neurology. It was obvious to them that these observations were a neurological phenomenon rather than peripheral issues of the muscles and joints. It was apparent that the muscle tone expressed in the LCS, for example, was of central nervous system (CNS) origin and that the learned motor pattern (or 'engram') was a product of the brain learning to adapt to the demands placed upon it; the interplay between the sensory and motor systems in daily life. Janda's explanation was that 'in the simplest terms, it all boils down to the CNS'. This learning and adaptation, thanks to the incredible work of such people as Paul Bach-y-Rita,[13] we now know to be neuroplasticity and that this is what these Czech pioneers of the Cold War were describing. Indeed, technological advances have shown us that chronic pain syndromes may often be associated with a poor sensory motor system such as poor head-repositioning accuracy in whiplash;[14] poor local body image in chronic low-back pain[15] and altered sensory and motor homunculi in complex regional pain syndromes.[16]

Lewit and Janda hypothesized that if the CNS learns muscle length, posture, and movement patterns due to the demands that we impose upon the body, then surely the treatment cannot reside in the periphery alone. Rehabilitation for chronic MS pain syndromes emerged from this philosophy and it remains the founding principle for many in MS rehabilitation practices, and the Prague School's early work is cited by many of the authors that we read today.[9,17,18]

The third pioneer of the group was Professor Vojta, again a neurologist, who systematically described the development of the motor system in the first year of life along with seven postural tests that could assess a baby's developmental age.[19,20] His work then moved to the early assessment and treatment of cerebral palsy (CP) in this age group.[21] He began to experiment with certain body positions and the stimulation of certain key points that he suggested could increase or decrease muscle tone, allow 'centration' of a joint and so promote better development and movement. Vojta's techniques became known as 'Reflex Locomotion' and led to parents being taught how to help their CP child at home.[19]

This is perhaps a leap of faith and is best explained by an example; Vojta advocates that during each developmental stage, partial motor patterns mature and represent the basic elements of adult motor behavior. For a developing baby the normal progression from a supine posture to a side lying (and later prone) posture, requires trunk rotation, which can be stimulated by careful and specifically directed pressure on a 'breast zone' located in the medioclavicular line between the fifth and sixth ribs.[19]

Vojta's work went with him to Germany where he has worked since 1968. First he worked at the orthopaedic clinic in Köln under professor Immhäuser, and conducted developmental kinesiology courses for medical doctors and physiotherapists. In 1975, Vojta became the head of the rehabilitation department at the Paediatric Clinic in Munich and, in 1984, he established the International Vojta Society and the non-profit International Vojta Institute which continues to promote his principles for the early diagnosis and therapy of children and adults with motor dysfunction. (www.vojta.com).

Today, the Prague School model has been further developed by Pavel Kolář, who proposes his system of Dynamic Neuromuscular Stabilization, based upon three levels of motor organization.[22,23] The lowest level is the spinal and brain-stem level of the newborn, where primitive reflexes dominate and give rise to holokinetic (non-directed) movement. The second, subcortical level between 2 and 12 months as the development of basic core stabilization and locomotion function of the extremities matures. Contralateral patterns develop between legs and arms even when prone and ipsilateral organization is apparent when supine to facilitate rolling (before 7 months). The highest, cortical (and cerebellar) level is responsible for learning new skills. Kolář argues that children who are poor at sport may complain of non-specific symptoms (headache, stomach pain, nausea, vertigo) and other seemingly psychological reasons to avoid sport, but this may be a neurological difficulty at integrating and adapting their existing motor patterns. In individuals who display a degree of dyspraxia, he argues, the continued prescription of exercise requires great attention to 'form' (technique) as otherwise they will propagate their pain and worsen the neuroplastic maturation of the pain matrix. In many MS pain cases Kolář argues that the lack of MS stability[24] lies in poor organization at a subcortical neurological level, which will need to be suppressed by retraining proper postural-stabilization patterns via exercise in the developmental positions and sometimes even by reflex stimulation. Ideal stereotypes established via postural exercise and reflex stimulation must then be fixed at the cortical level and integrated into activities of daily living and sport.

The obvious concern about much of the Prague School (PS) approach is that it lacks evidence of validity, reliability, and a demonstration of effectiveness and therefore, in an era of Evidence-Based Medicine, should it be practised at all? However, the progress that the PS has made, perhaps because it was unhindered by the shackles of technological advances of Western medicine, hidden in the Eastern Block, has seen a dramatic deviation away from conventional

Western practice: and perhaps we may also be just a bit nervous of it. However, if we are totally honest, how much of what is accepted in the West actually has good evidence behind it? We all purport to treat 'function', an approach that in itself lacks scientific rigor, let alone a good description of what function actually is; to some, a 'return to function' means a return to work.[25] Professor Lewit warns us to avoid 'over-reliance on objective measures' and to 'learn again to rely upon our hands and our brains; to trust our brains, and not the computer'. There are very few surgeons nowadays who would operate on a lumbar disc herniation based upon magnetic resonance imaging (MRI) findings alone, and despite the magnificence of this 'gold standard' there is evidence of false negatives[26,27] and false positives.[27]

So what should we do? The Prague School has developed over many decades, with sensible, traditional and empirical approaches that medicine has relied upon since Hippocrates. It lacks evidence, but that is not an evidence of lack. The current direction is perhaps alien to many practitioners in the West but it warrants greater attention by the scientific community. After all, such things as Janda's movement patterns and Lewit's treatment techniques are embedded and taught worldwide, perhaps without the recognition that they deserve – in part due to their refusal to 'name' the techniques, as they were attempting to define physiology.

The assessment and treatment of 'function' and of 'observing movement quality' are cornerstones to many MS practitioners, but was alien to many in medical practice in the latter half of the last century when there was a heavy leaning towards structural diagnosis with the advent of computerized tomography and MRI. The Prague School takes a mind shift and a greater trust than we are perhaps willing to give it without the evidence that we crave. Let us work for that evidence.

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