# REGIONAL INTERDEPENDENCE

PART A: A Clinical Model in Musculoskeletal Therapy

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## Introduction to Regional Interdependence

- The term ***regional interdependence*** or RI refers to a clinical model of musculoskeletal assessment and intervention
- RI describes the clinical observations related to the relationship between regions of the body
- **Its role in management of patients with musculoskeletal dysfunction is normally considered within the context of the biomedical model**

## Early clinical observation

- In 1959, Slocum stated that it was not uncommon for a baseball pitcher with an injured toe or foot to lose the effectiveness of the shoulder joint



## Kinetic Chain

- An efficient kinetic chain requires optimal anatomy, physiology and mechanics throughout all of the body segments involved
- Breakdown in the kinetic chain may include:
  - Variation in motor control
  - Inadequate muscle strength
  - Flexibility & endurance
  - Joint injury
  - Improper muscle activation patterns

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## RI as a Treatment Framework

- The primary interest of RI has been physical manifestations:
  - pain
  - range of motion
  - **and involving the musculoskeletal system**
- It must be recognised that:
  - The mechanisms underlying these primary manifestations can be much **more complex involving other physiological systems**

## Defined and redefined

- **The biomedical model has been expanded to include other factors that may contribute to the patient's complaints**
- Any disorder initiates a series of responses that involves multiple systems of the body not only musculoskeletal but also:
- **Neurophysiological**
- **Somatovisceral**
- **and Biopsychological responses**

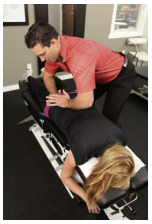


## A Mechanism for Manual Therapy

- Manual therapy likely works through biomechanical and/or neurophysiological mechanisms
- **Neuromuscular changes such as decreased resting EMG activity and decreased muscle inhibition have been associated with manual therapy**
- This is theorized to occur due to stimulation of the mechanoreceptors or proprioceptors producing a spinal cord mediated effect

## A mechanism for Manual Therapy

- Bialosky et al, 2009 suggested that RI may be the result of the combined interaction between biomechanical and neurophysiological mechanisms
- **This model suggests that a mechanical force from manual therapy:**
  - **initiates a cascade of neurophysiological responses**
  - **from the peripheral and central nervous system**
  - **which are then responsible for the clinical outcomes**



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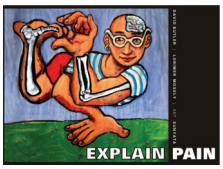
## Biopsychosocial model

- Research has demonstrated that altering a patient's perception of pain allows for improved neuromuscular function
- **Lorimer Moseley 2004, 2006**
  - Graded motor imagery is effective for longstanding complex regional pain syndrome
  - Graded motor imagery for pathological pain
- **Butler and Page 2006**
  - Mental practice with motor imagery: evidence for motor recovery and cortical organization after stroke

## *Explain Pain* by Lorimer Moseley & David Butler

- *Explain Pain* describes the complexities of the central nervous system for chronic pain patients in everyday language
- ***Explain Pain* covers how pain is a response produced by the brain**




- And how responses from the autonomic motor and immune systems can contribute to pain



## A redefined model of Regional Interdependence

- A more expansive and encompassing model:

1. **The revised RI model states that the interdependence between regions of the body may involve the musculoskeletal system**
2. **Neurophysiological, biopsychosocial, and somatovisceral systems can also influence musculoskeletal function both locally and at remote sites**

## Somatovisceral as a source of pain

- Somatovisceral tissue can be the source of referred pain as well as mimic musculoskeletal pain
  - Left shoulder pain can be due to heart disorders
  - Right shoulder pain can be due to liver disorders
  - Low back pain the result of urogenital disorders
- Gerwin in an article from 2002 in the *Journal of Musculoskeletal Pain* describes myofascial and visceral pain syndromes and the subsequent visceral-somatic pain representations

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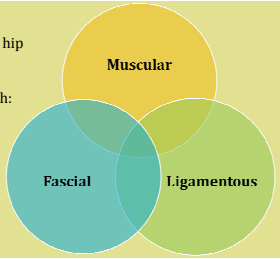
## The integrated lumbopelvic-hip region

The sacrum, pelvis, hip & spine are all functionally interrelated through:




Interconnections

## Thoracic Ring Approach ™

- The Thoracic Ring Approach ™ is part of The Integrated Systems Model co-developed by Canadian Physiotherapists Diane Lee & Linda Joy Lee

- It is a framework to help clinicians organize knowledge and develop clinical reasoning
- **It allows clinicians to determine the "Primary Driver"**

## Functional Testing for the Kinetic Chain

- **The Functional Movement Screen FMS**
- Gary Cook (2004) developed the FMS with the aim to identify, analyse and treat functional imbalances in order to improve performance and prevent injuries
- **The FMS is a test of 7 fundamental movements that assesses the quality of movement patterns**
- Essentially this is a test of neuromuscular control to challenge the kinetic chain



## *In summary*

- Clinical observations during both assessment and treatment of musculoskeletal disorders supports the view of a Kinetic Chain
- **Regional Interdependence is part of a more integrated clinical reasoning model whose scope extends beyond the biomedical model**
  **It is part of the biopsychosocial model**
- Several clinical reasoning models draw on the idea of Regional Interdependence
- Research studies do support the idea of Regional Interdependence