What Is Lumbo-Pelvic Dysfunction?

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Relevance:
- In patients experiencing low back & pelvic pain disorders, there is evidence for both compromised and augmented neuromuscular activity:
  - Reduced, delayed and inconsistent activity in some deep muscles
  - Earlier, more tonic and dominant activity in some more superficial ‘global muscles’
  - The differing individual muscle timing & activity levels have been found principally in response to postural perturbation created by limb movement or under constrained experimental conditions.
  - There has been limited examination of the co-active muscle synergies which initiate and dynamically control basic functional axio-pelvic movement patterns.

Proposal:
- Imbalanced neuromuscular activity compromises spinal & proximal girdle alignment & control patterns of movement response, & important physiological mechanisms such as breathing and equilibrium control.
- There is increasing interest in the relationship between pain syndromes & the preferred & potentially provocative posturo-movement strategies habitually adopted by subjects, & the kinematics involved in everyday activities.
- Associations have been found between pain states & altered control of standing, altered postures, altered kinematic patterns of movement in forward bending/reach, & lifting.

Both research & clinical evidence demonstrate that compromised control of the pelvis is always a significant feature.
- The pelvic myomechanics which underpin healthy posturo-movement control of the axial spine & pelvis have been little explored, yet understanding them helps comprehend the impairments seen in patient populations.
- As the sacrum/ coccyx forms both the base of the spinal column and part of the pelvic ring, the quality of pelvic movement control plays a highly significant role in healthy movement.
- From a functional movement perspective, physiological control of the pelvis can essentially be distilled into three interrelated components:
  - Intrapelvic control
  - Control of pelvic ring ‘distorsion’ & ‘torsion/rotation’
  - ‘Inner unit’ co-activation synergies to provide counter-support & stability against the actions of the large ‘outer’ pelvi-femoral muscles & during load transfer
- Clinical practice suggests that this healthy control is subserved by four Fundamental Pelvic Patterns (FPP) of Movement:
  - FPP1: anterior pelvic rotation (sagittal) – coupled with ischial out-flare & anterior shift
  - FPP2: posterior pelvic rotation (sagittal) – coupled with ischial in-flare & anterior shift
  - FPP3: control of ‘distorsion’ or intrapelvic rotation – contra rotation of the innominates ‘distors’ the pelvic ring & brings the sacrum into torsion initiating rotation through the spine – underlies all axial rotation, transitions through level change & walking
  - FPP4: controls frontal plane rotation on the femoral heads ensuring lateral pelvic stability during lateral weight transfer – underlies standing on one leg, walking

- These fundamental patterns of axio-pelvic control rely upon balanced co-activation and modulation from a deep, continuous inner myofascial sleeve – ‘The Lower Pelvic Unit’ (LPU).
- Early pre-activation of the LPU provides patterns of inner support and control through the pelvis & control of the neuromuscular force couples necessary for effective control of weight shift & load transfer. Emerging evidence supports the role of some muscles in contributing to these important patterns of functional posturo-movement control.

Lumbo-pelvic dysfunction
- Clinically, patients with lumbo-pelvic pain symptoms consistently demonstrate defective control of the Fundamental Pelvic Patterns & so the initiation & control of posturo-movement from the base of the column is compromised. Common clinical patterns of impaired control emerge increasingly supported by translating the evidence.
- This creates the need for subsequent compensations throughout the spine which further jeopardize axial control mechanisms including the generation of pain.
- The diminished contribution by the pelvis as the inhibitor & controller of the centre of weight shift of the body during all functional activities is also associated with:
  - control of the SIJ
  - control of the lumbar lordosis
  - control of the hips – closed & open chain movements.

The joint dysfunctions & pain syndromes predictably relate to the movement pattern impairments.

Implications:
- Appreciating the Fundamental Pelvic Patterns of control provides insights into how to build appropriate foundation patterns of posturo-movement control in people with lumbo-pelvic dysfunction & associated axio-pelvic pain disorders.

Exploring pelvic myomechanics & fundamental patterns underlying functional control: applying the evidence toward clinical solutions.