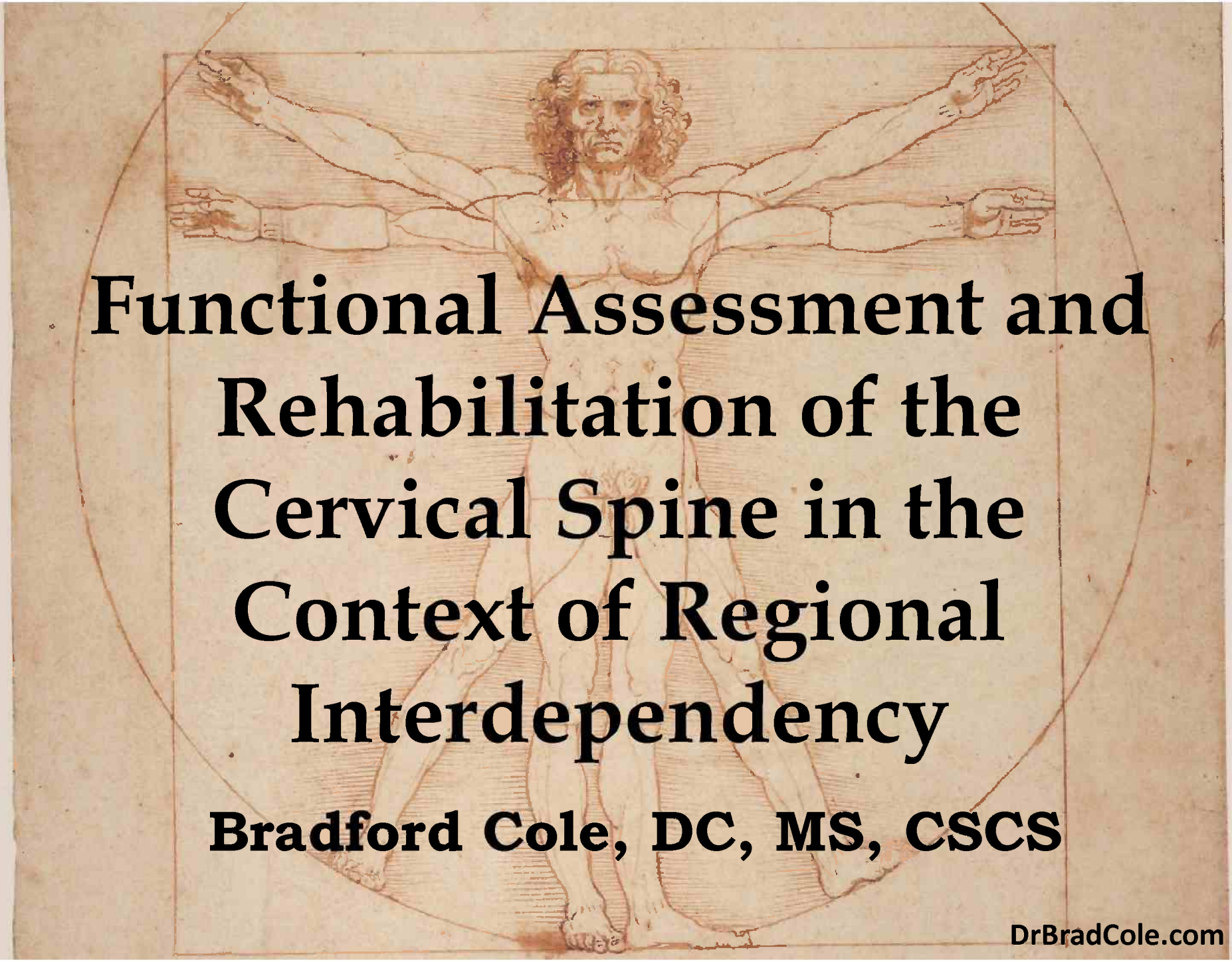

Functional Assessment and Rehabilitation of the Cervical Spine in the Context of Regional Interdependency

Bradford Cole, DC, MS, CSCS

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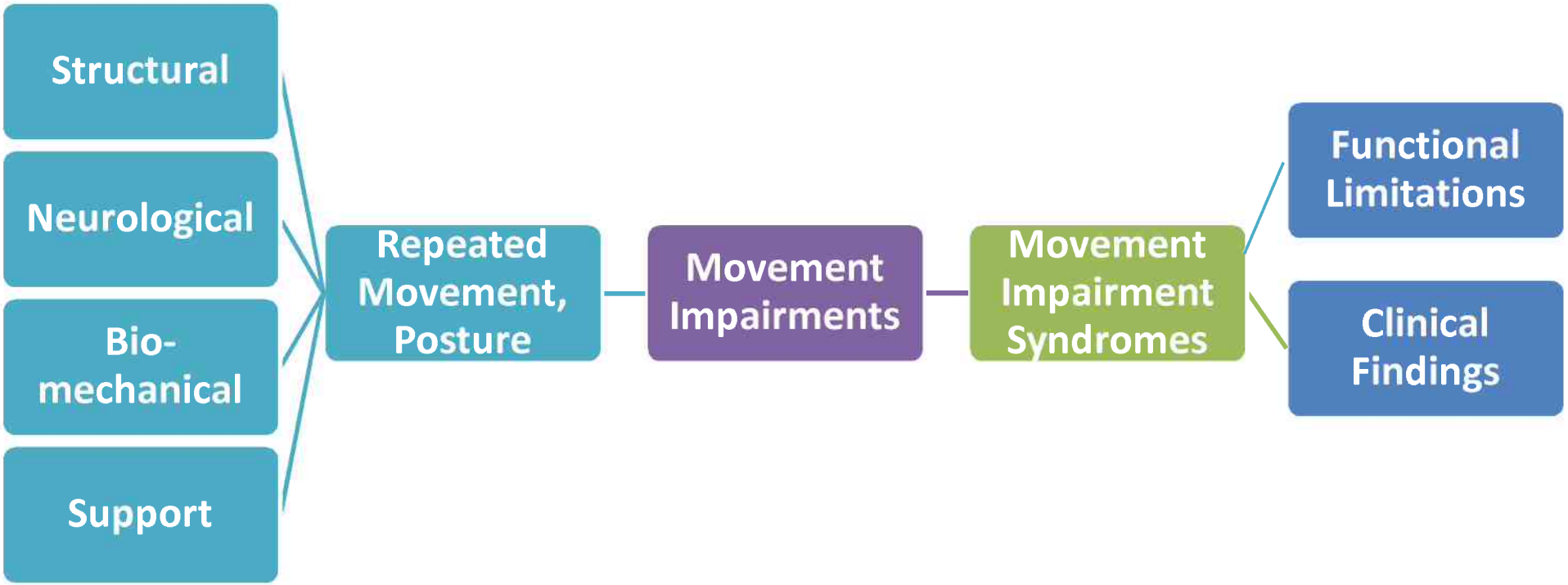
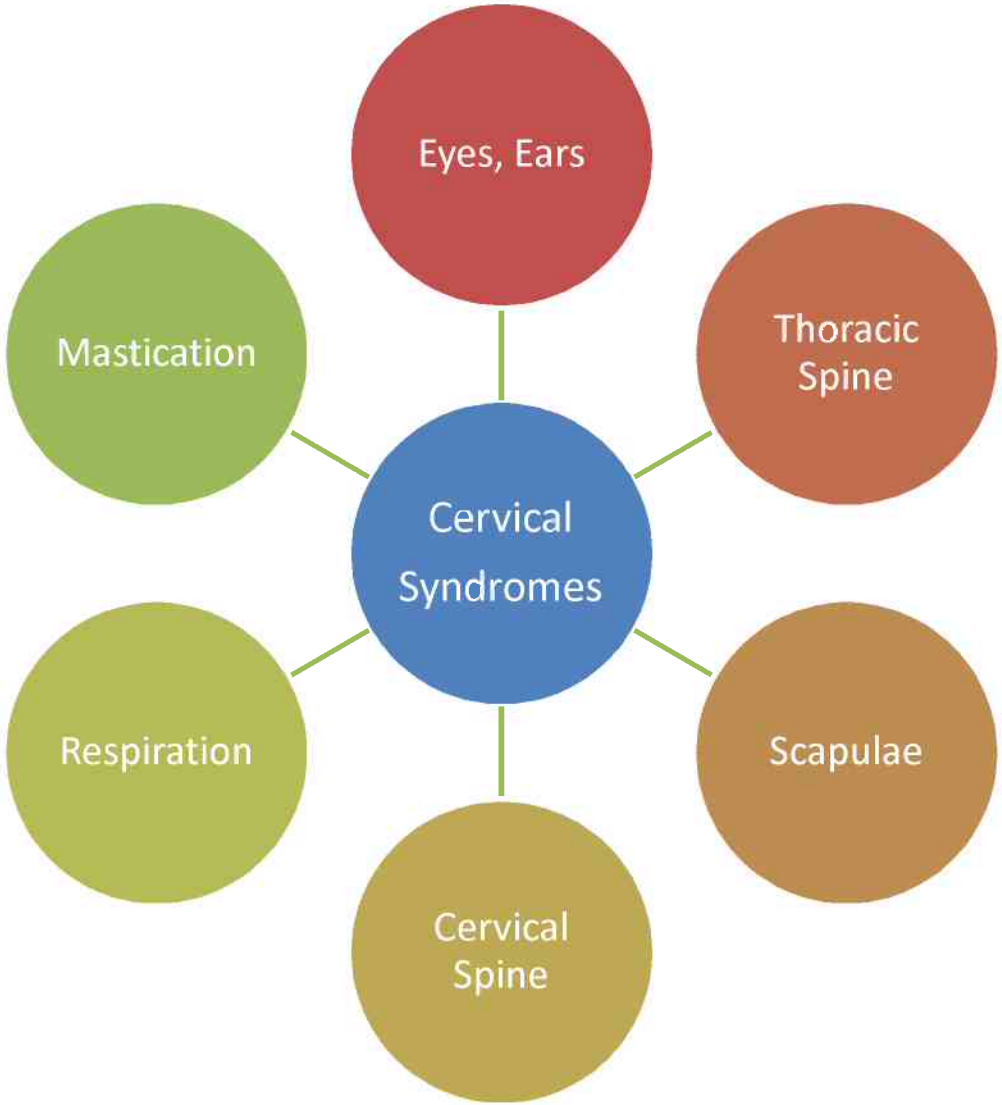
Kinesiopathologic Model of Rehabilitation



Sarhman, S. Diagnosis and Treatment of Movement Impairment Syndromes. Mosby 2002

Functional Interdependency



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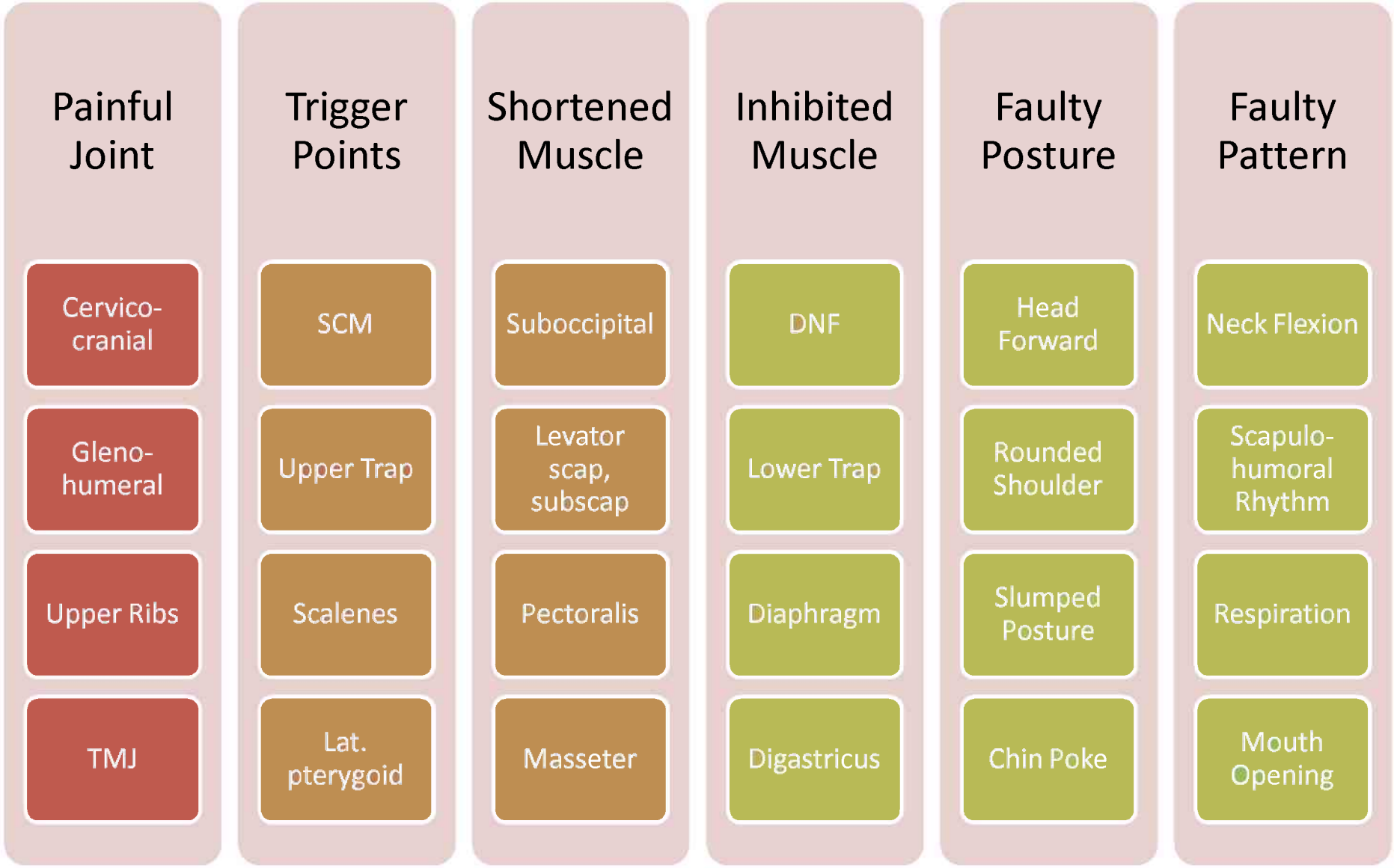

Liebenson, C. Functional reactivation for neck pain patients. Journal of Bodywork and Movement Therapies. (2002) 6(1), 59-66

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Patterns in Orofacial Pain

Digastricus Inhibition	• Hyoid mobility positive
Lateral pterygoid, masseter overactive	• Positive mouth opening • Trigger points present
TMJ hypomobility	• Side of decreased translation during TMJ mobility test

Skaggs DC. Orofacial Pain. Topics in Clinical Chiropractic; 2000;7(2):43-50.

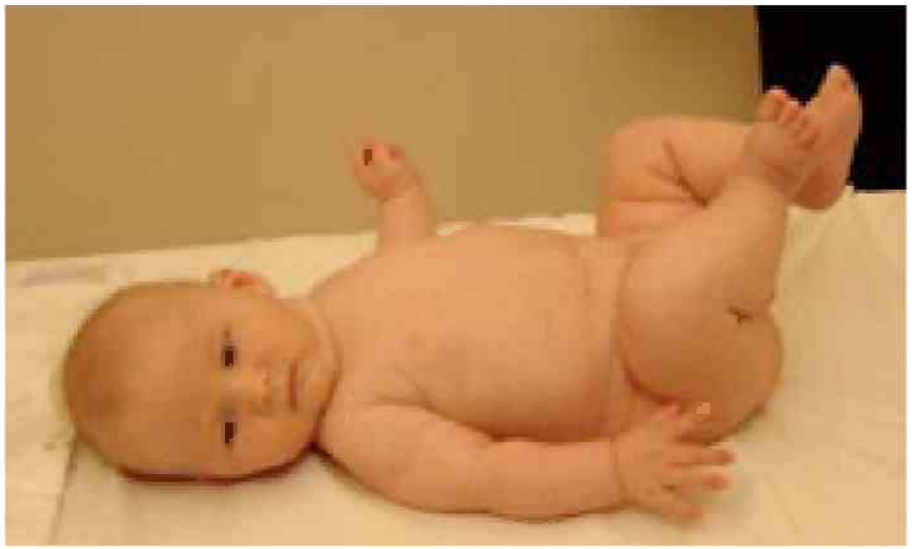

Performance
Pain

Fig.1,2: Ideal pattern of sagittal stabilization matures at the age of 4,5 months

Fig.3: Ipsilateral motor pattern
Left arm and left leg- stepping forward,
right arm and right leg supporting

Fig.4: Contralateral motor pattern
Right arm, left leg stepping forward (reaching)
right leg, left arm supporting

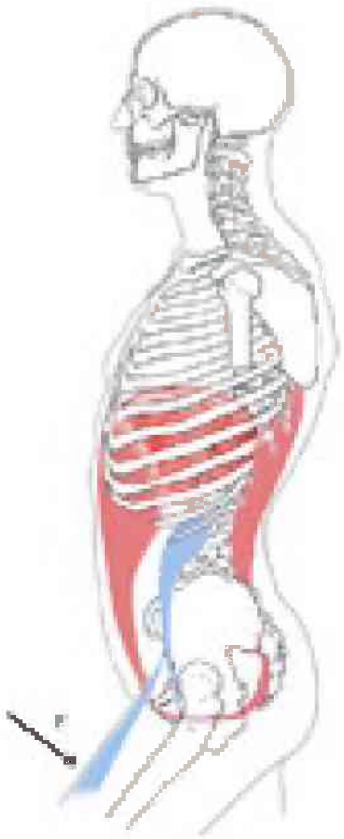
Assoc. Prof. Pavel Kolar, PaedDr., Ph.D.
Alena Kobesova, M.D., Ph.D.
Department of Rehabilitation and Sports Medicine, 2nd Medical Faculty, University Hospital Motol, Charles University, Prague, Czech Republic

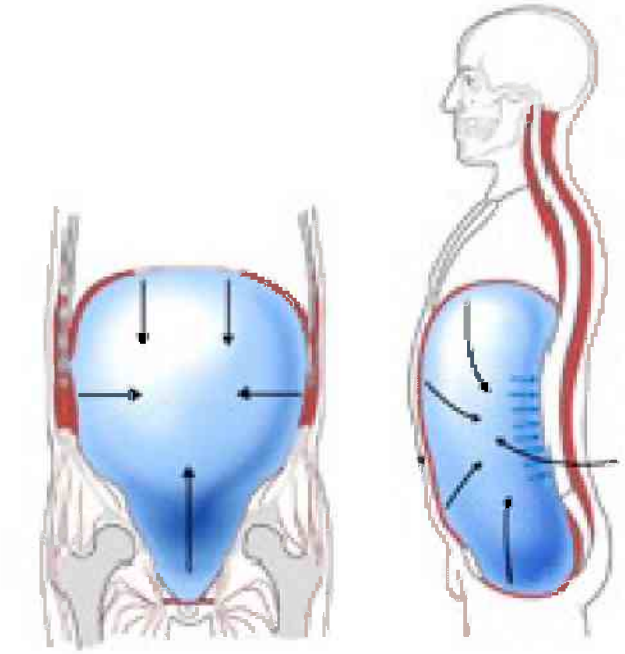


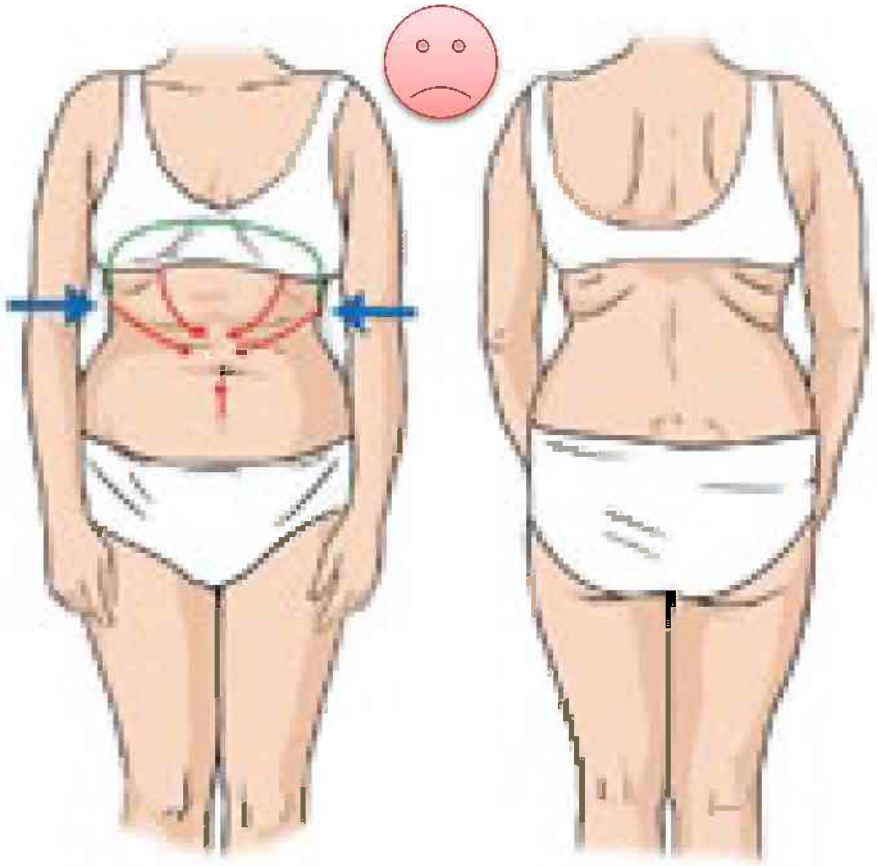
Functional diagnosis is based on comparing the patient's stabilizing pattern with that of a normally developing baby and/or with the pattern evoked by reflex stimulation.

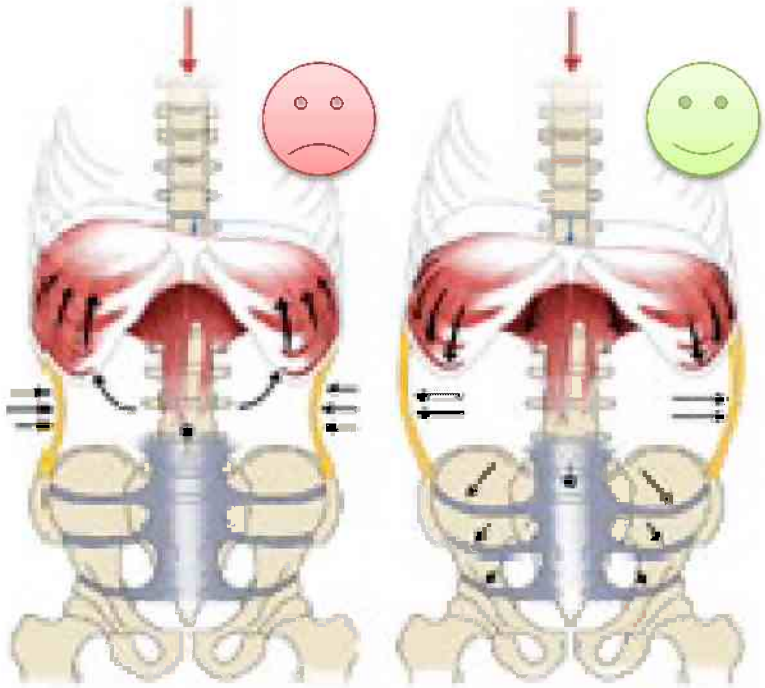
Postural Reactivity

Postural stabilization precedes any purposeful movement, ensuring a punctum fixum from which the punctum mobile moves about a joint in centration.



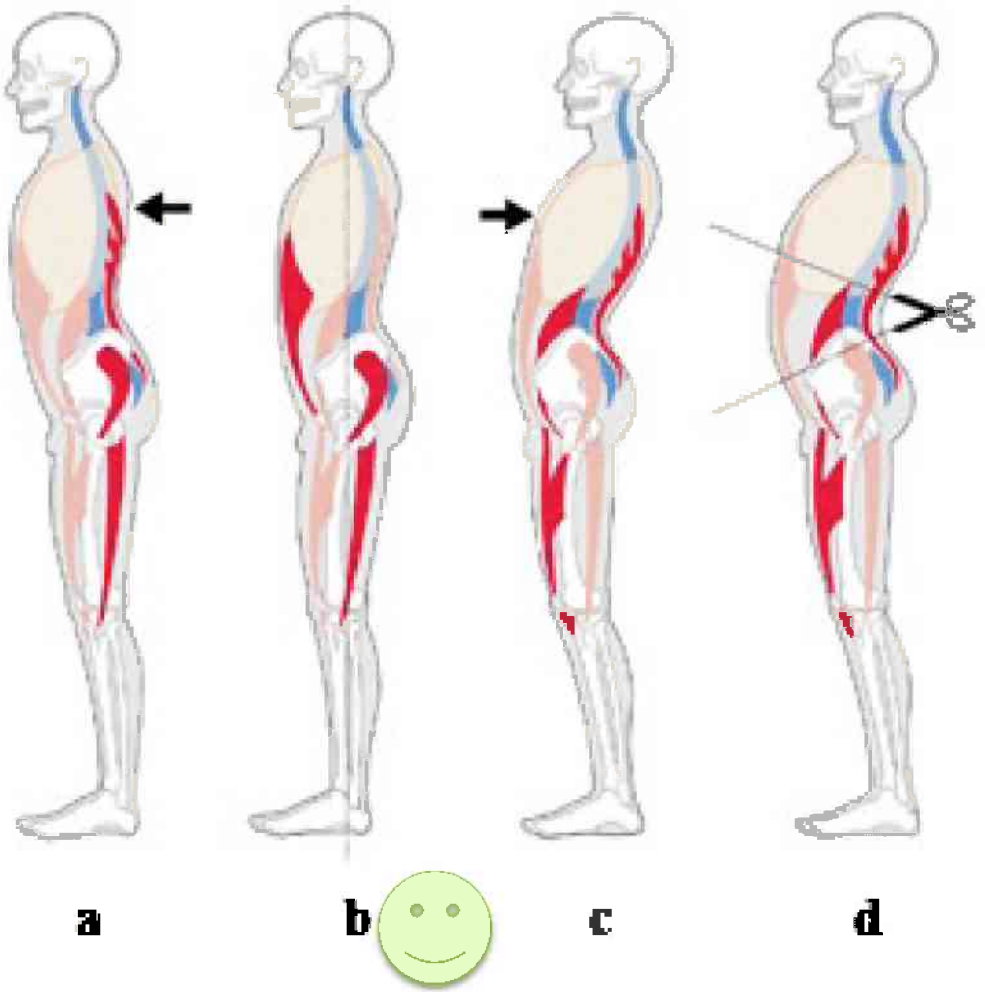




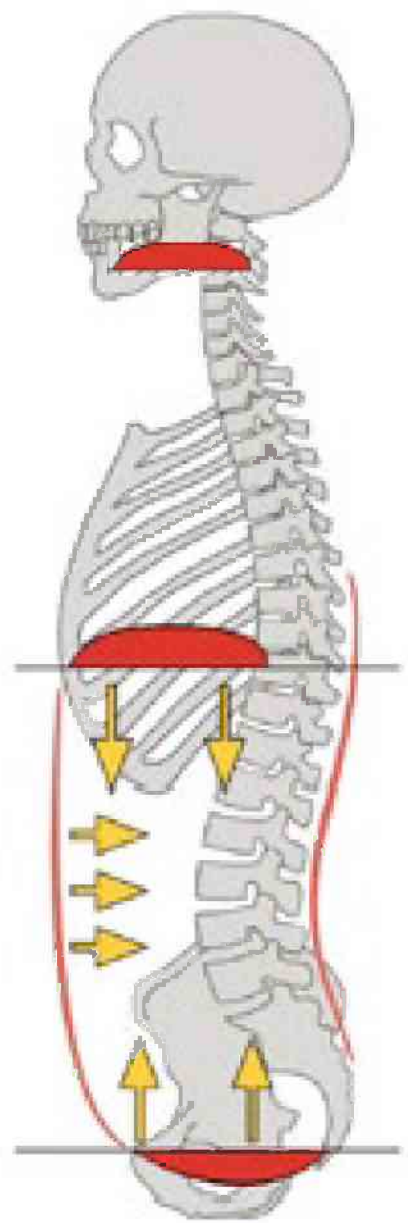


- Hour glass syndrome
- Cephalad shift of lower ribs
- Cephalad shift of umbilicus?

- TL paraspinal hypertrophy
- Poor depression of diaphragm
- Failure of IAP



(B) IAP regulators and DNF balance deep spinal extensors at low contraction levels.



Upon standing the spinal erectors, quadratus lumborum, and psoas are nearly relaxed. Walking involves 2% of maximum voluntary contraction (MVC) of the rectus abdominus and 5% MVC of the external obliques. Then lifting a 15kg (33lb) kettle bell causes these muscular contractions to increase 1.5%.

Lederman E. The myth of core stability. J Bodyw Mov Ther. 2010 Jan;14(1):84-98.

3 Myths About Core Strengthening for Back Pain (DrBradCole.com)

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Muscle function encoded by central motor programs develop as the CNS matures. Disturbance in this equilibrium due to CNS lesions, pain, trauma, habitual patterns, or repetitive overuse results in musculoskeletal pain.

Pavel Kolar, PaedDr, PhD

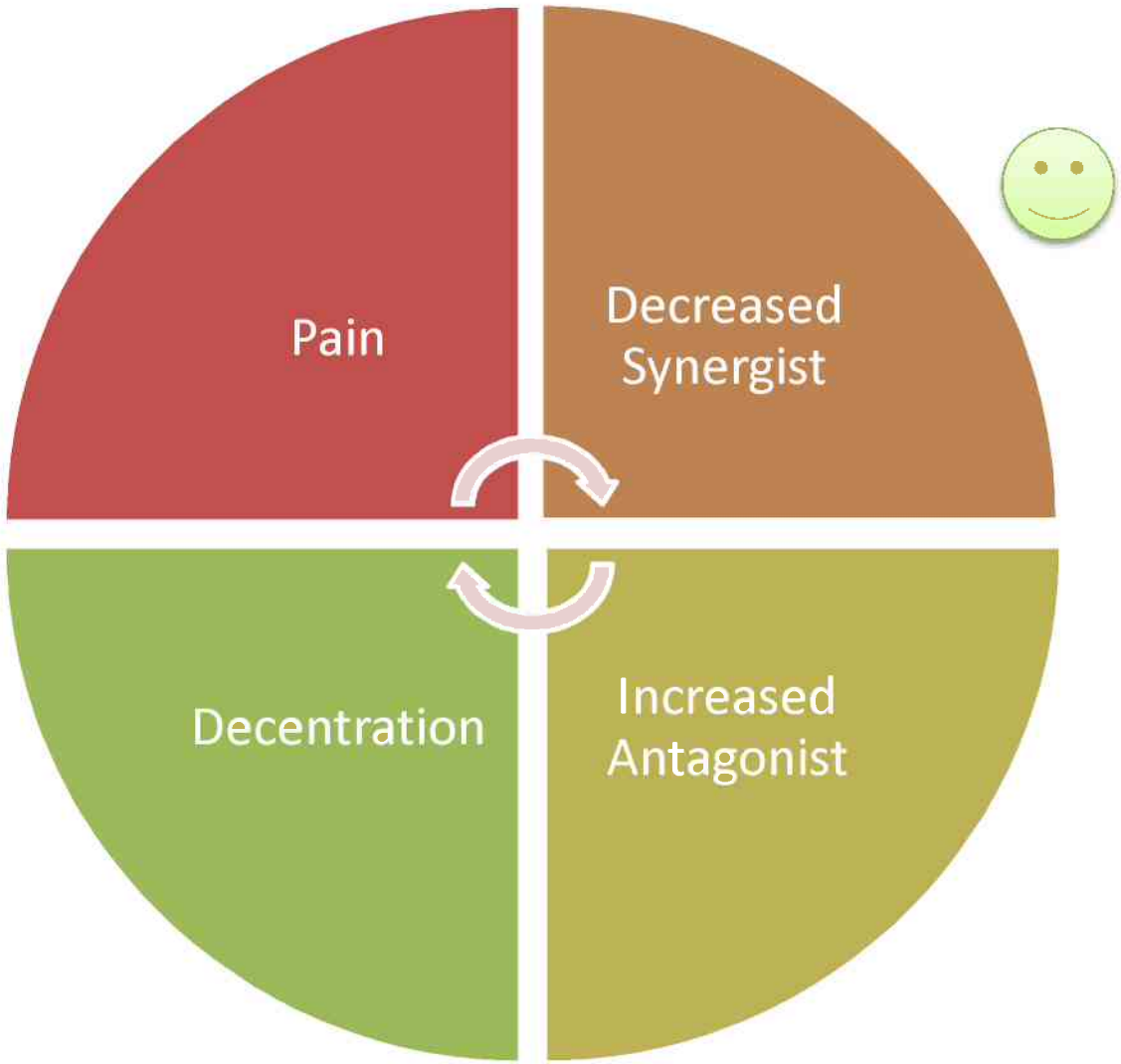
Reasons for postural disturbance:

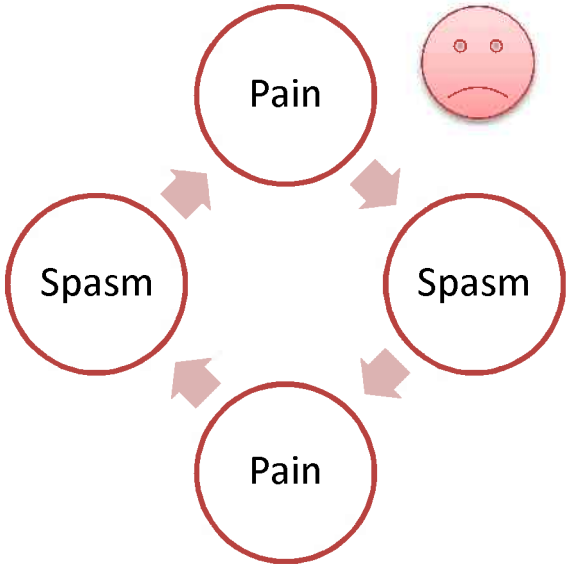
1. Central Coordination Deficit *
2. Habitual reasons
3. Nociceptive reasons

*neurological deficits

Should internal forces produce abnormal loading:

1. Developmental changes
2. Degenerative changes
3. Resulting pain





Lund JP, Donga R, Widmer CG, Stohler CS. The pain-adaptation model: a discussion of the relationship between chronic musculoskeletal pain and motor activity. Can J Physiol Pharmacol. 1991 May;69(5):683-94. Review.

Kapreli E, Respiratory dysfunction in chronic neck pain patients. Cephalalgia. 2009 Jul;29(7):701-10.

The aim of this pilot study was to add weight to a hypothesis according to which patients presenting with **chronic neck pain** could have a **predisposition towards respiratory dysfunction**. Twelve patients with chronic neck pain and 12 matched controls participated in this study. Spirometric values, maximal static pressures, forward head posture and functional tests were examined in all subjects… Furthermore, the current study demonstrated **a strong association between an increased forward head posture and decreased respiratory muscle strength in neck patients**. The connection of neck pain and respiratory function could be an important consideration in relation to patient assessment, rehabilitation, and consumption of pharmacological agents.

Fernandez-de-las-Penas C, Performance of the craniocervical flexion test, forward head posture, and headache clinical parameters in patients with chronic tension-type headache. J Orthop Sports Phys Ther. 2007 Feb;37(2):33-9.

BACKGROUND: Musculoskeletal impairments of the craniocervical region might play an important role on the pathogenesis of CTTH. **Deficits in the performance of the CCFT** have been reported in patients with **cervicogenic headache**, nonspecific neck pain, and whiplash injury, but not in individuals with CTTH.

CONCLUSIONS: These findings suggest **possible impairments** of the musculoskeletal system in individuals **with CTTH**, although it is not possible to determine if these impairments contributed to the etiology of CTTH or are as a result of the chronic headache condition.

- People with chronic neck pain demonstrate a reduced ability to maintain an upright posture when distracted.
- People with neck pain demonstrate altered motor control during performance of a functional activity.
- Greater activation of accessory neck muscles during the functional task may represent a compensation of reduced activation of painful muscles.
- Compared to control, impairment in isometric CCF muscle performance exists over a range of contraction intensities in neck pain sufferers.
- Greater perceived disability among patients with neck pain appears to result in greater accessory muscle EMG amplitude during the functional task.
- Following intervention with an exercise program targeted at training the cranio-cervical flexor muscles, subjects with neck pain demonstrated an improved ability to maintain a neutral cervical posture during prolonged sitting.

O'Lerary, Jull. Manual Therapy 2007
Falla, Jull, et al. Spine 2004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