Objectives

• Review the clinical reasoning framework of The Thoracic Ring Approach to determine when you should treat the thorax to address the patient’s problem related to their whole body function.
• Consider the multiple mechanisms proposed to explain how non-optimal strategies for thoracic ring control can cause problems in distal areas from the head to the toes.

How do you Decide When to Treat the Thorax?

If Thoracic Ring Shifts are Present in Posture and Movement, Should you Always Treat Them?

When Is Dysfunction of the Thoracic Rings Relevant?

How does it relate to the patient’s experience of their body and/or the painful structure?

How does it relate to whole body function & performance?

To Answer These Questions -

It depends on what the patient wants to do...

You Need to Assess Tasks that are Based on:
• Painful or Aggravating Activities
• Difficult Movements
• Functional Goals
The Thoracic Ring Approach –
Understanding the Connections Between the Thorax & the Entire Body
Created by Dr. Linda-Joy (LJ) Lee

These Tasks Have Meaning

It’s all about the story...

Meaningful Task Analysis – Is the Thorax the Driver?

Use thoracic ring analysis & correction - determine if correcting thoracic rings have an impact on changing the rest of the kinetic chain & an impact on performance of the task. Compare to changing other areas (e.g., foot, pelvis, glenohumeral joint, neck, etc.)

Meaningful Task – Warrior 1
Thorax Driven Hip

Finding the Primary Driver when there is more than one site of Failed Load Transfer

Michelle’s Story Thorax Driven Knee
From the Discover Physio Series Vancouver 2012
Treating the Whole Person with The Integrated Systems Model

The Thoracic Ring Approach
Non-Optimal Thoracic Ring Function Affects Whole Body Function & Performance via Multiple Mechanisms

synergophysio.ca  ljlee.ca  Twitter @LJLee
The Thoracic Ring Approach –
Understanding the Connections Between the Thorax & the Entire Body
Created by Dr. Linda-Joy (LJ) Lee

Key Area of Load Transfer

The Functional Thorax

Key area of myofascial attachments
- head, neck, scapula, clavicle, shoulder, lumbar spine, pelvis

5th thoracic ring driven neck pain & reduced ROM

2nd/3rd Thoracic Ring Driven Carrying Disability & Arm Pain

The Thorax & the Functional Upper Extremity

3rd/4th Thoracic Ring Driver for “TOS”

Relationship to brachial plexus and blood vessels

Dr. Linda-Joy Lee Physiotherapist Corp. ©
synergypathio.ca ljlee.ca Twitter @LJLlee
The Thoracic Ring Approach –
Understanding the Connections Between the Thorax & the Entire Body
Created by Dr. Linda-Joy (LJ) Lee

Connections from the Lower Thorax to the Upper Thorax, Affect on Apertures in Diaphragm, Role in Respiration

The Thorax & Whole Body Function

- Relationship to SNS
- Relationship to Viscera
- Emotional Centre


- Innervation to all abdominal muscles is from T6 to L1/2
- Dysfunction in thorax is common driver for dys-synergies of deep and superficial abdominal muscles (LJ’s clinical observation, supported by anatomy)

The Thorax – largest region of the spine, forms 20% of overall body length – poor thoracic ring control impacts the rest of the trunk & body

Optimal strategies for function & performance require coordinated activity of all the muscles of the trunk – Clinical observations that thoracic ring dysfunction affected optimal trunk muscle recruitment & could “drive” low back & PGP

Abdominal Wall Resting Tone & Activation
Thoracic Rings common driver for inability to recruit Transversus Abdominis & train synergistic abdominal wall function

Runner – unable to perform plank due to LBP, also “head feels like going to explode”

Dr. Linda-Joy Lee Physiotherapist Corp. ©
synergophysio.ca ljlee.ca Twitter @LJLee
Abdominal Wall Resting Tone & Activation
Thoracic Rings common driver for inability to recruit Transversus Abdominis & Pelvic Floor & train synergistic abdominal wall/ PF function

Thoracic Rings Common Driver for Inability to Recruit Transversus Abdominis & Train Synergistic Abdominal Wall Function
Without Thoracic Ring Correction – Poor Ability to Recruit Transversus Abdominis – With Thoracic Ring Correction – Good Contraction

Thoracic Rings can also be driver for inability to recruit deep lumbar multifidus and excessive superficial multifidus activity
Indirect and direct influences – impact of ring rotation on lumbar spine balance between superficial and deep multifidus

Thoracic Ring Dysfunction can Drive Problems with Pelvic Floor Recruitment and Tone
Thoracic Driven Incontinence & Prolapse
Impact of excessive superficial muscle activity – the continuous ‘holding’ pattern around the thoracic rings
Some data to support these ideas – EO/PF increased resting tone in women with incontinence (Smith et al 2007)
Likely Multiple Mechanisms
eg. Impact on hip position  changes in length-tension of PF muscles

Non-optimal Strategies Create Excessive Intra-Abdominal Pressure (IAP) – “Pressure Belly” → Excessive Fascial Load & Ultimately Facilitate Prolapse or Herniation

The Thorax is the Centre of Trunk Rotation
6-22° rotation per segment
4-6° flex-ext per segment
Compare to 1-3° in the lumbar spine
Non-optimal neuromuscular control for rotation
- reduces ROM → greater stress on adjacent areas
- affects loading capacity in multiple planes

Dr. Linda-Joy Lee Physiotherapist Corp. ©
synergypysio.ca ljlee.ca Twitter @LJLee
The Thoracic Ring Approach –
Understanding the Connections Between the Thorax & the Entire Body
Created by Dr. Linda-Joy (LJ) Lee

"I get pain with running & working overhead"

Pain related to excessive extension at TL junction/upper lumbar spine – extension "give" controlled with correction of rotational dysfunction upper thoracic rings

Most common pattern of dysfunction in the thorax is poor rotational control

= control of lateral ring translation
Impacts sagittal curves (posture) and function throughout the body

Findings: Thoracic multifidus and longissimus function similarly to control sagittal plane perturbations and are differentially active with rotational forces on the trunk

Biologically Plausible Mechanism to Explain the Clinical Observations of Thoracic Driven Low Back and Pelvic Girdle Pain

Lee LJ. The Role of the Thorax in Pelvic Girdle Pain, Barcelona, Spain, 2007.

Dr. Linda-Joy Lee Physiotherapist Corp. ©

synergypysio.ca
ljlee.ca
Twitter @1LJLee
The Thoracic Ring Approach –
Understanding the Connections Between the Thorax & the Entire Body
Created by Dr. Linda-Joy (LJ) Lee

Thorax Driven Pelvic Girdle Pain,
Groin Pain & FAI, Thorax Driven Foot Pain

Thoracic Ring Driven “Classic FAI”
The Thoracic Ring Approach (LJ Lee)

The thorax is often a driver or a significant contributor to hip problems
There are multiple possible mechanisms to explain these clinical observations

It’s All Connected….

Thoracic Ring Driven Moderate to Severe QA Changes

The thorax is often a driver or a significant contributor to hip problems
There are multiple possible mechanisms to explain these clinical observations

The Functional Thorax & Performance

Lateral Translation is Component of Normal Biomechanics of Each Thoracic Ring
Adjustor for COM/BOS – postural equilibrium esp. to lateral perturbations
Hip – Thorax Strategy Needed to Maintain Body over Base of Support

Gait & Thorax Driven Foot Pain – tendinopathy, fasciosis, etc…

The Functional Thorax & Performance
Trunk “spring” for compressive loads & give in the system

Foot Can Also be a Common Secondary Driver to the Thoracic Rings – Check Opposite Foot to Side of Lateral Thoracic Translation

Dr. Linda-Joy Lee Physiotherapist Corp. ©
synergphysio.ca ljlee.ca Twitter @1LJLee
The Thoracic Ring Approach –
Understanding the Connections Between the Thorax & the Entire Body
Created by Dr. Linda-Joy (LJ) Lee

In the context of integrated whole body function, there are multiple mechanisms by which impairments in the thorax & non-optimal neuromuscular control can be the underlying cause for low back pain, pelvic girdle pain, neck pain, shoulder pain, groin pain, Achilles tendinopathy, etc.

But other areas can be drivers too...

Finding the Primary Driver – The Thoracic Ring Approach & The Integrated Systems Model for Pain & Disability

Thoracic Driven Recurrent Hamstring Pain

Experience = Hamstring Pain
Meaningful Task = Deadlift

The Integrated Systems Model for Pain & Disability (Lee LJ, Lee DG) – Finding the Driver, Reconceptualizing Pain, and Connecting the Whole Person

Dr. Linda-Joy (LJ) Lee, PhD
www.ljlee.ca
@ 1LJLee
Facebook.com/LJLeeConnected

Copyright Dr. Linda-Joy Lee Physiotherapist Corporation 2014
All Rights Reserved

Thanks to….

Assoc. Prof. Michel Coppieters
Prof. Paul Hodges www.uq.edu.au/core-spine
Prof. Karim Khan

"If I have seen further it is by standing on the shoulders of giants" 
Isaac Newton, 1675

Thanks to….

Prof. Paul Hodges
www.uq.edu.au/core-spine

All our patients and mentors who share our journeys and challenge us to keep learning, thinking, feeling and questioning so that we can help our patients live the highest quality of life possible

synergyphysio.ca ljlee.ca Twitter @1LJLee
The Thoracic Ring Approach –
Understanding the Connections Between the Thorax & the Entire Body
Created by Dr. Linda-Joy (LJ) Lee

Copyright Dr. Linda-Joy Lee
Physiotherapist Corporation
February 2014
All Rights Reserved

Dr. Linda-Joy Lee Physiotherapist Corp. ©
synergphysio.ca ljlee.ca Twitter @ILJLee