Red Flag Screening and Differential Diagnosis in Patients with Spinal Pain

MEREDITH CABLE PT, DPT, OCS
MATTHEW JULY PT, DPT

Objectives
At conclusion of today’s session, the learner will be able to:
• Recognize red flag items and appropriately refer out in order to maximize efficiency with direct access
• Differentiate red flag screening items from musculoskeletal conditions in patients with spinal pain and treat as appropriate
• Design an initial examination for patients with spinal pain that will clear out all red flag conditions, while differentiating various musculoskeletal hypotheses
• Categorize patients with spinal pain by treatment based classification system
• Plan best initial treatment for patients with spinal pain based on classification

APTA Vision Beyond Vision 2020
Quality: “As independent practitioners, physical therapists in clinical practice will embrace best practice standards in diagnosis/classification, measurement, and intervention.”
“....striving to prevent adverse events related to patient care, and demonstrating continuing competence.”

APTA Vision Beyond Vision 2020
Advocacy:
“The physical therapy profession will advocate for patients/clients/consumers both as individuals and as a population, in practice, education, and research settings to manage and promote change, adopt best practice standards and approaches, and ensure that systems are built to be consumer-centered.”

Direct Access
As many states, Missouri included, push for greater direct access in the profession, a thorough examination is absolutely essential.
Vital to assess and refer out for red flag items
Ensure the safety and appropriate treatment for all patients

Evidence-Based Practice
• EBP
• Clinical Experience
• Evidence/Research
• Patient Values
Current Practice

A survey of current physical therapists was created to assess the perception of both current practice and the future of clinical practice, as it relates to direct access and medical screening.

Physical Therapists of the future SHOULD BE

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capable of seeing patients in a primary care role</td>
<td>0.00%</td>
<td>3.45%</td>
<td>25.43%</td>
<td>71.12%</td>
</tr>
<tr>
<td>Capable of screening for medical conditions masked as a musculoskeletal condition</td>
<td>0.00%</td>
<td>0.00%</td>
<td>24.24%</td>
<td>74.76%</td>
</tr>
<tr>
<td>Perceived by the medical community as being a primary care provider that can effectively screen for medical conditions</td>
<td>43%</td>
<td>3.03%</td>
<td>29.44%</td>
<td>67.10%</td>
</tr>
<tr>
<td>Perceived by the public as being seen as a primary care provider that can effectively screen for medical conditions</td>
<td>0.00%</td>
<td>3.46%</td>
<td>30.30%</td>
<td>66.23%</td>
</tr>
</tbody>
</table>

Patients of Tomorrow

Reports indicate a doubling in number of new cases of obesity-related ailments:
- Diabetes, heart disease and hypertension by 2030

Physical Therapists are CURRENTLY

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capable of seeing patients in a primary care role</td>
<td>.86%</td>
<td>5.17%</td>
<td>46.55%</td>
<td>47.41%</td>
</tr>
<tr>
<td>Capable of screening for medical conditions masked as a musculoskeletal condition</td>
<td>.87%</td>
<td>3.03%</td>
<td>47.62%</td>
<td>48.48%</td>
</tr>
<tr>
<td>Perceived by the medical community as being a primary care provider that can effectively screen for medical conditions</td>
<td>17.83%</td>
<td>63.48%</td>
<td>16.52%</td>
<td>2.17%</td>
</tr>
<tr>
<td>Perceived by the public as being seen as a primary care provider that can effectively screen for medical conditions</td>
<td>17.75%</td>
<td>62.77%</td>
<td>16.88%</td>
<td>2.06%</td>
</tr>
</tbody>
</table>

Patients of Tomorrow

Life expectancy continues to grow, meaning patients are living longer

- Obesity Rate %
- Cancer Cases
- Cancer Deaths
Optimal Screening for Prediction of Referral and Outcome (OSPRO)

**Purpose:** Develop a concise review-of-systems screening tool

**Why:** "A standard assessment tool would mitigate the variability in red flag symptom identification"

Start with red flag raised and lower throughout exam

Found to have a long and short form
- 23-item: 100% of red flag items
- 10-item: 94.7% of red flag items

---

What is on the OSPRO?

1. abnormally sensations (eg, numbness, pins and needles)?
2. headaches?
3. night pain?
4. sustained morning stiffness?
5. light-headedness?
6. trauma (eg, a motor vehicle accident, a fall)?
7. easy bruising?
8. changes in vision?
9. chest pain with rest?
10. shortness of breath?
11. changes in the integrity of your nails?
12. changes in menstruation patterns?
13. prolonged use of corticosteroids?

---

General Screening from Patient History

**Age**
- Cancer rate generally increases with age, unlikely < 50
- Osteoporosis more likely with increased age

**Gender**
- Higher cancer risk in females
- Mortality is higher in men than women for cancer

**Past Medical History**
- History of Cancer: highest likelihood ratio (+LR) of current cancer

**Family History**
- Abdominal Aortic Aneurysm (AAA): 15% of male first relatives
- Ankylosing spondylitis: 8.2% of first relatives

---

Infection

**General signs/symptoms:**
- Redness, fever, warmth
- Lethargy, recent bite or infection

**Cellulitis – skin**
- Blisters, skin dimpling

**Osteomyelitis – bone**

**Joint Sepsis**

**UTI**

---

Cancer

**Biggest risk factor for cancer is previous history of cancer**

**Prevalence**
- Breast 123.7/100,000
- Lung 69.8/100,000 (male>female)
- Pancoast Tumor can present similarly to cervical radiculopathy

Consider unexplained weight loss, night pain, pain not correlated to functional movements, no improvement with conservative care for 4 weeks, age greater than 50

---

Osteoporosis

**Increased age correlates with increased risk of osteoporosis**

Assess for previous falls with fractures or injury, decreased bone mineral density via DEXA scans, prolonged use of corticosteroids
Myocardial Infarction
Men > 40 y/o, Women > 50 y/o, Increases with age

**Signs and symptoms:**
- Angina > 30 min not relieved by rest, antacids, or nitroglycerin
- Vague chest, shoulder, mid back, or arm(s) pain
- Shortness of breath
- Cold sweat
- Nausea
- Rapid or irregular pulse

Aortic Syndromes

Acute aortic syndromes, thoracic aortic aneurysms
- More prevalent in men, but common during pregnancy

**Signs and symptoms:**
- Chest pain
- Anterior pain or radiation to neck, back, abdomen
- Syncope or CVA
- Pressure differential in UEs
- Pulse deficits
- Risk factor - hypertension

Pulmonary Embolism (PE)

Age < 55, the incidence of pulmonary embolism is higher in females

**Well’s Criteria to raise red flag**

<table>
<thead>
<tr>
<th>Criteria/Signs</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical presentation</td>
<td>3</td>
</tr>
<tr>
<td>Clinical signs and symptoms of DVT (previous history of leg/foot swelling)</td>
<td>2</td>
</tr>
<tr>
<td>No alternative diagnosis is more likely than PE</td>
<td>1</td>
</tr>
<tr>
<td>Recent surgery or trauma</td>
<td>1</td>
</tr>
<tr>
<td>Clinical evidence of PE</td>
<td>1</td>
</tr>
<tr>
<td>Pressure in pulmonary artery &gt; 30 mmHg</td>
<td>1</td>
</tr>
<tr>
<td>Evidence of PE in lower limb</td>
<td>1</td>
</tr>
<tr>
<td>Coagulopathy</td>
<td>1</td>
</tr>
<tr>
<td>Temporary mechanical ventilation in the last 6 mo</td>
<td>1</td>
</tr>
<tr>
<td>History of PE</td>
<td>1</td>
</tr>
</tbody>
</table>

PE: Pulmonary Embolism

Pneumothorax

- Age 60-65, more prevalent in males
- COPD is a common cause of spontaneous pneumothorax

**Signs and symptoms:**
- Ipsilateral chest pain that increases with deep breath or cough
- Dyspnea
- Cyanosis
- Significant fatigue
- Decreased ipsilateral chest expansion
- Hyperresonance on percussion
- Reduced breath sounds

Diabetes Mellitus

**Screening/Risk Factors for Type 2 Diabetes**
- Age > 45 years
- Family history of diabetes
- Obesity
- High risk ethnic or racial group
- Hypertension or Dyslipidemia
- Gestational diabetes
- Sedentary lifestyle
- History of vascular disease
- History of impaired glucose tolerance

Diabetes Mellitus

Signs and symptoms: hunger, fatigue, thirst, increased urination frequency, dry mouth, itchy skin, blurred vision, yeast infections, slow healing, pain/numbness in feet and legs
Referral Pain
Visceral dysfunction can mimic musculoskeletal pains and complaints

Cervical Conditions

Upper Cervical Instability
- The prevalence of UCI varies among different types of patients.
- Signs and symptoms:
  - Cervical trauma
  - Neck pain with sustained postures
  - Weakness of the neck
  - Altered ROM
  - Hypermobility and soft end-feeling in passive testing
  - Referred pain in the shoulder and periscapular area
  - Cervical radiculopathy or myelopathy
  - Occipital and frontal or retro-orbital headaches
  - Down Syndrome, Rheumatoid Arthritis

Upper Cervical Instability
- Often missed on initial imaging post-trauma
- Multiple examination options to utilize but best in combination
  - Transverse Ligament Testing
  - Anterior Shear Testing — SYMPTOM PROVOKING
  - Sharp-Purser — SYMPTOM RELIEVING
  - Alar Ligament Testing

Cervical Arterial Dysfunction
- Risk Factors
  - Past hx of cervical trauma
  - Hx of migraine-type HA
  - Hyperlipidemia
  - Cardiac or vascular disease
  - Previous CVA or TIA
  - Diabetes
  - Clotting disorders or other blood disorders
  - Anticoagulant therapy
  - Long-term steroid use
  - Hx of smoking
  - Recent infection
  - Immediately postpartum
  - *Absence of a plausible mechanical explanation for the patient's symptoms*

Cervical Fracture
- Multiple tools have been developed to assess for cervical fractures
- Important to utilize most sensitive and specific tool, especially in post-traumatic patients
- Most sensitive and specific is the Canadian C-Spine Rules
Canadian C-Spine Rules

Thoracic Compression Fractures
CPR by Henschke et al:
1. Age > 70 year old
2. Female
3. Significant trauma – major in young patients, minor in elderly
4. Prolonged use of corticosteroids

Cervical Treatment Based Classification (TBC)
Fritz developed a TBC for patients with cervical pain
Initial question: Is this patient appropriate for therapy?
Greater results with matched interventions compared to standard
Update in Clinical Practice Guidelines (CPG) of 2017

Pain Control
Signs/symptoms:
- High pain and disability scores
- Acute symptoms
- Often traumatic MOI
- Poor tolerance for examination and assessment
Primary Treatment:
- Gentle AROM within pain tolerance
- Education to remain as active as possible

Centralization
Signs/symptoms:
- Radicular or referred symptoms
- Peripheralization or centralization with neck ROM
- Signs of nerve root compression present
- + Spurling’s A, + Distraction, + ULTT-A, ipsilateral rotation < 60 degrees
Primary Treatment:
- Mechanical or manual traction
- Repeated movements

Headaches
Signs/symptoms:
- Unilateral headaches
- Headache triggered by neck movements and positions
- Can be associated shoulder or arm pain
- Ruled out other causes – migraines, CAD, etc.
Primary Treatment:
- Cervical spine mobilization/manipulation
- Strength and endurance exercise program
- Postural education
Mobility

Signs/symptoms:
- Recent onset of central and/or unilateral neck pain
- Limitation in neck motion that consistently reproduces symptoms
- Limited cervical ROM
- Restricted cervicothoracic joint mobility

Primary Treatment:
- Cervical and thoracic manipulation/mobilization
- AROM exercises

Exercise and Conditioning

Signs/symptoms:
- Lower pain/disability scores
- Chronic symptoms
- No centralization or nerve root compression evidence
- Poor motor control

Primary Treatment:
- Strength and endurance for neck and upper quarter

Questions?

Lumbar Dysfunction
Cervical Myelopathy

1. Gait deviation
2. + Hoffman’s
3. + Babinski
4. + Inverted Supinator Sign
5. Age >45

Abdominal Aortic Aneurysm (AAA)

Patient population
- Age 50: 25/100,000
- Age 70: 78/100,000

Risk factors:
- Smoking
- Male
- HTN
- Increased age

Palpation (normal size 2 cm)
- 61% of AAA > 3 cm
- 82% of AAA > 5 cm

Throbbing, pulsing with palpation along aorta

Cauda Equina

1 case per 33,000 to 100,000

Signs/symptoms:
- Saddle anesthesia
- Loss of bower/bladder control
- Radiating symptoms down leg
- Pain not related to movement

Ankylosing Spondylitis

Male 3x > Female, <40 yo
CPR (3 or more)= +LR

1. LBP improved with exercise but not rest
2. AM stiffness>30 min
3. Awakening with LBP, 2nd half of the night
4. Alternating buttock pain

Abdominal Aortic Aneurysm

Patient population
- Age 50: 25/100,000
- Age 70: 78/100,000

Risk factors:
- Smoking
- Male
- HTN
- Increased age

Palpation (normal size 2 cm)
- 61% of AAA > 3 cm
- 82% of AAA > 5 cm

Throbbing, pulsing with palpation along aorta

Endometriosis:
- Prevalence in women ranges from 40-70%
- Signs and symptoms:
  - Pain, fatigue, and mood change 1-2 days before menstruation, dysmenorrhea, pain with sexual intercourse, fever, diarrhea, constipation, rectal bleeding, referred pain, infertility

OB-GYN Complications

Peripheral Arterial Dysfunction (PAD)

Can be difficult to differentiate from spinal stenosis

Signs/symptoms:
- Pain worsening with activity
- Loss of color, temperature and pulse

Differentiate with positional testing
- Seated bicycle testing with symptoms – likely PAD
- Worse with treadmill – likely spinal
Other Lumbar Considerations

Cancer
- Previous history of cancer +LR 23.7
- Bladder, prostate, colorectal cancers

Prolonged steroid use
- Incidence of low back pain and hip pain

Osteoporosis
- Pelvic fractures with falls

Lumbar TBC
Delitto et al developed initial lumbar TBC similar to cervical TBC
Brennan et al progressed this into 3 main categories
Alrwaily et al took this TBC and built on
Initial screening for appropriateness of therapy
Grouped into medical management, rehab management and self-care

Directional Preference
Signs/symptoms:
- Preference for sitting or walking/specific positions
- Centralization with motion testing and peripheralization with opposite movement
- No evidence of nerve root compression
Primary Treatment:
- Repeated movement exercises

SIJ Pain
Laslett CPR for SIJ pain
- Gaenslen’s
- Sacral Thrust
- Thigh Thrust
- Compression
- Distraction

Manipulation
Signs/symptoms:
- Recent onset of symptoms (<16 days)
- No symptoms distal to the knee
- Segmental hypomobility
- Low FABQ (FABQ-W <19)
- Hip IR > 35 degrees in at least one hip
Primary Treatment:
- Lumbar manipulation

Stabilization
Signs/ Symptoms:
- Age < 40 yo
- SLR > 91 degrees on one side
- Aberrant motion
- + Prone instability test
Primary Treatment:
- Core stabilization and functional movements
Lumbar TBC

Questions?

References


Dayo et al. What can the history and physical examination tell us about low back pain? JAMA 1992;268:765-5


Lumbar Examination Video

https://www.youtube.com/watch?v=ujQOu0no5MK

References


References


