

Thoracic pain syndromes

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Thoracic Pain Syndromes

- Thoracic spine more in number than cervical or lumbar spine
- Uncommon?
- Under diagnosed
- Reinforced with ribs
- Believed it is sturdy and resistant to mechanical forces - pain
- Enclose vital organs- clinical concern attention is diverted

Table 71.1: Thoracic Spine Pain Generators

Thoracic zygapophyseal joints

Thoracic intervertebral disc

Costovertebral joints (e.g. synovitis from ankylosing spondylitis)

Posterior thoracic muscles (e.g. trigger points)

Costotransverse joint

Vertebral body (e.g. compression fractures)

Dura mater

Epidural blood vessels

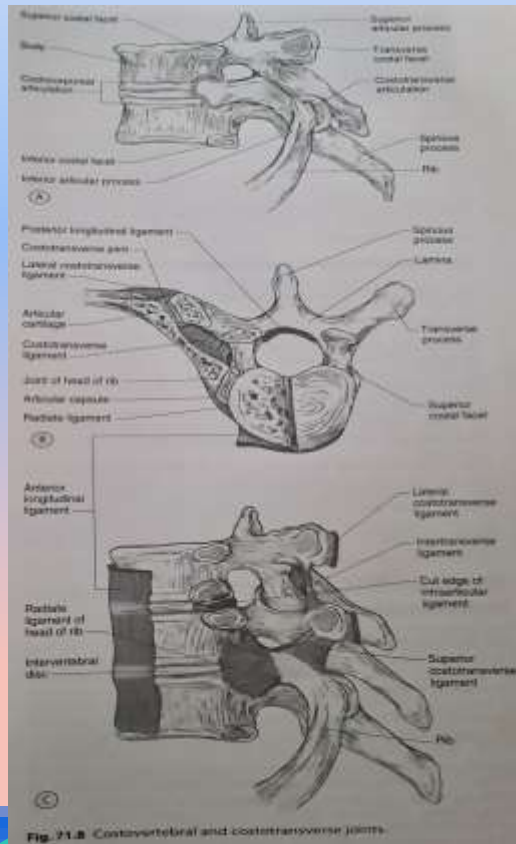
Posterior longitudinal ligament

Sympathetic trunk

Thoracic Pain Generators

- Musculoskeletal
 - Thoracic facet joints, intervertebral discs, Costovertebral/transverse joints, vertebral bodies, muscles and ligaments.
- Sympathetic/autonomic nervous system
- Enclosed organs: lungs/pleura, aorta, esophagus, mediastinal pathology, gall bladder, diaphragm (distention and irritation), mediastinal pathologies.

Anatomy of costovertebral, costotransverse and facet joints



Four synovial joints at each level:

Between individual spines: Facet joints, articular processes

Between the rib and the spine

- Costovertebral joint: head of rib with body of spine
- Costotransverse joint: rib and the transverse process
- costosternal joints
- Make the thoracic cage a sturdy frame
- additional unique joints- -pain generators

Extended referral zones -thoracic facet joints:

- Referral zone is localised no more than 2.5 segments lower
- Lower thoracic facet joints have been theorised to refer to the lumbar spine iliac Crest and buttocks
- -Maigne's Syndrome

Extended referral zones –costovertebral joints

- innervated by the sympathetic trunk
- Innervation from the same level and one level above
- Synovial joints- can be Affected by ankylosing spondylitis and osteoarthritis
- Pain can mimic anginal pectoris, renal colic or cholecystitis
- Most commonly found in the T1, T 6-8 and T11-12; most asymptomatic
- Costotransverse joints: innervation lateral branches of thoracic dorsal rami

Costovertebral joints

- Often in female patients.
- Pain is usually centered at the level of bra strap
- Refers to front or side of chest wall
- Heavy breasts/tight straps
- Some has history of rib/thoracic trauma or surgery
- Diagnostic confirmation by injection
- imaging

Types of Thoracic Pain:

Table 71.2: Types of Pain: Somatic vs. Autonomic Nervous System

Superficial cutaneous pain

Somatic pain

Somatic localized pain

Somatic referred pain

Radicular pain

Visceral pain

True or localized visceral pain

Visceral referred pain

Localized parietal pain

Referred parietal pain

Thoracic somatic pain

- Superficial pain – localized
- Somatic pain- referred to distal sites
- Radicular pain-
fairly precise, shooting, neuropathic, 2inch band

Thoracic visceral pain

- Poorly localized unless pleural is involved
- Diaphragmatic pain –neck
- Renal - pain along the costovertebral angle
- pancreatic and gall bladder - dissecting sharp pain
- Dissecting aortic aneurysms- interscapular region

Etiology

Table 72.1: Etiology of Thoracic Spine Pain

1. Disc herniation
2. Spinal stenosis, osteoarthritis
3. Infection: osteomyelitis, tuberculosis, discitis
4. Fractures (traumatic, stress, osteoporotic, tumor (primary, secondary), multiple myeloma)
5. Non-disc herniation-related radicular pain: intercostal neuralgia, postherpetic neuralgia, post-thoracotomy pain syndrome
6. Spinal abnormalities: kyphosis, scoliosis
7. Muscular and postural
8. Inflammatory disorders: AS, RA, costochondritis, Tietze's syndrome
9. Rare causes: CRPS, T4 syndrome, thoracic nerve root dysfunction

Discs

- Incidence is very low
- Mostly in lower thoracic spine
- occur in the 4th to 6th decade
- acute sub acute or chronic

Spinal stenosis

- Facet joint disease most common at the T3-5 segments

Infection:

- discitis or osteomyelitis or tuberculosis

Fracture spine:

- Osteoporosis, metastasis, trauma

Costochondritis

Metastatic bone disease

- can lead to fractures, hypercalcemia and spinal cord compression all of which can adversely affect a patients
- functional status and quality of life

Myofascial pain syndromes

- regional pain
- Referral pattern
- Trigger points

Trauma

- Posterior, anterior and middle column injuries

Post thoracotomy pain

- Radicular type of pain
- Radicular type of pain is also seen in PHN
- Both are Neuropathic type of pain

Rare causes

- complex regional pain syndrome type 1
- Rheumatoid arthritis
- The T4 syndrome
- Thoracic nerve root dysfunction (TNRD).

Clinical Assessment:

- History:
- Onset
- Duration
- Type of pain
- Intensity
- Function
- Past and concurrent illness
- Treatments

Physical Examination

- focused physical examination
- Trauma, infection lesions or other skin abnormalities
- spine for kyphosis or scoliosis
- Abnormalities in posture biomechanics and mobility
- Palpate spine and ribs
- Sensory/motor deficits
- ROM
- Systemic examination

Neurological assessment

- pyramidal tract signs- central disc herniation; lateral disc may radicular pain
-
- motor and sensory deficits with radicular pain or numbness
- Bowel and bladder dysfunction may also be present.

Post thoracotomy

- history of chest and or spine surgery
- muscular tenderness sensitivity to touch
- Tenderness along a dermatome near incision

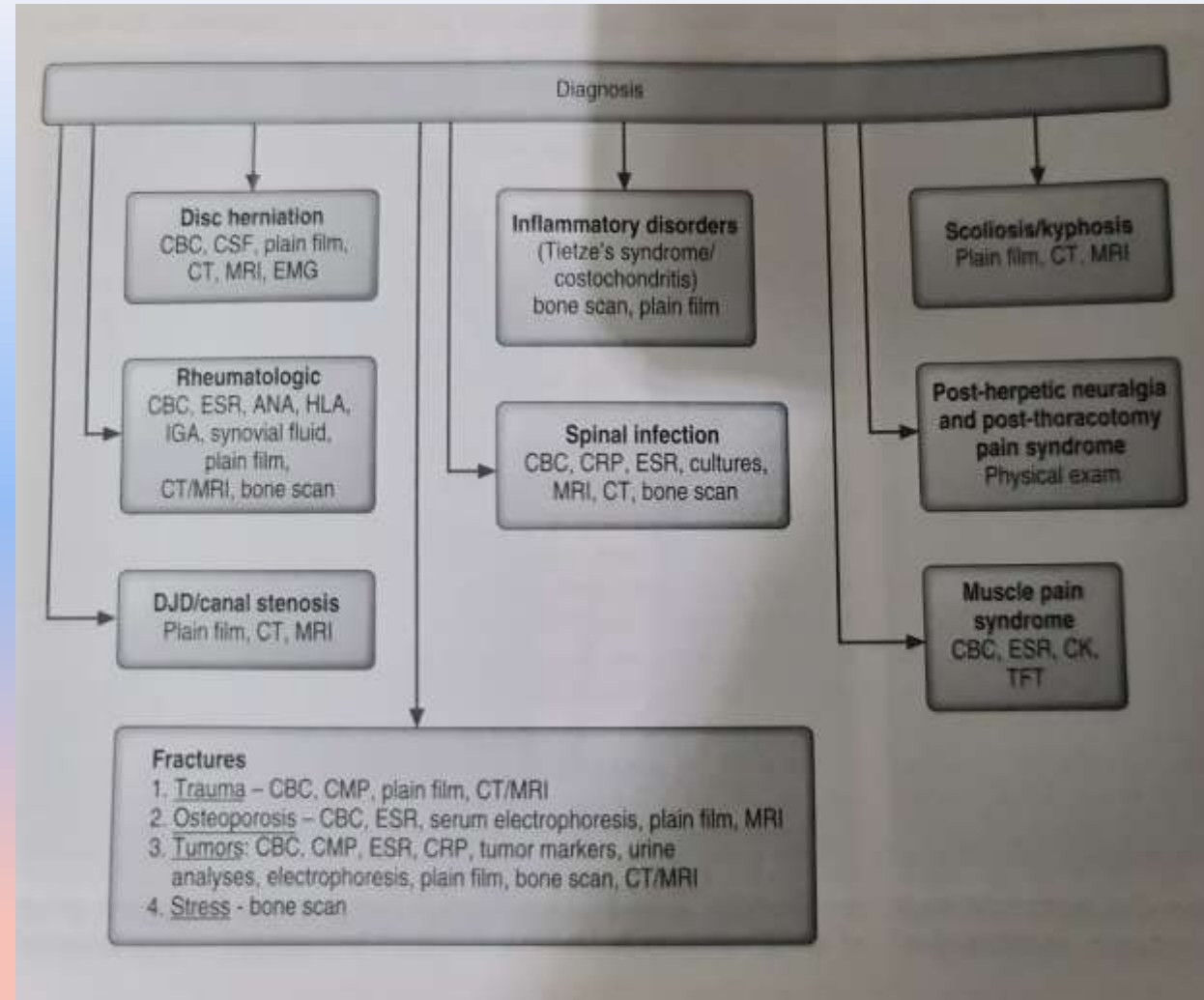
Post herpetic neuralgia

- similar physical findings
- Pain is usually unilateral, may last a few weeks or persist longer
- Pain in a dermatomal pattern usually presents 7 to 10 days prior to the rash.
- Nerves commonly affected include T4 -T6

Physical Examination

- inflammatory diseases
 - systemic evidence, poly arthritis, constitutional symptoms
- ankylosing Spondylosis
 - spine deformity and restrictive lung disease
- stress fracture or costochondritis:
 - tenderness with pressure over the affected ribs
- myofascial pain syndrome
 - pain: regional or referred
 - taut bands and trigger points

Diagnosis-algorithm



Diagnosis

- Laboratory work up
 - Depending on the history and physical examination
 - thoracic disc herniation: complete blood count maybe for normal and CSF analysis usually reveal a normal cell count and clear fluid.
 - Tumour or malignancy: complete blood count, metabolic profile, tumour markers urine analysis, Electrophoresis, ESR
 - rheumatological disorder: ESR, ANA, HLA, RF
 - Ankylosing spondylosis: HLA -B27 gene
 - Osteoporotic fractures: CBC, esr, and serum electrophoresis
 - myofascial pain: diagnosis by exclusion: ESR, serum creatinine kinase, complete blood count and thyroid function test

Radiological work-up:

- plain x-ray
- CT
- MRI
- Bone scans

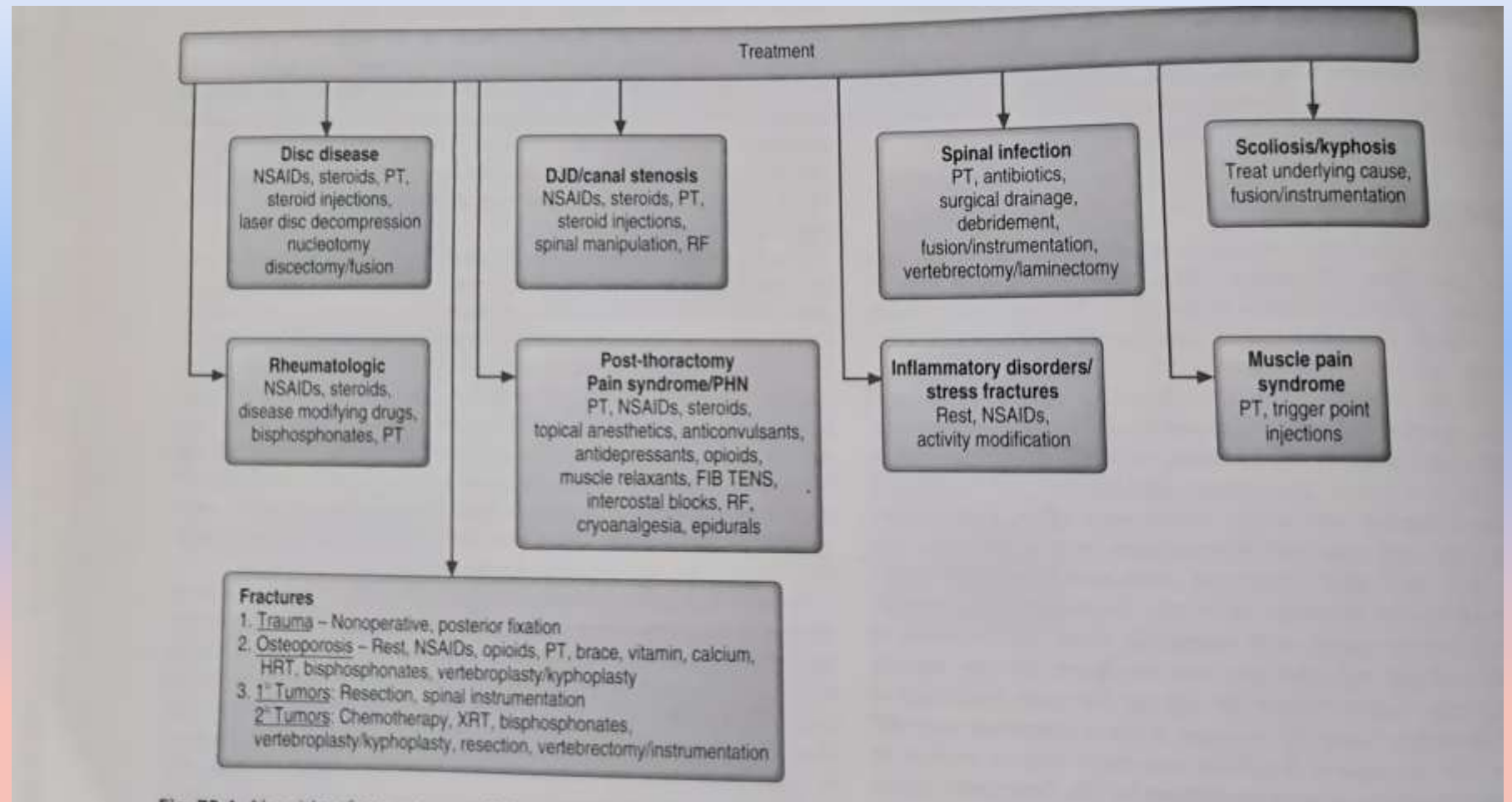
Nerve physiology:

- Electromyography

Differential diagnosis:

- cardiovascular
- pulmonary
- gastrointestinal
- genitourinary
- psychiatric disorders.

Treatment -algorithm



Therapeutic options:

- Physical therapies and manipulations
- Diet and lifestyle modifications
- Pharmacotherapy
- Spinal injections and nerve blocks nerve ablations and neuro modulation
- Surgery
- CBT based multidisciplinary pain management programme

Conservative or Aggressive strategies

- Conservative:
 - Physical therapy – could be very effective in pain relief and rehabilitation
 - improve posture
 - joint and spinal mobility and flexibility
 - strengthen musculature such as the trapezius rhomboids and lattismus dorsi
 - to prevent deconditioning.
 - spinal manipulative therapy
 - Acupuncture

Symptomatic management –osteoporotic fractures

- short period of bed rest
- modification of activity
- anti inflammatory agents and analgesics
- nutrition
- cessation of smoking and alcohol
- exercise and physical therapy
- bisphosphonates
- Interventions:
 - nerve root injections for pain control-
 - kyphoplasty

Injections to diagnose and silence the pain generators

- LA + Steroids-diagnostic and therapeutic goals
- Used when conservative therapies fail
- Facet joint injections
- Costovertebral/transverse joint blocks
- Nerve root injections
- RF ablations
- Intercostal nerve blocks
- TPIs

Bony metastasis from cancer

- Non-surgical
 - external beam radiotherapy, chemotherapy, bisphosphonates
 - vertebroplasty and kyphoplasty
- surgically

Post thoracotomy pain syndrome:

- NSAID, steroids, topical local anaesthetics, anticonvulsants, opioids and muscle relaxants
- electrical nerve stimulation and cryo analgesia

Post herpetic neuralgia:

- Antivirals, antidepressants, corticosteroids or opioids
- anti convulsant, topical agents
- nerve blocks (sympathetic nerve block, epidural)
- spinal cord stimulation

Inflammatory disorders (RA and AS)

- Pharmacological:
 - NSAIDs, Steroids, disease modifying drugs, IV pamidronate
- Nonpharmacological management
 - exercise: to maintain erect posture spinal and joint mobility and chest expansion.
- Surgery
 - Spinal stenosis, atlanto axial instability

Other conditions:

- T4 syndrome: joint manipulation stretching and strengthening exercise, spinal injection- CV joint injection
- TNRD: anticonvulsants, tricyclic antidepressants, local nerve blocks.

Summary

- Thoracic pain may be due to a variety of causes
- It is helpful to categorise the pain into axial nonaxial components.
- Due to a variety of aetiologies
- A range of treatment options are available depending on:
 - aetiology, clinical presentation, severity of symptoms and duration
 - It is critical to rule out visceral pain