Physiotherapy and Chronic Low Back Pain: The Importance of Specific Assessment and Treatment

Tim Rogers
BKin, BScPT, Dip.Manip.PT, FCAMPT, CAFCI
Registered Physiotherapist

Objectives:

1) Review of Manual Therapy assessment and treatment for Chronic LBP

2) Review of Specific Exercise Prescription for Chronic LBP

3) Review of the evidence in scientific literature

Assessment: Lower Quadrant Scan

• History: Mechanism of Injury, Initial presentation, Progression of symptoms, Chronicity of symptoms, Previous assessment and treatment, PT, Chiro, RMT, medications, modalities, physicians/specialists, diagnostic testing

Tim Rogers PT

• Hons.B.Kinesiology McMaster 2000
• Hons.B.Sc.Physical Therapy Queen’s 2003
• Acupuncture Certification AFCI 2004
• Intermediate Diploma Manual Therapy 2007
• Advanced Diploma of Manual and Manipulative Physiotherapy 2009 (FCAMPT)

1) Review of Manual Therapy assessment and treatment for Chronic LBP

• What is Manual/Manipulative Physiotherapy?
  – Hands-on assessment and treatment of joint and tissue mobility in the spine and peripheral joints
  – treatment using gentle, hands-on techniques, to reduce muscle tightness, improve joint movement, reduce pain and improve function.
• CAMPT: Canadian Academy of Manipulative Physiotherapists (member of IFOMPT)
  www.manippt.org

Observation:

• Structural symmetry: thorax, pelvis (ASIS, pubic symph., PSIS, ischial tub.), leg length
• Scars, deformities
• Posture
• Localizing signs (splinting/guarding),
**Lower Quadrant Scan:**

- **Functional Movements:**
  - Sit-to-stand
  - Gait
  - Weight (load) transfer: single leg stance, step forwards/back
  - Torsion test (rotation): assess throughout the kinetic chain (foot to thorax)
  - Squat
  - Lunge
  - Step up/down
  - Heel raise/lower
  - (Jump (vertical/horizontal))
  - (Bridging)
  - (Prone hip extension)
  - (ASLR)

- **Physiological (Habitual) Movements:**
  - **AROM:**
    - flexion (overpressure, resisted); test in standing and sitting
    - extension
    - sideflexion (OP, resisted)
    - rotation (OP, resisted); can be tested in sitting

- **Quadrant testing**
  - Lumbar Extension & ipsilateral rotation/sidebend
  - Can also test into flexion with rotation/sidebend

- **H & I Testing**
  - Test sidebend then flexion or extension (H)
  - Test flexion or extension then sidebend (I)
  - If facet restriction present, restriction should be similar for both H & I; if not, possible hypermobility (confirm with manual assessment)

- **Special Tests (Load Transfer Tests)**
  - Kinetic Test (Gillet, Stork)
  - ASLR

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**Kinetic Test**

- **Ipsilateral**
  - Assess joint mobility

- **Contralateral**
  - Assess load transfer

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palpate sacral base & PSIS
ASLR

- Height: 20cm
- Effort scale: 0-5 (0: no effort, 5: unable)
- Assess force closure
  - Stabilization of pelvis to reproduce activation of core muscles

NEUROLOGICAL TESTS

- Dermatomes
- Reflexes
- Myotomes
- UMN Tests
- Neural Mobility Tests

Manual Therapy Assessment

- Passive Intervertebral Movement
  - Assess physiological (osteokinematic) movement at lumbar segment (flexion/extension)
- Passive Accessory Vertebral Movement
  - Assess arthrokinematic movement at lumbar segment (superior/anterior or inferior/posterior glide of facet)
- Stability Testing
  - Lumbar
  - Pelvis
  - Peripheral Joints

Unilateral Flexion PPIVM

Unilateral Extension PPIVM
Superior-Anterior Glide

Posterior Inferior Glide

Pelvis Mobility Testing

Anterior Innominate Rotation

Posterior Innominate Rotation

Pelvis Accessory Glides
Innominate Posterior-Inferior Glide

Innominate Superior-Anterior Glide

Sacrum Inferior-Posterior Glide

Sacrum Anterior-Superior Glide

STABILITY

Stability Testing of the Pelvis

• Clinical Instability (Panjabi 1992)
  • A significant decrease in the capacity of the stabilizing system to maintain the neutral zones within physiological limit, which results in pain and disability.
STABILITY

1. Osseous/Articular/Ligamentous integrity
2. Myofascial integrity
3. Neural control

- **SIJ: Integrated Model** (Panjabi 1992)
- Form Closure & Force Closure, Motor Control, Emotions

Neutral Zone Theory

- Panjabi describes a small range of displacement near a joint's neutral position.
- He has found that the range of the neutral zone may increase with trauma, degeneration and weakness of the stabilizing structures.

Lumbar Stability Tests

- Traction
- Compression
- Anterior Translation
- Posterior Translation (Dynamic)
- Lateral Translation
- Torsion

Anterior Translation

Posterior Translation

Lateral Translation
Stability Testing of the Pelvis

- SI: AP
- Superior
- Inferior
- PA (can be performed in prone)

- Pubic Symph: sup, inf, AP

Posterior translation

Superior translation

Inferior translation

Figure 3. CT coronal oblique view showing preserved and symmetrical joint spaces, with regular surfaces. The joint space is considered as normal between 2.0 and 4.0 mm.
Pubic Symphysis: inferior and superior translation

Lumbar Treatment

- TRACTION
- UNILATERAL FLEXION
- UNILATERAL EXTENSION

TREATMENT:
- Mobilization of the Pelvis
What are our assessment findings?

- Common presentations for chronic LBP:
  - Hypertonicity QL, iliopsoas, Piriformis;
  - Altered biomechanics, hypermobility, hypomobility
  - Neural irritation, defacilitation, neuromuscular fatigue
  - Altered gait patterns, further tissue irritation (bursitis, muscle strain, degenerative changes)
- RESULTING IN: activity avoidance, deconditioning/loss of strength and endurance, postural dysfunction (flexed postures due to increased time sitting), loss of flexibility (reduced thoracic extension/rotation, loss of hip extension), further alteration of normal biomechanics...
2) Review of Specific Exercise Prescription for Chronic LBP

- Thorough and accurate assessment will dictate which specific exercises should be included

What is our physio treatment plan?

- Retrain defacilitated/weak muscles
- Reduce tone in hypertonic muscles
  - Acupuncture, neuromuscular techniques
- Mobilize/Manipulate hypomobile joints
- Stabilize hypermobile joints

- Also, improve posture, endurance, motivation...

STABILISING CORE MUSCLES

- THE INNER CORE
- Transversus abdominus
- Multifidus
- Pelvic Floor Muscles
- Diaphragm

PAIN inhibits Lumbar multifidus

- Muscle recovery is not automatic following injury
- Segmentally innervated
- Require specific retraining
  (Hides et al., 1996)

Lumbar multifidus

- importance of palpation
- diagnostic US, biofeedback
- visualization

Transversus abdominus

- Tonic muscle
- Goal: build endurance and control
Gluteus medius

- L5 innervation
- Stabilizer of the hip during weight bearing
- Avoid overcompensation of piriformis, TFL

Gluteus Maximus/Biceps Femoris

- Stabilize Pelvis and Lumbar spine
  - Biceps femoris via sacrotubrous ligament
  - Gluteus via thoracodorsal fascia

Latissimus dorsi/erector spinae

- Stabilization via TDF & muscular insertion
- Progress into direction of vulnerability (eg. Flexion)

3) Review of the Literature

Exercise therapy for treatment of non-specific low back pain
Hayden J, van Tulder MW, Malmivaara A, Koes BW

- Cochrane, 2005
  - Exercise therapy appears to be slightly effective at decreasing pain and improving function in adults with chronic low-back pain, particularly in populations visiting a healthcare provider.
Exercises for prevention of recurrences of low-back pain
Brian KL Choi, Jos H Verbeek, Wilson Wai-San Tam, Johnny Y Jiang

• There is moderate quality evidence that post-treatment exercise programmes can prevent recurrences of back pain but conflicting evidence was found for treatment exercise.

Questions?

• Complimentary and Alternative Therapies for Back Pain II, Agency for Healthcare Research and Quality Advancing Excellence in Health Care (AHRQ), Furlan, A. et. al. (2010)