PHYSICAL THERAPY MANAGEMENT OF LOW BACK PAIN

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Objectives

- Describe the use of treatment-based classification for patients with low back pain (LBP)
- Define the clinical presentation of a patient in each LBP classification
- Discuss the application of ROM, manual therapy, and stabilization training for patients with LBP
Why Classify?

- **Problem:** Not all patients with low back pain respond to a single treatment. Treatment outcomes remain less than optimal.

- **Solution:** Treatment performed on *homogeneous* subgroups will result in more effective and efficient care
Rehabilitation Approaches

- ROM exercise
- Mechanical traction
- Manual therapy
  - Mobilization/Manipulation
  - Massage
- Spinal stabilization
  - Motor control training
  - Progressive resistance exercise
Traction and ROM

- Intervertebral disc disorders (722.xx)
- Spinal stenosis (724.0)
- Sciatica (724.3)
- Back pain with radiation (724.4)
Manual Therapy

• Lumbago (724.2)
• Backache (724.5)
• Disorders of sacrum (724.6)
• Myalgia and myositis (729.1)
Spinal Stabilization

• (Degenerative) Intervertebral disc disorders (722.52)
• Spondylosis and allied disorders (721.xx)
• Acquired spondylolisthesis (738.4)
HISTORY AND EXAMINATION
Physical Examination

- Posture assessment
- Spinal ROM testing
- Neurological exam
- Palpation
- Special testing

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Traction and ROM

- Predictors of Lumbar Spine Stenosis
  - No pain or sx improved when sitting
  - Age > 48 years
  - Leg pain > back pain
  - Bilateral symptoms
  - Pain during walking/standing
    - Pre-test probability = 40%
    - 4/5 = 76%
    - 5/5 = 99+%

Traction and ROM

- **Posture**
  - Acute lateral shift highly predictive of lumbar disc pathology
    - Porter and Miller, *Spine* 1986

- **ROM**
  - Repeated lumbar ROM creates centralization or peripheralization
Traction and ROM

- **Validity**
  - Centralization with repeated movements consistent with disc as the source of pain (+LR = 2.8-6.7)
    - Hancock et al, *Eur Spine J* 2007

- **Reliability**
  - K = .70-.82 on whether centralization occurred in a given patient
    - Kilpkoski et al, *Spine* 2002
  - K = .90 on directional preference
    - Kilpkoski et al, *Spine* 2002
Traction and ROM

- Traction Subgroup
  - Signs and symptoms of nerve root compression
  - Pain or numbness extending distal to the buttock in the previous 24 hours
  - Peripheralization of pain with extension
  - Positive crossed straight leg raise (<45deg)
Traction and ROM

- Special Testing: SLR
- Validity (pooled)
  - SLR $\rightarrow$ Sensitivity = .85, Specificity = .52
  - Crossed SLR $\rightarrow$ Sensitivity = .29, Specificity = .88
- Reliability
  - SLR $\rightarrow$ $K = .70$

- van der Windt et al, *Cochrane Review* 2010
Manual Therapy

• Signs of Myofascial Pain Syndrome
  • Focal tenderness with concordant sign reproduction
  • Twitch response
  • Taut band
  • Often referred pain (non-dermatomal) on continued (~5sec) pressure

• Reliability (k=.76)
  • Gerwin et al, Pain 1997
Manual Therapy

• CPR for lumbar manipulation
  • No symptoms distal to the knee *
  • Duration of symptoms < 16 days *
  • At least one hip with > 35° of IR
  • Hypomobility with lumbar PAIVM testing
  • FABQ(W) < 19
• 4/5 criteria → Posttest probability of success increased from 44% to 92% (+LR=13.2)
Manual Therapy

• Special Testing (SI Joint)
  • Provocation tests
    • Identify SI Joint as pain generator
    • Combination of 3 or more tests with absence of centralization
    • Specificity .87, sensitivity .91 (+LR = 6.97)
  • Mobility tests
    • Identify movement dysfunction of SI Joint
      • Cibulka et al, *JOSPT* 1999

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Manual Therapy

Thigh thrust

Compression

Gaenslen’s

Distraction

Sacral thrust
Manual Therapy

Supine long-sit

Deerfield

Standing flexion

PSIS alignment
Manual Therapy

- Anterior innominate rotation
  - Positive standing flexion test
  - PSIS high on involved side
  - Long sit test-leg long to short
  - Deerfield test-leg long to short
- Posterior innominate rotation
  - Positive standing flexion test
  - PSIS low on involved side
  - Long sit test-leg short to long
  - Deerfield test-leg short to long
Spinal Stabilization

- **Posture**
  - Skin creases
  - “Orange-peel” appearance

- **ROM**
  - Painful arc
    - Greatest pain in mid range, not at end range
Spinal Stabilization

- Predictors of Joint Pain
  - Positive Extension-Rotation test
  - Age ≥ 50
  - Best when walking
  - Best when sitting
  - Pain is paraspinal
    - 3 of 5 present suggest relief with ZJ block (+LR 9.7)
    - Extension-Rotation test (SN = 100%)
    - Laslett et al, *Spine J* 2006
Spinal Stabilization

- Predictors of Radiographic Instability
  - Age <37 years
  - Total extension >26deg
  - Any hypermobility of the lumbar spine
  - Lack of hypomobility of the lumbar spine*
  - Lumbar flexion >53deg*
  
  * \( +LR = 12.8; -LR = .72 \)
  
  - Fritz et al., *Eur Spine J* 2005
Spinal Stabilization

- CPR for lumbar stabilization
  - Age < 41 years *
  - Positive prone instability test
  - Aberrant motion
  - SLR > 91°
- 3/4 criteria (LR+ = 4.0)
Clinical Decision Making

Short-term management

Long-term management

Tissue causing pain

Impairments leading to pain

Impairments resulting from pain
Ergonomics – Short-Term Mgt

• Sleeping
  • Mattress
  • Pillow between the knees
  • Pillow under the lateral trunk
  • Pillow anterior/posterior to trunk

• Sitting
  • Foot support
  • Seat support
  • Back support
  • Arm support

Driessen et al, *Occup Environ Med* 2010
Modalities – Short-Term Mgt

- Supporting evidence
  - Needling/Acupuncture in cases of chronic LBP
    - Furlan et al, *Spine* 2005
- Lack of evidence
  - Iontophoresis
  - Ultrasound
- Conflicting evidence
  - Electrical Stimulation and laser in cases of nonspecific chronic LBP (unsupported)
  - Electrical Stimulation and laser in cases of radiculopathy supported
    - Konstantinovic et al, *Photomed Laser Surg* 2010
    - Chou et al, *Spine* 2009
Extension ROM Short-Term Mgt

- HNP with radiculopathy
- 15-40 year olds
- Centralize with extension; peripheralize with flexion
Extension ROM Long-Term Mgt

- Weak back extensors/hip flexors
- Tight hamstrings
Flexion ROM Short-Term Mgt

- Lumbar Spine Stenosis
- Age > 48
- Centralize with flexion; peripheralize with extension
Flexion ROM Long-Term Mgt

- Weak abdominals and gluteals
- Tight hip flexors
ROM – The Evidence

• The McKenzie Approach
  • Systemic review supports short term benefits
  • Patients given exercises matched to their movement preference improved significantly in pain, med use, disability
    • Long et al, *Spine* 2004
Traction – The Evidence

• Traction efficacy (pain and disability) not endorsed in systematic reviews for mixed samples of LBP

• Traction efficacy supported at 6 weeks in a population with radiculopathy
  • Positive crossed leg raise (<45deg)
  • Lower extremity pain that peripheralized with extension
    • Fritz et al, *Spine* 2007
Manual Therapy Short-Term Mgt

- Mechanical low back pain
- Local pain and limited lumbar motion
Manual Therapy Long-Term Mgt

- Locked SI joint
- Tight paraspinals
- Tight lower thoracic spine
Manual Therapy – The Evidence

- **Non-specific low back pain**
  - 13 studies
  - “Massage might be beneficial for patients with subacute and chronic non-specific low back pain, especially when combined with exercises and education.”
    - Furlan et al, *Cochr Syst Rev* 2008

- **Myofascial low back pain**
  - Support for multimodal treatment including massage, correction of muscle imbalance, and dry needling
Manual Therapy – The Evidence

• Chiropractic management of LBP and back-related leg pain: 12 guidelines, 64 RCTs, 20 reviews
  • Levels of evidence supporting the use of manipulation
    • Acute (<6 weeks) to Chronic (>12 weeks) LBP: A
    • Sciatica/Radiating pain: C
  • Lawrence et al, J Manip and Phys Ther 2008
Spinal Stabilization Short-Term Mgt

- **LS corsets**
  - Equivocal findings for management
    - van Duijvenbode et al, Cochr Syst Rev 2008

- **SI Belting**
  - Reduction of radiographic-identified impairment
    - Mens et al, PT 2000
  - Decreased sacral flexion by 20% with belt force of 50N
    - Snijders et al, Clin Biomech 1993
Spinal Stabilization Long-Term Mgt

- The Lumbopelvic “Core”
  - Breathe (Diaphragm) and relax
  - Draw up
    - Cut off urine flow (PF)
    - Pull belly button to head (TrA)
    - Straighten lower spine (Mult)
Spinal Stabilization Long-Term Mgt

Level 1
- Isolated core/superficial
- Isometric
- Motor control

Level 2
- Regional movements
- Non-weight bearing
- Open Chain
- Trunk supported

Level 3
- Whole body mass movements
- Progression to weight bearing
- Closed Chain
- Trunk unsupported
Sample Exercises – Flexors

Supine Leg Raises  Level 2

Prone Planking Level 3
Sample Exercises – Lateral unit

Clamshells  Level 2

Side Planking  Level 3
Sample Exercises – Extensors

Prone Leg Raise Level 2

Bridges Level 3
Spinal Stabilization – The Evidence

• Systematic Reviews: Acute to chronic LBP
  • Exercise improves pain and disability in chronic population (A); equivocal results in acute population (C)
  • Moderate quality evidence that post-treatment exercise program can prevent recurrence of low back pain
    • Choi et al, *Occup Environ Med* 2010
Spinal Stabilization – The Evidence

- Population: Spondylolysis or spondylolisthesis
- Intervention: Stabilization program with TRA and multifidus focus versus treatment as directed by PT (10 weeks)
  - Significant improvements in disability and pain at 10 weeks and 30 months in stabilization group
  - O’Sullivan et al *Spine* 1997
Avoiding Signs of Overload

- Pain that is unbearable
- Pain that does not decrease 4 hrs after activity and does not resolve within 24 hrs
- Pain that is increased over the previous session or comes on earlier in the exercise session
- Progressive increased weakness or stiffness over several exercise sessions
- Swelling, redness, and warmth in the healing tissue
Final Thoughts…

- Attempt to classify all patients with LBP
  - 50% fit one group
  - 25% fit >1 group
  - 25% unable to classify
    - Stanton et al, PT 2011

- Recommend short-term focus on pain management via ergonomics, modalities, ROM, and manual therapy techniques

- Recommend long-term term focus on impairments: motor control deficits, stiffness, and weakness
QUESTIONS?