

PATHOPHYSIOLOGY OF CONDITIONS OF THE THORACIC SPINE

What Can Go Wrong and What You Can Do About It

Most Common Conditions Seen

- ◉ Tumors of the Thoracic region
- ◉ Scheuermann's disease
- ◉ Kyphosis
- ◉ Scoliosis
- ◉ Thoracic Outlet Syndrome
- ◉ T4 Syndrome



Conditions Continued

- ◉ Thoracic Nerve Root
- ◉ Thoracic Disc
- ◉ First Rib Syndrome



Tumors of the Thoracic Spine

- ◉ **Pancoast tumor** - weakness/atrophy small muscles of the hand, hoarseness and Horner's syndrome
- ◉ **Neurinomas** - may occur as part of neurofibromatosis
- ◉ 80% tumours producing neurological signs occur at thoracic level



Scheuermann's Disease

- ◉ A structural deformity characterised by 5 degrees or more of anterior wedging of 3 adjacent vertebral bodies. (Tibus 1998)
- ◉ Incidence 0.4 - 8% of the population
- ◉ Schmorl's nodes



On X-ray



- Irregular disc space
- Narrowing-cupid bows
- Marginal osteophytes
- Sclerosis of vertebral bodies
- Increased AP diameter of bodies
- Schmorl's nodes



Clinical Features

- Onset at or around puberty
- Poor posture
- Thoracic kyphosis
- Rounded shoulders
- Moderate back
- Painful tight hamstrings



Features

- Pain
- Decreased RoM
- Deformity
- Palpation
- History



Treatment

- Decrease pain
- Increase postural awareness
- Maintain flexibility
- Strengthen weak structures
- Occasionally brace or surgery
- Can be long term problems



Previously discussed so we'll not cover it here

KYPHOSIS

You will have covered this in Tutorial so lets not waste time covering old ground

SCOLIOSIS

Now there is something new so let's talk about it

THORACIC OUTLET SYNDROME

Thoracic Outlet Syndrome

- ⦿ Caused by compression of brachial plexus and/or blood vessels into the arms as they pass through the thoracic outlet
- ⦿ Onset age 20-50
- ⦿ Ratio of female/male 3.5/1
- ⦿ C8 - T1 most commonly affected



Thoracic Outlet

- ⦿ The Thoracic outlet consists of the
 - anterior and middle scalene muscles,
 - first rib
 - clavicle
- ⦿ Injury to any of these can result in thoracic outlet



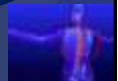
Signs And Symptoms

- ⦿ **NEUROLOGICAL** - pain, tingling, P&Ns, parasthesia, tingling, clumsiness, coldness, heaviness, altered sensation, tenderness, wasting hypothenar muscles
- ⦿ **VENOUS** - oedema, cyanosis, distended veins shoulder and neck region
- ⦿ **ARTERIAL** - palor, pulselessness, low BP, coolness, tingling, multiple infarcts



Test for Thoracic Outlet Syndrome

- ⦿ Hard to diagnose due to the variety of causes – and often the lack of direct injury
- ⦿ Common tests used to compromise the neurological or vascular systems are:
 - Adson's maneuver
 - Allen's test
 - Roo's (EAST's) test – most reliable
 - Wright's test



Treatment

- ⦿ Education
- ⦿ Stretching
- ⦿ Strengthening
- ⦿ Postural re-education



T4 Syndrome

- ⦿ A description used by Maitland to describe vague symptoms of pain and paraesthesia in the upper limbs/or head.
- ⦿ No proof of this phenomena

T4 Cont. Anatomy to Consider

- ◉ SNS in this area
- ◉ Canal is narrowed
- ◉ Decreased blood supply

Area of Symptoms

- ◉ Glove-like (nondermatomal) symptoms involving the hands, forearms or total upper extremity
- ◉ They are usually symmetrical
- ◉ If the symptoms involve the head, they are whole head or top of the head

Type of symptoms

- ◉ Arms – numbness, tingling, heaviness/puffiness, coldness
- ◉ Head – ache, swollen/fullness

Objective Findings

- ◉ May have increased dorsal kyphosis
- ◉ Rarely able to reproduce symptoms with active movements
- ◉ Neuro exam negative
- ◉ Palpation – frequently able to reproduce distal symptoms with thumb pressures

Objective Findings Cont.

- ◉ Not unusual for several levels to be involved from T2-7
- ◉ Soft tissue thickening and positional alterations are frequently associated with the most symptomatic level

Differentiation

- ◉ Must differentiate Carpal Tunnel Syndrome, lower cervical spine, TOS, neural tension (ULTT's, Slump)

Treatment

- Mobilization of thoracic spine
- Slump or ULTT's
- Joint mobilization of costotransverse joints in slump to mobilize sympathetic trunks
- Home exercise program – foam roll, towel rolls

Thoracic Nerve Root

Symptoms

- Uncommon disorder – usually T5-12
- Onset attributed to recent trauma
- Severe pain or paraesthesias along line of rib worse distally
- Deep inspiration may provoke symptoms

Thoracic Nerve Root

Signs

- Symptoms provoked with extension and T-rotation, lateral flexion toward the side of pain
- Sensation may be decreased in dermatomal distribution

Thoracic Nerve Root

Treatment

- Gentle traction – cervical T1-4 and lumbar for below
- Rotation painful side up if pt unable to lie prone or supine
- Transverse pressures toward painful side
- Transverse pressures away from painful side

Thoracic Disc

- Pathology common – ie, spondylitic degenerative changes
- Disc herniation – Rare? Due to relative stability of region
- Authors differ in levels Grieve – usually below T6/ Bogduk T9-10
- If herniated at T4-9 dangerous as the neural canal is most narrow – potential for spinal cord injury or other cord signs

Thoracic Disc

Symptoms

- Often traumatic onset
- Central posterior deep ache which radiates through to sternum
- Lower thoracic disc - pain in lumbar region and abdominal wall

Thoracic Disc

Treatment

- Traction – gentle
- Mobilization centrals - unilaterals

First Rib Syndrome

Clinical Features

- Presentation slight cervical side flexion toward the painful side, holding the “Yoke” with opposite arm
- Symptom area: local unilateral pain or tenderness of the supraspinous fossa; constant referred pain, aching or paresthesia in the C8-T1; dermatomal distribution of the arm forearm or hand

First Rib Syndrome

- Pt may c/o weakness or heaviness in the upper limb, occ c/o discoloration, sweating, or swelling of hand and forearm on affected side.

First Rib Syndrome

Signs

- Observation – upper trap looks full, is it true spasm?
- Symptoms agg by active or passive scapular depression, cervical rotation towards, side bending away and extension. Flexion causes pulling unilaterally

First Rib Syndrome

Signs

- Unilateral PA's on costotransverse joint and laterally on first rib as well as caudally directed unilateral PA's over the lateral and anterior aspect of the rib reproduce some or all of the symptoms

First Rib Syndrome

Treatment

- Palpation techniques which reproduce the symptom is commonly used to RX first.

