Sub-Group Classification of 'Core Dysfunction': What do we notice & what do we know?

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ntroduction: Discussion:

- ite the popularity of • De rehabilitating 'the core' in both the therapeutic and fitness industries, the patterns of functional and structural change have been little described.
- An ultrasound study by Langevin et al¹ into the connective tissue structure of subjects with chronic or recurrent low back pain (CLBP) found substantial differences in lumbar connective tissue morphology in the CLBP cohort: increased thickness and echogenicity of the peri-muscular connective tissues at L2/3 of 25% on average - yet this was not necessarily correlated with nptom severity.

Is this connective tissue remodelling regional or general? Does it occur in all CLBP subjects? Is it cause, or effect?

• Clinical practice suggests that in subjects with CLBP and/ or pelvic/hip pain, two main subgroups emerge with distinct regional differences in the myofascial envelope. One group will predictably show the changes found in Langevin's study – in the other group, these findings will be less apparent, or not at all.

- It is apparent that fascia can both influence² and respond³ to altered loading conditions.
- Clinically, tonic imbalance between the 'intrinsic' and 'extrinsic' myofascial systems is associated with disturbed functional mechanisms such as continence and breathing and ipso facto, distorted 3 dimensional spatial and structural relationships in/between the major body segments.
- Based upon changes in postural alignment and regional myofascial structure and tension, two subgroups are apparent sharing common features yet showing distinct differences in the compensated strategies they adopt for regulating the important functional mechanisms of breathing, postural control and controlling the torso on the legs.
- In both groups the architecture of the 'core' and its control are differently compromised.
- In essence, <u>common to both groups</u> is an observed:
- Imbalance in the activity level between the axial flexor and extensor systems

 Further co-associated with deficient activity in the deep intrinsic myo-fascial system – particularly the Lower Pelvic Unit' Synergy ^{4,5} jeopardising in particular the breathing and IAP mechanisms and lumbo-pelvic control.

- A compensatory over-reliance on regions of the 'extrinsic' myofascial system

- The body shape and its functions change resulting in disturbed regulation of internal pressure change hydrodynamics through compromised diaphragmatic function hence breathing; the generation of appropriate levels of intra-abdominal pressure (IAP) suffer with suboptimal patterns of axial postural and movement control.

Each subgroup shows characteristic <u>features</u>

- 1. One subgroup is more **axial** extensor dominant - particularly over the thoracolumbar region. Described as **The Posterior Pelvic Crossed Syndrome (PPXS)**^{4,6} it is characterised by observable unde activity of the **entire** antero-lateral abdominal wall
- Thoraco-pelvic alignment alters the pelvis moves back and the thorax moves forward assuming a more oblique relationship; interfering with the functional relationship between the thoracic and pelvic diaphragms and disturbing Lower Pelvic Unit synergies and IAP generation.

 Relative overactivity in the psoas and probably the crural fibres of the diaphragm further disturb patterns of control.

- The changes in the superficial connective tissue morphology found by Langevin et al¹ are typical of this group. This regional myofascial remodelling is associated with predictable changes in the joints and related soft tissues over the thoracolumbar spine and sets the stage for pain generation.

- In active rehabilitation, this group do well with core control retraining focusing on the Lower Pelvic Unit and with a **carefully prescribed** abdominal emphasis.
- 2. The other subgroup is more **axial** flexor dominant with over-activity of the upper antero-lateral abdominal wall. Described as the **Anterior Pelvic Crossed Syndrome (APXS)**⁴⁶ it is characterised by relative under activity in the axial extensor system
- Again, thoraco-pelvic alignment assumes an oblique relationship - the pelvis moves forward and the thorax back and the lower pole of the thorax becomes more constricted.
- This mal-alignment interferes with the reflex relationship between the diaphragms and the thoracic diaphragm's ability to descend hence it is relatively underactive while the pelvic diaphragm appears overactive though with timing delays

 Relative overactivity in the myofascial tissues over the posterior inferior pelvis further disturbs patterns of control.

 The changes found by Langevin et al¹ will be less apparent in this group

 Active rehabilitation should focus upon activating Lower Pelvic Unit synergies - in particular good diaphragm descent and the generation of functional IAP. Focusing overly on the abdominals and pelvic floor - particularly 'pulling up and in' strategies risks further imprinting of unhealthy patterns of control and symptom aggravation

Conclusion:

- In patients with CLBP, changes in the regional connective morphology will vary depending upon patient subgrouping and appear to contribute to both the cause and perpetuation of symptoms.
- Appreciating these dysfunctional patterns and their clinical significance will hopefully inspire further directions for future basic research.
- Meanwhile, it is important that the clinician can appreciate and recognise these patterns as each dictates a different emphasis in remediation - both manual and exercise therapy

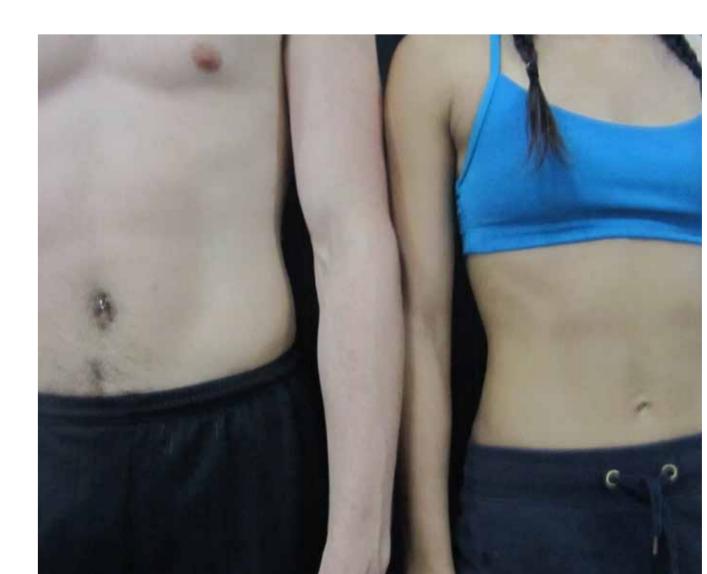


PPXS



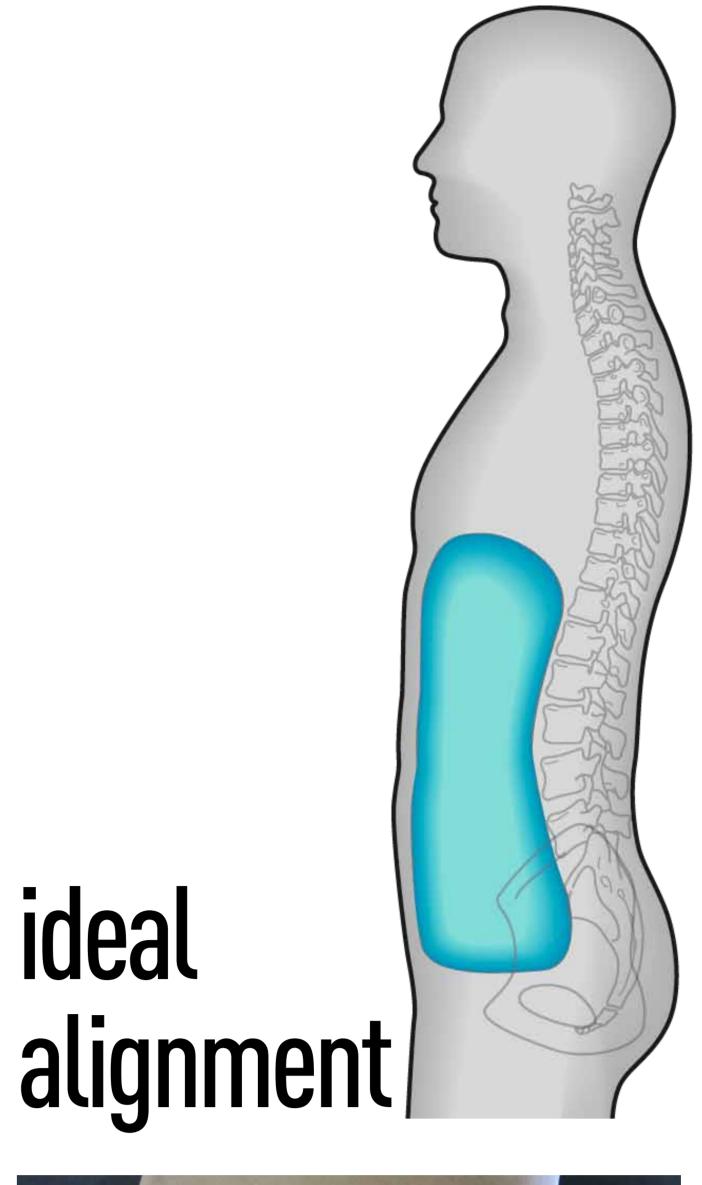


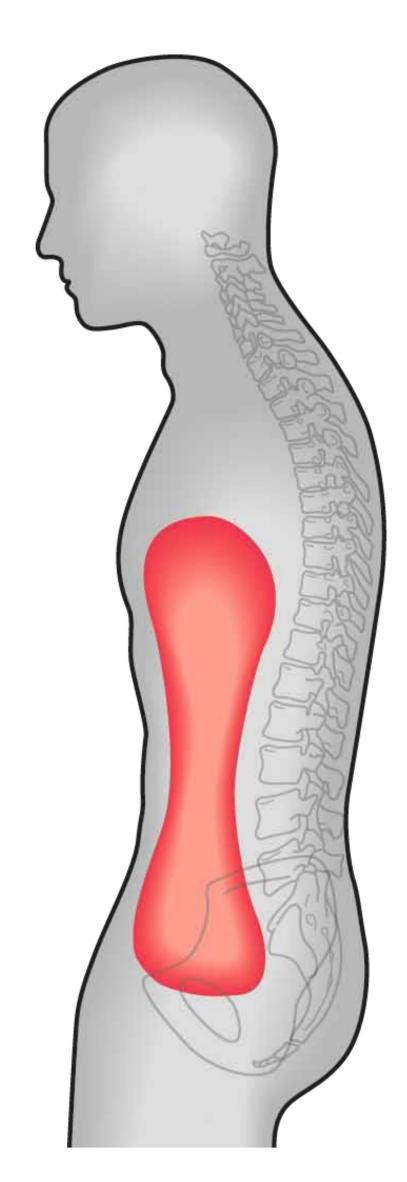




Altered postural alignment affects the shape and volume of the internal cavities and disturbs the important pressure change mechanisms which underlie healthy patterns of functional control - in particular, breathing & IAP.

¹ Langevin HM, Stevens-Tuttle D, Fox JR, Badger GJ, Bouffard NA, Krag MH, Wu J, Henry SM. 2009. Ultrasound evidence of altered lumbar connective tissue structure in human subjects with chronic low back pain. BMC Musculoskeletal Disorders 3 (10) 151. ² R Schleip, W Klingler, F Lehmann-Horn. 2006 Active fascial contractility: Fascia is able to contract and relax in a smooth muscle like manner and thereby influence biomechanical behavior. Acta Physiologica, Official journal of the Federation of European Physiological ocieties. Volume 186, Supplement 1, page 247. ³ Langevin HM, Bouffard NA, Fox JA, Palmer BM, Wu J, Iatridis JC, Barnes WD, Badger GJ, Howe AK. 2011 Fibroblast cytoskeletal remodelling contributes to connective tissue tension. Journal of Cellular Physiology. May, 226(5):1166-75 ⁴ Key J 2010. Back pain: A movement problem. A clinical approach incorporating relevant research and practice. Elsevier, Edinburgh ⁵ Key J 2010a. The Pelvic Crossed Syndromes: A reflection of imbalanced function in the myofascial envelope; a further exploration of Janda's work. J Bodywork and Movement Therapies 14(3):299-301 ⁶ Key J, Clift A, Condie F, Harley C. 2008. A model of movement dysfunction provides a classification system guiding diagnosis and therapeutic care in spinal pain and related musculoskeletal pain syndromes; A paradigm shift - Part 2 J Bodywork and Movement Therapies 12(2):105-120











APXS





