PEdiatric Spine Pain

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Goals

• Review Initial Evaluation and Management of Neck and Back Pain in Pediatric Patients
• Review Initial Evaluation and Management of Pediatric Patients with Spinal Deformity (i.e., Scoliosis and Kyphosis)
• Learn When to Refer to a Spine Specialist and the Urgency of Referral
NORMAL SPINE ANATOMY

NECK AND BACK PAIN IN CHILDREN

- History: Onset, severity, duration, radiation to arms or legs, red flags—trauma, fever, constitutional sx, hx of cancer, family hx of back pain
- Age of child
- Neurological complaints—altered gait, motor, sensory, balance, bowel bladder function
NECK AND BACK PAIN IN CHILDREN

Physical examination: gait, alignment, range of motion, observation: bruising, rashes, café au lait spots, skin dimple or sacral hair patch, spurlings test, SLR, sacroiliac tests, shoulders, hips, knees

Neuro examination: mental status, cranial nerves, cerebellar tests: Romberg, finger to nose, heel to shin, motor, sensory, reflexes, Hoffmanns sign, clonus, Babinski test

SPURLINGS TEST

Maximum Cervical Compression Test
STRAIGHT LEG RAISE

STRAIGHT LEG RAISING (SLR) TEST

- Patient in supine position. On the tested leg keep the knee fully extended with one hand. Ask the patient to relax.
- With the other hand cupped under the heel, slowly raise the straight limb, ask the patient, "If this bothers, and to let you know, when to stop." Positive if symptoms elicited.
- Check for any movement of the pelvis before complaints. True sciatic tension elicit complaints before the hamstrings are stretched enough to move the pelvis.
- Estimate the degree of leg elevation that elicits complaint from the patient.
- Determine the most distal area of discomfort: back, hip, thigh, knee, or below the knee.

DIAGNOSTIC TESTING

MOST CASES OF MECHANICAL NECK AND BACK PAIN WITHOUT "RED FLAGS" DO NOT REQUIRE IMAGING STUDIES IMMEDIATELY

"RED FLAGS" = HISTORICAL OR EXAM FINDINGS CONCERNING FOR SERIOUS CAUSES OF SPINAL PAIN WHICH REQUIRE EMERGENT OR URGENT MANAGEMENT

- TRAUMA- MVA W FOCAL CSPINE TENDERNESS, NORMAL LOC AND NO DISTRACTING INJURIES OR SUBSTANCE/ALCOHOL USE
- PAIN UNRELATED TO ACTIVITY= WORSE AT REST ,LIE ,WAKES UP AT NIGHT
- CONSTITUTIONAL SYMPTOMS —UNEXPLAINED WEIGHT LOSS ,POOR APPETITE, FEVERS, CHILLS
- CANCER—HISTORY
- INFECTION RISK FACTORS— DIABETIC, STEROIDS,IVDA,DIALYSIS ,CHEMO
- CAUDA EQUINA SYNDROME : BILATERAL LEG WEAKNESS, SEVERE PAIN,LOSS OF BOWEL BLADDER
NECK AND BACK PAIN IN CHILDREN – DIAGNOSTIC TESTING

X-rays: AP, LAT – flex ext lateral if no trauma – indicated for trauma or repetitive trauma in athlete – rule out fractures spondylolysis, DDD, Scheurmanns disease, tumors – no need for obliques – inc radiation exposure – not needed initially if normal exam

MRI: if significant neuro deficit or red flag conditions – do without contrast initially, suggest facility with T2 scout sagittal view of whole spine –

MRI: without red flags - wait until after 4-6 weeks of conservative tx – ie nonspecific neck, TBP or LBP without radicular complaints and normal exam

NORMAL SPINE MRI
NECK AND BACK PAIN IN CHILDREN – DIAGNOSTIC TESTING

- **CT scan** — most specific test for spondylolysis, fracture healing, tumors, used for preop planning for fusions
- **SPECT** — bone scan w/ CT cuts — used to identify active vs inactive spondylolysis
- **Nuclear scans** — screening tool if MRI or CT inconclusive, or sometimes for infection, gallium, indium scans
- **Labs**: CBC, ESR, CRP, Lyme, Babesiosis, Ehrlichiosis, tumor markers, ALK PHOS, Chem, ANA, RF, HLA-B27-(AS)
- **EMG/NCs** — for numbness or tingling or weakness greater than 6 weeks when presentation isn’t classic

DIFFERENTIAL DIAGNOSIS — PAIN GENERATOR SPINE RELATED — IN ORDER OF FREQUENCY-MOST COMMON — NOT INCLUDING CONTUSIONS AND MUSCLE STRAINS — PERSISTENT CERVICAL/TBP/LBP

1. **Degenerative disc disease** — 70% **GENETIC** — defect in collagen X crosslinking — identical twins studies — can begin as early as age 9 — includes spectrum of facet arthritis — 60% of pain from disc 40% from facet — **Herniated discs** are a complication of DDD — focal tear allows disc material to protrude or extrude into canal — **Radicular arm or leg pain is sine qua non**

2. **Scheuermann’s disease** — a congenital variant of DDD — irregular disc endplates — Schmorls nodes and wedging — usually at thoracolumbar junction
DIFFERENTIAL DIAGNOSIS - PAIN GENERATOR
SPINE RELATED - IN ORDER OF FREQUENCY-MOST COMMON

• 3. Congenital spinal stenosis= short pedicles usually seen at lower lumbar /lumbosacral spine – pedicle length to body ratio <0.4
• 4. Spondolysis/spondylolisthesis- A stress fracture in the pars interarticularis in an individual with a congenitally or developmentally thin pars – can be due to acute trauma but more common with repetitive injuries – ie gymnasts, offensive lineman – hyperextension is the mechanism of injury – graded 1-4 based on percentage of slippage

DIFFERENTIAL DIAGNOSIS - PAIN GENERATOR
SPINE RELATED - LESS COMMON

1. Acute trauma
2. Primary spine Neoplasia/Tumors – benign: osteoid osteoma/osteoblastoma/eosinophilic granuloma, Malignant : osteosarcoma, ewing’s sarcoma
3. Infections- osteomyelitis /discitis , TB fungal (extremely rare)
DIFFERENTIAL DIAGNOSIS - PAIN GENERATOR NONSPINE RELATED

1. Infectious - Lyme, Babesiosis, Ehrlichiosis, Bacterial Sepsis, GC in sexually active adolescents
2. Inflammatory - Juvenile Arthritis, Ankylosing Spondylitis, Reiter's Syndrome, SLE
3. Urologic - Kidney Stones, Pyelonephritis, UTI
4. GI - Acute Hepatitis, Gastroenteritis, Peptic Ulcers, Pancreatitis, intraabdominal tumors,
5. Oncologic - Leukemia Lymphoma, Metastatic

INITIAL TREATMENT FOR NON SPECIFIC PEDIATRIC SPINE PAIN - NON “RED FLAG “ CONDITIONS

• If no red flags and normal exam - 1-2 days of restrictions - Bed rest not recommended - if red flags - refer to specialist within 1-2 weeks - sooner if neuro deficit fracture or suspicion of infection / tumor
• Patient education - Most nonspecific neck and back pain is benign - 80% are improved within 6 weeks
• Avoid improper “BLT” bend at knees not waist, turn using small steps not at waist, for neck pain - turn at waist not neck, adjust work or school station height to maintain comfortable position - temporary use of extra books or wheeled backpack, backpacks have not been found to cause back pain nor scoliosis
• Psychosocial screen for depression, anxiety, stressors at home or in school
INITIAL TREATMENT FOR NON SPECIFIC PEDIATRIC SPINE PAIN – NON “RED FLAG“ CONDITIONS

• EXERCISES: HOME BASED - FOCUS ON SPINE STABILIZATION NOT STRETCHING - CORE STRENGTHENING - IF CANT LEARN THE EXERCISES THEN REFER TO PHYSICAL THERAPY

• CHIROPRACTIC IS AN ALTERNATIVE TO PT FOR ACUTE PAIN — AS LONG AS NO RED FLAG CONDITIONS - NOT GOOD FOR ACUTE SPONDYLOLYSIS

• PAIN CONTROL - ACETAMINOPHEN FIRST LINE, STEP WISE MULTIMODAL AFTER THAT, ADD NSAID WITH THE ACETAMINOPHEN, TOPICAL AGENTS, ICE HEAT, GABAPENTIN FOR NERVE PAIN OR AMITRIPTYLINE

• GYM — TRY NOT TO KEEP OUT — MODIFIED PROGRAM — DO BACK EXERCISES IN LIEU OF REGULAR GYM — LIGHT JOGGING, STATIONARY BIKE, WEIGHT TRAINING

• LIFESTYLE CHANGES — EXERCISE, BODY MECHANICS, NICOTINE PREVENTION, DIET — TREAT OBESITY

INITIAL TREATMENT FOR NON SPECIFIC PEDIATRIC SPINE PAIN – NON “RED FLAG“ CONDITIONS

• SOFT NECK COLLAR OR LUMBAR CORSET IF SEVERE PAIN OR RESTRICTION IN MOTION

• FOLLOW UP EVERY 1-2 WEEKS — UNTIL IMPROVED

• IF GETTING WORSE OR NOT BETTER BY 4-6 WEEKS WITH MEDS, PT ACTIVITY RESTRICTION — REFER TO ORTHOPEDICS

• IF UNCONTROLLABLE PAIN DESPITE ANALGESICS, NSAIDS, TOPICAL AGENTS — LIMITED USE OF MUSCLE RELAXANT OR TRAMADOL CODEINE CONTRAINDICATED IN CHILDREN
INDICATIONS FOR INVASIVE TREATMENTS

• Acupuncture — May offer short term relief if not improved with 6 weeks nonop care
• Pain management injections — Not done commonly — Effect of cortisone on growing child — Not much data — Epidural steroids for herniated disc — Radicular pain, facet joint injections / medial branch blocks for axial neck or back pain if unilateral tender over facet region
• Surgery: herniated disc — Failed 6 weeks of conservative care or sooner if severe or progressive neuro deficit — Weakness, bowel or bladder — Cauda equina syndrome

INDICATIONS FOR INVASIVE TREATMENTS

• Surgery for herniated disc in the young patient
• Cervical spine — Anterior cervical discectomy and total disc replacement —
• Lumbar spine — Outpatient lumbar microdiscectomy
• Spondylolysis / spondylolisthesis — Failed brace treatment x 6mos or any progressive slippage to grade 2 or greater — Lumbar pars repair if no slip, lumbar fusion — Often minimally invasive techniques
• DDD— Controversial — Lumbar fusion for 1 or 2 level disease after 6 mos of conservative treatment — Many insurance companies will not cover anymore — Get psych eval — Most kids get better with lifestyle changes and exercise
OUTCOMES

- 80% OR BETTER GET SIGNIFICANT DECREASE IN PAIN AND RETURN TO NORMAL FUNCTION IN 6 WEEKS
- RECURRENCES ARE COMMON – LIFESTYLE CHANGES OR MODIFICATIONS MAY BE NEEDED – VOCATIONAL COUNSELING
- HERNIATED DISC SURGERY ABOUT 90% EFFECTIVE – RECURRENT HERNIATION OR ADJACENT LEVEL PROBLEMS COMMON ABOUT 1–3% PER YEAR NEED ADDITIONAL TREATMENT

REFERENCE

ORTHOPEDIC KNOWLEDGE UPDATE: SPINE 5, EDITED BY TRUEMEES, EERIE ET AL., PUBLISHED BY THE NORTHAMERICAN SPINE SOCIETY AND AAOS 2017
THANK YOU FOR YOUR ATTENTION