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Treating the Core:
Lumbo-Sacral Spine, Gluteals and Abdomen, and Pelvic Girdle

Extension Disorders

1. **Facet Syndromes**
2. **Spondylosis/degenerative**
3. **Neuroforaminal stenotic radiculitis/radiculopathy**
4. **Central canal stenosis/cord compression and neurogenic claudication**

GENERAL APPROACH

Sleeping modifications. "Supine 90/90" position (hips and knees both flexed about 90 degrees) on firm sleeping surface allows spine to sink into slight flexion and opens facet joints. Recommend "ortho wedges" for stable support of legs in 90/90 position.
Note: uncontrolled sleep apnea--common in overweight patients with back pain--is likely to be exacerbated by supine sleeping position. Sleep apnea can lower pain thresholds and tolerance and exacerbating sleep/mood contributions to pain. If sleep apnea is suspected, referral to primary physician or pulmonologist for sleep lab study and treatment options is appropriate.

Therapeutic exercise.

Stretching the superficial anterior chain/*yangming jing-jin.* Tight hip flexors pull spine into extension (often from sitting, and from abdominal panus during standing due to obesity, pregnancy, and/or weak abdominals). The challenge is to stretch hip flexors *without putting spine further into extension.* One method is to place a "yoga block" under the sacrum, allowing the hip joints to sag into extension on either side; excessive spinal extension is limited by the floor and by reflexive contraction of the abdominal musculature to maintain neutral spine position.

To flex or not to flex? Flexion stretches in theory open up the facet joints. However, flexion stretches by themselves have not been shown to prevent or treat low back pain, which is *not* surprising considering how flexion stretches the *dura mater* and pushes disc nuclear gel against the back wall of the *annulus fibrosis*, and is a primary mechanism of lumbar injury when

combined with gravitational loading, breath-holding or non-neutral motions/positions. The safest way for patients to mobilize and open their own facet joints is flexion in a "kneeling on all-fours" position, a.k.a "cat" pose in yoga. Slow, gentle repetitive flexion/extension while maintaining neutral coronal plane alignment ("cat/cow"), within pain-free range, is more likely to yield benefit with lower risk than forcefully pushing into flexion (extreme "cat"). Stretching in a non-neutral position in particular places additional compressive and torsional loads on discs, facet joints, the posterior longitudinal ligament, and musculature and is generally contraindicated in patients with back pain. Patients who experience temporary relief from flexion stretches often admit that they must repeat them frequently to control pain; the transient benefit may derive from endorphin release from the pain of stretching, vs. a therapeutic effect on facet joints. Guiding such patients towards strengthening and stabilization exercises may minimize the urge to stretch.

FACET SYNDROMES.

Pathoanatomy. Various factors have been proposed to explain loss of pain-free motion in facet joints:

- Capsular & ligament sprains (motion beyond ROM barrier)
- Mal-tracking of facet articular surfaces during motion.
- Excessive loading/stress: ligament tension locks joint.
- Tearing and entrapment of the tiny meniscus inside the facet joint.
- Thickening of synovial fluid and surfaces.
- Diminished local muscular tone and control.
- Inflammatory, traumatic and degenerative changes in local soft tissue.

Facetognic pain is occurs frequently together with ipsilateral sacro-iliac joint dysfunction.

Symptoms.

- Sudden onset of sharp localized unilateral lumbar pain and immediate postural deviation contralaterally to sprained facet(s) and/or locking in flexed position. Precipitating motion/injury not always clear; may involve sudden rotation such as rolling over in bed.
- L 4-5 facet joint refers pain to groin.
- Other symptoms may include stiffness, involuntary muscle guarding, sudden sharp pain and "catching" during extension, rotation, and occasionally with flexion or deep/sudden/forceful inhalation.
- Aggravating and alleviating factors are more variable than discogenic pain: sitting,

walking, standing may alleviate *or* aggravate; flexion may be palliative.

Signs.

- End-range pain-inhibition and provocation of symptoms ipsilaterally on extension, and on ipsilateral rotation and side-bending.
- Flexion may be palliative.
- Localized paraspinal pain and tenderness and loss of lordosis is common at affected levels. Extension AROM may or may not be inhibited.

Progression. Increases risks of facet osteoarthrosis, neuroforaminal stenosis, synovial cyst formation, and disc injury, all of which can impinge on nerve roots.

Diagnoses.

- Lumbosacral sprain, S33.5XX_
- AOM: stagnation of *qi,* primarily *du mai,* foot *shaoyin, taiyang jing-jin;* may refer symptoms to foot *shaoyang, yangming jing-jin.*

Treatment.

Acupuncture:

- Acute facetogenic pain can respond well to both local and distant acupuncture because of strong proprioceptive effects. Less risk of transient flare from deep needling, than with acute disc injuries.
- Chronic facetogenic pain: deep/local needling with strong stimulation may be relatively more important.
- Facet joints are typically located mid-way between inner UB and *huatuojiaji* lines, i.e. at 1.0 *cun* lateral to the spine; however in the author's experience, localizing treatment to the facet joints vs. inner UB and *huatuojiaji* lines does not appear to yield superior results to using the traditional loci. The safest direction for needling the UB inner line is medially and caudally, which will bring the needle tip close to the facets.
- *Patient positioning is important:*
    - If supine position/distant needling chosen, important to support calves on cushion, with hips and knee joints both flexed 90 degrees to avoid spinal extension that occurs while lying flat on table.
    - If prone position/local needling chosen, use "body cushion"-type support or pillow under abdomen to put spine in neutral; unmodified prone position on table extends spine and can worsen pain.

Suction cupping: Strong (vacuum pump) suction beneficial, pulls joints into flexion, breaks

pain-spasm cycle in adjacent muscles. May be combined with AROM ("cat/cow" and rotation).
Manual therapies:

- Myofascial glides, superficial *gua sha, tui na* oscillations can help mobilize facet joints and reduce muscle guarding.
- Deep *gua sha*, pressure, percussion on paraspinals contraindicated, can worsen because they push joints into extension.

Exercise therapy: Facet joint stabilization/control exercises

a. Level 1:
    i. Half-lying position (patient lies supine, hips and knees bent)
    ii. Half-lying pelvic tilt and hold: hold posterior pelvic tilt for 5 minutes
    iii. Half-lying slides: same position, patient alternates complete leg-to-leg extension of hips and knees, sliding feet away from their torso
    iv. Reciprocal toe-tapping: supine 90/90 start position holding legs off ground, patient alternates simultaneous tapping toe to floor with contralateral leg flexion (towards shoulder) (scissoring or cycling motion). Placing patient longitudinally along 6" diameter foam roller adds core musculature training/challenge to this exercise.
b. Level 2:
    i. Full-lying position: hold pelvic tilt for > 5 minutes
    ii. Full-lying position: leg slides
    iii. Half-lying position: repeat reciprocal toe-tapping.
    iv. Half-lying position quiver: pelvic tilt, hold slight flexion until patients' abdominals start to quiver with fatigue. Goal: 3 x 1-minute holds
c. Level 3: Repeat levels 1-2
    i. Quiver becomes short-arc crunches (complete hold in upper abdominals)
    ii. Oblique short-arc crunches
    iii. Supine bicycling: lying supine, holding neutral position, flexing and extending legs repetitively
    iv. Supine bug: add contralateral arm flexion/extension
    v. Hip flexor stretches: lunges; "warrior" pose

Spondylosis: Degenerative Osteoarthrosis of Facets and Vertebrae. Imaging findings have weak correlation with pain, unless arthrosis is accompanied by facet motion restriction, disc injuries and/or nerve compression. Pain is typically aggravated by extension and side-bending, but not likely to be relieved by flexion. Treatment: same as above.

NEUROFORAMINAL STENOTIC RADICULITIS/RADICULOPATHY.

Pathoanatomy: A progression of facet syndromes, degeneration and bony hypertrophy, rare in patients < 50 years old except in the presence of congenital anomalies or history of significant fractures/trauma. Bony enlargement of the facet joints narrows the diameter of the neuroforamen to the point where impingement of the exiting nerve root occurs upon spinal extension, which narrows the neuroforamen. May combine with disc protrusion to compress spinal nerve roots ("disc-osteophyte complex"). With progression, neural impingement may occur at rest/in neutral and become constant.

Symptoms.

- Unilateral lumbar pain with associated leg pain (radiculitis), sometimes progressing to:
    - Moderate: numbness and tingling in a dermatomal pattern
    - Severe: fasciculations, weakness and loss of motor control in myotomes
    - Very severe/end-stage: muscular atrophy of myotomes
- Symptoms can appear abruptly or slowly, with or without trauma.
- Aggravating and alleviating factors more variable than discogenic pain. Extension typically aggravates symptoms; sitting, walking, standing may alleviate *or* aggravate; flexion may be palliative.

Signs.

- End-range pain-inhibition and provocation of low back and lower extremity symptoms ipsilaterally on extension, and on ipsilateral rotation and side-bending.
- Flexion may be palliative.
- Localized paraspinal pain and tenderness and loss of lordosis is common at affected levels. Extension AROM may or may not be inhibited.
- Diminished sensation in leg dermatomes.
- Myotomal weakness.
- Gross muscular atrophy and gait abnormalities are late signs of severe radiculopathy.

Prognosis. Spontaneous resolution may occur, but sensory and motor losses and muscular atrophy may progress and become irreversible without treatment.

Diagnoses.

- Lumbar radiculopathy M54.16; lumbar spondylosis M43.06

- AOM patterns: primarily in *du mai, shaoyin, taiyang;* may involve *shaoyang, yangming.*
    - Stagnation and deficiency of *qi* and blood
    - *Bi* syndromes: cold; phlegm and blood stasis knotted; bone *bi*

Treatment. Same as above for facet syndromes. Addition of needles at distal terminus of symptoms along affected *jing-jin*/dermatomes/myotomes may provide additional benefit.

CENTRAL CANAL STENOSIS/SPINAL CORD COMPRESSION.

A progression of vertebral hypertrophy, rare in patients < 60 years old except in the presence of congenital anomalies, significant fractures/trauma, and/or large (> 7-8mm) central disc bulges.

Symptoms.

- Bilateral lumbar pain with associated diffuse aching pain, sometimes progressing to numbness and tingling in a diffuse non-dermatomal pattern in the lower extremities. Pain is typically worse proximally, at anterior and posterior thighs, and diminishes distally. Radiation below calves is likely attributable to other pathology. Lumbar pain is typically milder than leg symptoms.
- Symptoms typically develop slowly without trauma.
- Symptoms are reliably aggravated on extension, and alleviated by flexion.
- May progress to intermittent neurogenic claudication, in which neutral upright posture required by walking aggravates leg symptoms to the point of intolerable upon short distances/times (city block, 5-10 minutes). Sitting promptly alleviates the leg symptoms., walking, standing may alleviate *or* aggravate; flexion may be palliative.

Signs.

- Patients tend to walk and stand in forward-flexed position to avoid pain provocation. Lordosis is often absent, flat-back posture is the norm.
- End-range pain-inhibition and provocation of low back and lower extremity symptoms occur on extension or in more severe cases upon standing upright with spine in neutral.
- Flexion often palliative, unless disc bulging is also present.
- Lower extremity radicular exams should be performed to assess/rule out diminished sensory and motor function and deep tendon reflexes.
- Upper motor neuron exams should be performed to assess severity of cord impingement.
- Mild atrophy, diminished proprioception and clumsiness are common. Gross muscular atrophy and incoordination are late signs of severe spinal cord compression.

Prognosis. Spontaneous resolution is uncommon. Mild/early stage may respond well to AOM interventions. Sensory and motor losses and muscular atrophy may progress and become irreversible without treatment. Progression to *cauda equina* syndrome is a rare but feared complication. Appearance of perinanal/genital numbness and tingling, loss of control of defecation, and painless difficulty with urination indicate urgent need for neurosurgical evaluation within the day.

Diagnoses.

- Lumbar spine stenosis: M48.06; with neurogenic claudication: M48.062
- AOM: stagnation and deficiency of *qi*, blood, and *yang* secondary to cold/bone *bi* syndrome, primarily in *du mai,* 3 leg *yang jing-jing.*

Treatment. Same as above for facet syndromes.

- Positioning patient prone often aggravates symptoms by pushing spine into flexion, which can be avoided by:
    - Treating in sidelying position.
    - Treating with patient supine with legs supported, using distal needling loci.
    - If patient is placed prone, additional pillows under abdomen may be required to support spine in flexion.
- Addition of needles at distal terminus of symptoms along affected *jing-jin*/ dermatomes/myotomes may provide additional benefit beyond local-only treatment.
- Use of negative heel shoes may be helpful in further flexing spine when patient is standing/walking.