OBJECTIONS

1. Discuss patient with thoracic pain history
2. Develop hypotheses based on history
3. Review clinical examination of the shoulder and clinical reasoning for its interpretation
4. Discuss decision-making for the use of extra tests
5. Review a case study and how the examination is conducted and interpreted
WHO
• A 29-year-old male working at large warehouse. Working out and bodybuilding since the age of 16.

WHAT
• One-year history of thoracic pain.

WHERE
• Right mid-thoracic level

WHY
• Discomfort, “like a strain” in the right mid-thoracic region during lifting.
• Gradual onset and increased to severe intensity over the following 2-3 days.
• Over the next year significant pain

WHEN
Aggravating Factors:
• Use of the right arm such as with lifting, pulling, or arm elevation provoked his symptoms.
• Slouching
• Worse as the day went on
• Pain while taking a deep breath.

Alleviating Factors:
• In the morning
• Rest
• One day of feeling “normal” in the 2 weeks before his visit to physical therapy and this was a rare experience for him.
TO WHAT EXTENT
• Intensity of pain varied.
• At its best, which was after rest, he rated it a 1/10
• Most of the time 3/10, which he felt with activity.
• Did not miss work, it significantly interfered with his
typically physically active lifestyle. Gave up weightlifting
• Prior treatment: modalities, trigger point work,
chiropractic manipulation, rib mobilization and massage.

PAST MEDICAL HISTORY
• In good health. Very active in martial arts and with other
sports such as mountain biking and golfing.
• Three years prior to the most recent problem he had a
similar incidence of right midthoracic pain after a session
of vigorous golfing. This pain resolved on its own after
four to five months.

IMAGING
• MRI and radiographs normal

CLINICAL EXAMINATION – Diagnosis

Diagnosis - hypotheses
1. Acute onset of pain, without a trauma, in the region of the
thoracic spine – once serious pathology has been ruled
out – is most likely to be discogenic.
   1. Arm movements cause thoracic spine movements
down to T6 explains pain during both trunk motions
as well as during arm motions.
   2. Disc problems often painful during deep respiration.
2. Potential rib pathology: most painful with trunk
sidebending and arm movements
3. Zygapophyseal unlikely due to no macro-trauma and pain
with breathing.

Causal factors and perpetuators
1. Posture
2. Weight lifting lifting in a bent and rotated position,
predisposing him to internal disc derangement.
### HISTORY

Who?  
What?  
When?  
Where?  
Why?  
To what extent?

### INTAKE INFORMATION

#### UNIVERSITY MEDICAL CENTER HEALTH SYSTEM

Physical Medicine & Rehabilitation

<table>
<thead>
<tr>
<th>Was this a result of an injury?</th>
<th>Yes / No</th>
<th>Work injury?</th>
<th>Yes / No</th>
<th>Gradual onset?</th>
<th>Yes / No</th>
</tr>
</thead>
<tbody>
<tr>
<td>When it started</td>
<td>/ /</td>
<td>When it became worse</td>
<td>/ /</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Do you or your parents have or have ever had any of the following? (If yes, indicate on page.)

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Y / N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asthma</td>
<td>Y / N</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>Y / N</td>
</tr>
<tr>
<td>Back/Neck Problems</td>
<td>Y / N</td>
</tr>
<tr>
<td>Diabetes</td>
<td>Y / N</td>
</tr>
<tr>
<td>Heart Disease</td>
<td>Y / N</td>
</tr>
<tr>
<td>Kidney Disease</td>
<td>Y / N</td>
</tr>
<tr>
<td>Liver Disease</td>
<td>Y / N</td>
</tr>
<tr>
<td>Mental Health Problems</td>
<td>Y / N</td>
</tr>
<tr>
<td>Tendinitis</td>
<td>Y / N</td>
</tr>
</tbody>
</table>

#### Other:

- Do you have any of the following? (Y / N)
- Dizziness
- Headache
- Tinnitus
- Vertigo

#### Recent Surgeries or hospitalizations in the past 12 months?

1. 
2. 
3. 
4. 

#### Past Medical History (back/neck/knee problems, other surgeries, pregnancies, sinus, sperm, etc.)

1. 
2. 
3. 
4. 

#### Present medications

<table>
<thead>
<tr>
<th>Dosage</th>
<th>Physician</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dr. Phone #</strong></td>
<td></td>
</tr>
</tbody>
</table>
Thoracic Spine Physical Therapy Evaluation

Patient Name:__________________________________________

DOB:_______________________________

Age:_____________         Sex:  M / F

Date of Onset:____________________  Date of Surgery:_______________

Physician:____________________________________  Return to Physician___________________________

Occupation:_______________________  Work related injury?  Y / N  Precautions:_____________________

Diagnosis:_________________________________________________________________________________

History/Subjective

Pain Intensity:_______ cm (See pain/symptom diagram in chart)  ADL Score:_________________________

Notable Limits/Functional Difficulties:___________________________________________________________

Previous Level of Function:___________________________________________________________________

Commenced for no apparent reason:  Y / N

Etiology:__________________________________________________________________________________

_________________________________________________________________________________________

_________________________________________________________________________________________

Symptoms:________________________________________________________________________________

_________________________________________________________________________________________

_________________________________________________________________________________________

Symptoms:  Improving  /  Unchanging  /  Worsening                       Constant  /  Intermittent

Pain made WORSE by:_____________________________________________________________________

Pain made BETTER by:_____________________________________________________________________

Previous history of same condition:  Y / N

Previous treatment:  Y / N / NA

Did it Help?  Y / N / NA

Imaging:_______________________________________________________

PMH:_____________________________________________________________________________________

PHI:_____________________________________________________________________________________

Medications (Prescription, OTC, Herbals):___________________________________________________________

Allergies:_________________________________________________________________________________

Accidents:__________________________________  Weight Loss:__________________________________

Steroids:___________________________________   Night Pain:____________________________________

Disturbed Sleep:  Y / N

Cough / Sneeze / Strain:  NA / Positive / Negative

Patient goals for outcome of treatment:
Rule out red flags

1° neoplasms

Metastases (33%) > 13 yo

**Who?**

**What?**

**When?**

**Where?**

**Why?**

**To What Extent?**


**Pain**

Sharp with movement, breathing

Dull aching @ rest & after activity.

**Hypo- or hyperesthesia**

Dermatomal

or Ventral thorax

**Sensory changes**

Rare! (due to overlap)

If (+), think red flag
**Spinal Cord signs**
- Sign of L'Hermitte.
- Cold Feet
- Electrical Currents

**Pain: Where and How did it start**
- Acute + Mid T: Disc > ZAJ > Rib
- Acute + Upper T: Rib > ZAJ > Disc
- Acute + Lower T: Disc > Rib > ZAJ


**Pain changes with:**
- Head Mvmnt C-Spine
- UE Mvmnt Upper-T
- Trunk Mvmnt Mid T

Remember! Organ pain can change with movement

CSS: Acute Disc > Dural > Ribs
Breathing: Disc vs. CVJ / CTJ

Pain changes with:
- Constant or Night: ALARM
- Metastasis

Look for capsular pattern! Red Flag!


First Clear Cervical Spine: Discogenic Pain

<table>
<thead>
<tr>
<th>Region of Pain</th>
<th>Involved Disc Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>C3C4</td>
</tr>
<tr>
<td>Mastoid</td>
<td>**</td>
</tr>
<tr>
<td>Temple</td>
<td>**</td>
</tr>
<tr>
<td>Jaw</td>
<td>**</td>
</tr>
<tr>
<td>TMJ</td>
<td>**</td>
</tr>
<tr>
<td>Parietal Cranium</td>
<td>**</td>
</tr>
<tr>
<td>Occipital Cranium</td>
<td>**</td>
</tr>
<tr>
<td>Craniovertebral Junction</td>
<td>**</td>
</tr>
<tr>
<td>Neck</td>
<td>**</td>
</tr>
<tr>
<td>Throat</td>
<td>**</td>
</tr>
</tbody>
</table>

**Upper Back**                    | **      | **      | **      | **      |

First Clear Cervical Spine


Chronic I.D.D.
Cervical ZAJ
Cervical UVJ
Thoracic Spine


**Local**
- Posterior IDD, Protrusion
- ZAJ arthropathy
- CVJ / CTJ arthropathy

**Referred, Non radicular**
- Chronic IDD
- ZAJ arthropathy

**Referred, Radicular**


---

Thoracic Spine Examination

- **Dermatomes** are not purely intercostal; Occupy 2-3 intercostal spaces
- **Intercostal pain**: No Δ with motion: Herpes Zoster
- **Sternal Pain** with inspiration: Thoracic, not heart
- **Unilateral organ** can produce bilateral pain
- Pain in UE’s & Head: potential **T4 Syndrome**


Who?
What?
When?
WHERE?
Why?
To What Extent?

Thoracic ZAJ (facet)


Who?
What?
When?
WHERE?
Why?
To What Extent?

Thoracic ZAJ (facet)

Etiology

**Microtrauma**: Eg…Golfing

- A persistent disc can be the result of repetitive rotation

---

Etiology

- **Apparently insignificant act**: Look for a history!

- **Unknown etiology**: Persistent Protrusion vs. Serious Pathology
• **Duration** of problem:
  • 1 year

• **Pain intensity**
  • At its best, which was after rest, he rated it a 1/10
  • Most of the time 3/10, which he felt with activity.

• **Zone of pain (how large)**

• Can they do their activities, house, work and leisure duties (limited for his job duties)

• How is their attitude toward their problem

• Did not miss work, it significantly interfered with his typically physically active lifestyle. Gave up weightlifting
Overview

Clinical Tips:
1. History Preparation
2. Exam Preparation
3. Diagnosis Explanation
4. Plan of Care Delivery

FIRST THINGS FIRST/BE PROACTIVE: ESTABLISH A POSITIVE PATIENT RELATIONSHIP
BEGIN WITH THE END IN MIND

- **What are your goals on the initial evaluation day?**
  1) Establish a positive working-relationship
     - Be present and listen
     - Show empathy
  2) Perform a skilled and thorough history and exam
  3) **Explain the Diagnosis and Plan of Care**
     - Create hope (and decrease fear and anxiety)
     - Describe physical therapy plan and path to healing
     - Set my expectations for the patient for optimal healing
     - Create goals together
     - Answer questions the patient may have
     - Help the patient get set up with appointments that work with their schedule

HOW TO WIN FRIENDS OF INFLUENCE PEOPLE: DALE CARNEGIE

**Six ways to make people like you**

1. Become genuinely **interested** in other people.
2. **Smile**.
3. Remember that a person’s name.
4. Be a good **listener**. Encourage others to talk about themselves.
5. **Talk in terms of the other person’s interests**.
6. Make the other person feel **important** – and do it sincerely.
BE PRESENT

- Presence is the state of being attuned to and being able to comfortably express our true thoughts, feelings, values and potential.
- When you are present, it allows others to be present.

HISTORY PREPARATION

1. Review the patients paperwork
2. Diagnoses hypotheses
3. Identify red flags
4. Mark/Asterisk sections for follow up questions
THANK THE PATIENT FOR

- Completing the paperwork
- Taking the courage to come in for treatment

SYSTEMATIC APPROACH

Pain Generator

- Soft Tissue
- Segment
- Mind + Body + Brain
- Posture + Control
- Strength

Dysfunctions

Dx Specific

Dx Inclusive
• **Education prior**
  • **Explain** you will perform a thorough clinical exam to help identify what is causing their symptoms.
  • **Encourage** patient to give best effort with testing because it helps you determine what the problem is
  • Some tests may increase pain and others won’t but all give important information
  • *If it hurts, Where it hurts, How much it hurts*
  • After the exam you will explain what you found and how to best manage their symptoms

• **Perform a Skilled Clinical Exam**
  • Look for both
  • Pain Generators
  • Dysfunctions
  • **Interpretation** should be as clear as testing
**EXAMINATION: INSPECTION**

**BASIC CLINICAL EXAMINATION**

**EXAMINATION**

**GENERAL HEALTH**

**Visceral Pathology**

a) Fever Chills, Nausea > 1 week  
b) Unexplained weight loss, anorexia, malaise  
c) Altered bowel habits  
d) Rectal or vaginal bleeding  
e) Cancer history

GENERAL HEALTH

EXAMINATION

Surgical History
a) Thoracotomy
b) Gynecological: Osteoporosis; eventual rib Fx.
c) Coronary Artery Disease:
   • Bypass grafting
   • Rib dysfunction due to rib spreading

CASE STUDY

CLINICAL EXAMINATION

• Inspection/Palpation:
  1. Antalgic thoracic kyphosis: acute disc
  2. Forward head posture.
  3. Palpation
     a) Tenderness @ Ant. Ribs 2 & 3: Tietze (costochondritis)
     b) Spinous Processes: Asymmetry = Rule
     c) Spinous processes located at the level of the transverse processes of the inferior vertebra
  4. Swelling
     a) Profile for upper traps; 1st rib position
     b) Supraclavicular: Plexus vs. 1st rib
     c) Full T-spine hypertonus: Alarm!
     d) Manubriosternal Junction: Ankylosing Spondylitis
1. Ask the patient **where the shoulder hurts most.**
2. Expose patient's thoracic spine
3. Check
   1. **Posture:**
      a) Head/neck
      b) Shoulders
      c) Thoracic spine

**BASIC CLINICAL EXAMINATION**

**Screening**

**Active/Passive Tests:**
- Quantity, Quality, & Provocation

**Resisted Tests**
- Quantity & Provocation

**Special Tests**

**Passive Tests**
- Quantity? How far do they go?
- Quality? Endfeel
- Provocation? Does the test provoke their symptoms?
Active/Passive Tests – Cervical Screen

Hips Flexed about 40-50 deg
Flexion, extension, retraction/extension, sidebending, rotation

Active/Passive Tests

Hips Flexed about 40-50 deg
• A. Flexion
  with neck flexion
• A/P. Extension
**ACTIVE/PASSIVE TESTS**

Hips Flexed about 40-50 deg

- A/P. Sidebending (L)
- A/P. Sidebending (R)

Wedge under the left buttock to stiffen lumbar spine with left thoracic rotation
**RESISTED TESTS**

- Sidebend (L)
- Sidebend (R)
- Rotation (L)
- Rotation (R)

**REFLEXES**

- DTRs patella and Achilles tendons
- Babinski
SPRING TESTS

- Spinous Processes (SPs)
- Transverse Processes (TPs)

Perpendicular to the kyphosis

Thoracic Spine Basic Clinical Examination
### BASIC CLINICAL EXAMINATION

#### Screening Tests Cervical Spine

<table>
<thead>
<tr>
<th>Active Cervical Motion</th>
<th>Limitation</th>
<th>Pain Level</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexion</td>
<td>No Lim</td>
<td>-</td>
<td>++</td>
</tr>
<tr>
<td>Extension</td>
<td>No Lim</td>
<td>-</td>
<td>++</td>
</tr>
<tr>
<td>Extension with Chin Tuck</td>
<td>No Lim</td>
<td>-</td>
<td>++</td>
</tr>
<tr>
<td>Right Axial Rotation</td>
<td>No Lim</td>
<td>-</td>
<td>++</td>
</tr>
<tr>
<td>Left Axial Rotation</td>
<td>No Lim</td>
<td>-</td>
<td>++</td>
</tr>
<tr>
<td>Right Side bend</td>
<td>No Lim</td>
<td>-</td>
<td>++</td>
</tr>
<tr>
<td>Left Side bend</td>
<td>No Lim</td>
<td>-</td>
<td>++</td>
</tr>
</tbody>
</table>

### BASIC CLINICAL EXAMINATION

#### Sitting Active/Passive ROM Tests

<table>
<thead>
<tr>
<th>Active/Passive Motion</th>
<th>Limitation</th>
<th>Pain Level</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thoracic Flexion</td>
<td>WNL</td>
<td>-</td>
<td>++</td>
</tr>
<tr>
<td>with Cervical Flexion</td>
<td>WNL</td>
<td>Same</td>
<td>Less</td>
</tr>
<tr>
<td>Extension</td>
<td>WNL</td>
<td>-</td>
<td>++</td>
</tr>
<tr>
<td>Right Side bend</td>
<td>WNL</td>
<td>-</td>
<td>++</td>
</tr>
<tr>
<td>Left Side bend</td>
<td>WNL</td>
<td>-</td>
<td>++</td>
</tr>
<tr>
<td>Right Axial Rotation</td>
<td>WNL</td>
<td>-</td>
<td>++</td>
</tr>
<tr>
<td>with Cervical Flexion</td>
<td>WNL</td>
<td>Same</td>
<td>Less</td>
</tr>
<tr>
<td>Left Axial Rotation</td>
<td>WNL</td>
<td>-</td>
<td>++</td>
</tr>
</tbody>
</table>

Notes: Passive testing of the trunk motions confirmed the pain provocation on active testing. End-feel was normal, with normal range of motion in all directions with the exception of right rotation, which was slightly limited, and the end-feel could not be reached due to muscle spasm.
BASIC CLINICAL EXAMINATION

Sitting Resisted Tests, Reflexes and Spring Testing

<table>
<thead>
<tr>
<th>Resisted Motions in Sitting</th>
<th>Strength</th>
<th>Pain Level</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>R. Right Rotation</td>
<td>5/5</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td>R. Left Rotation</td>
<td>5/5</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td>R. Right Sidebend</td>
<td>5/5</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td>R. Left Sidebend</td>
<td>5/5</td>
<td>+</td>
<td>++</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reflex Testing in Sitting</th>
<th>Reflex</th>
<th>L</th>
<th>R</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patellar Tendon</td>
<td>normal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Achilles Tendon</td>
<td>normal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Babinski</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Do we need to perform any extra tests?

- In the **first visit**, likely **not**.
- **Slump**?? Likely not. Cervical flexion increased the thoracic rotation pain
- **Rib testing**: may be later
- **1st rib**? Likely not. No pain in arms/neck
- Pain with arm elevation above T6

EXTRA TESTS
THORACIC SPINE: ACTIVE/PASSIVE TESTS

Quantity?
How far do they go?

Quality?
Smooth transitions, end feel

Provocation?
Does the test provoke their symptoms?

Most important question:
Was it their pain?

CERVICAL SCREENING

Thoracic spine: Active/Passive...
- Cervical Rotation painful: lesion above T4
- Retraction/extension: lower cervical disc?
- If cervical screen reproduces symptoms, cervical spine examination?
THORACIC SPINE: ACTIVE FLEXION

Pain & or Limitation? Possible acute disc

Quality & Provocation:

↑' d pain with expiration: disc
↑' d pain with inspiration: ribs
↓' d pain with inspiration: disc
(+ ) Neck Flexion: Disc pathology


THORACIC SPINE: ACTIVE EXTENSION

Pain & or Limitation? Possible acute disc

Not likely ZAJ; Why? S-processes

Quality & Provocation:

↑' d pain with inspiration: disc
↑' d pain with expiration: ribs
↓' d pain with expiration: disc
**THORACIC SPINE: ACTIVE/PASSIVE SIDEBEND**

Pain & or Limitation?
Possible ipsilateral costovertebral joint (rib)
Also (+) for rib fracture (with rib squeeze)

**THORACIC SPINE: ACTIVE/PASSIVE ROTATIONS**

Pain & or Limitation? Acute/Recurrent disc
Pain: ipsi or contralateral to movement?
Not likely rib; Why? ↓’ d constraint
Possibly ZAJ; Why? capsule stress
Rule out disc 1st!
(+ ) Neck Flexion: Disc-related
THORACIC SPINE: RESISTED ROTATION & SIDEBEND

**Quantity**  
Strength

**Provocation**  
Not likely (+); possible...
- Primary muscular lesion
- Fracture
- Acute disc
- Serious pathology

---

THORACIC SPINE: NEUROLOGICAL

**Reflexes (DTR’s, Babinski)**
Very Important! Look for ↑ response.

Suggests spinal cord lesion:
- Disc
- Serious pathology
  - 1° tumor or metastases

THORACIC SPINE: SPRING TEST

**Spring Tests** Level identified
Spinous process vs. transverse process

BASIC CLINICAL EXAMINATION INTERPRETATION

THORACIC SPINE: 1st QUESTION

Rule out red flags
- no red flags in this case

1st Question
- Is there a limitation of ROM?
2nd Question

- Capsular Pattern (CP)?
- Non capsular pattern (NCP)?

Thoracic Spine “Capsular Pattern” =

- Extension more limited & painful than flexion
- Symmetrical SB limit with = pain;
- Symmetrical rotation limit with = pain.

THORACIC SPINE: 2ND QUESTION

Acute Onset:

Traumatic: Synovitis of entire segment(s) (car accident, fall, etc…)

Nontraumatic:

- Discitis (younger)
- Malignant tumor (+ percussion or heel drop)

Nontraumatic, Gradual Onset:

Systemic disease (possible younger)
Arthrosis (older)
**Arthritis/Capsulitis**

**CP Pathologies to be treated with joint specific techniques (JST)**
- 1° Macrotraumatic Arthritis
- 2° Microtraumatic Arthritis

**CP Pathologies not to be treated with joint manipulations**
- Nontraumatic arthritis: other systemic disease, spondylodiscitis

---

**Arthrosis**

**Pathologies to be treated with JST**
- 1° Arthrosis without instability
- 1° Activated Arthrosis without instability
- 2° Arthrosis post fracture
### THORACIC SPINE: NON CAPSULAR PATTERN

#### Acute Onset
- Large Axial Rotation Limit: Acute disc
- Large SB Limit: Pleuritis
- Large Extension Limit: Compression fracture

#### Gradual Onset
- Recurrent/chronic disc
- Unilateral ZAJ synovitis / chondropathy
- Unilateral ZAJ spondylosis, spondylarthrosis
- Costovertebral joint, costotransverse joint pathology
- Visceral
**Compression Fractures**

- Can be traumatic or spontaneous
- (+) CSS; & or (+) pain w/ breathing

**THORACIC SPINE: MOST PAINFUL TESTS**

3rd Question: Most painful Tests

- **Rotation** and flexion/extension more likely disc
- **Sidebending** more ribs
- **ZAJ** are usually older people > 50 years
THORACIC SPINE: EXTRA TESTS

- At first, no need for extra tests
- If patient does not improve, or plateau or need more information

**EXTRA TEST**

Rib:
Examination of the ribs demonstrated painful hypomobilities with traction testing at the costotransverse joints of ribs 4, 5, 8 and 9 on the right. With positional testing, these ribs were found to be in an elevated position in comparison to the left side.

Segmental mobility:
Local three-dimensional testing for segmental mobility demonstrated a right rotation limitation of motion from T7 to T9.

Extra Tests for this Case:
Rib Costotransverse and Costovertebral
CASE STUDY

WHO
- A 29-year-old male working at large warehouse. Working out and bodybuilding since the age of 16.

WHAT
- One-year history of thoracic pain.

WHERE
- Right mid-thoracic level.

WHY
- Discomfort, “like a strain” in the right mid-thoracic region during lifting.
- Gradual onset and increased to severe intensity over the following 2-3 days.
- Over the next year significant pain.

Extra Tests for this Case:
3-D segmental mobility in sidelying
CASE STUDY

**WHEN**

**Aggravating Factors:**
- Use of the right arm such as with lifting, pulling, or arm elevation provoked his symptoms.
- Slouching
- Worse as the day went on
- Pain while taking a deep breath.

**Alleviating Factors:**
- In the morning
- Rest
- One day of feeling “normal” in the 2 weeks before his visit to physical therapy and this was a rare experience for him.

**Diagnosis - hypotheses**

Two main pain generators.

1. **Painful rotation** that increased in intensity with the addition of cervical flexion at end range indicated an **internal disc disruption, (IDD)**, with mild irritation of the dural sheath at the affected level.

2. Pathology of **ribs 4 and 5** would explain the pain that the patient experienced with **arm movements**, while pathology of both the disc and ribs 8 and 9 would explain the patient’s pain during trunk movements.

**Causal factors and perpetuators**

1. Posture
2. Job demands
3. **Costotransverse joints** of ribs 4, 5, 8 and 9. **Costovertebral stiffness** was suspected based on the elevated position of these same ribs.
1. **Education** of positions and movements to avoid and those that help heal.
2. **Explanation** of possible cause of the patient’s pain, suggested treatment and prognosis.
3. **Manual therapy**
   1. Manual therapy consisted of soft tissue mobilization in the form of 2- and 3-D movements
   2. 3-D Axial separation with rotation with the painful side up, and mobilization or manipulation in the nonpainful rotation direction.
   3. Costotransverse followed by costovertebral joints mobilizations

5. **Disc hydration** management: unload disc around lunch and when coming home (if possible left sidelying with towel rolled under T-spine)
6. **Movement**
   1. incorporate stability into transitional movements
   2. Progressive return to previously abandoned activities of daily living

THANK YOU!

ANY QUESTIONS?

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