Facet Joint or Zygopophyseal Joint Mediated Pain

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Definition: Facet joint pain (Facet Syndrome) refers to pain arising from the facet joints (Zygopophyseal joints or Z-joints) in the cervical, thoracic or lumbar spine. It can result from disruption in normal architecture, biomechanics or function.

Etiology: Facet Pain results from abnormal loading and excessive stress secondary to poor posture, decreased spine mechanics, trauma (i.e. Whiplash), fracture, inflammation, degenerative disc changes, degenerative facet arthropathy and spondylolisthesis.

Epidemiology: Seventy to eighty percent of adults experience an episode of low back pain during their lifetime. It is the most common cause of disability in population of 45 years old or older. The prevalence of Facet Joint pain range from 36% to 55% in the cervical spine and from 15 to 40% in the lumbar spine. In whiplash disorders the overall prevalence of 60% for C2-3 or below.

Patho-anatomy/ physiology: Diarthrodial joints formed by the articulation of the superior articular process of one vertebra and the inferior articular process of the vertebra above. The medial branch supplies the facet joint of its level and the level below it. It contains a fibrous capsule, synovial membrane, articular cartilage and menisci. Together with the intervertebral disc functions as a motion restricting unit, able to resist and withstand both axial and shearing forces or stress and absorbed compressive loads. Pain can be direct due to a problem within the joint itself or indirect due to joint hypertrophy or synovial cyst impinging on nerves.

Disease progression including natural history, disease phases or stages, disease trajectory (clinical features and presentation over time)

New onset/ acute- (Dysfunction). Duration-1 to 4 weeks. Characterized by minor pathology causing abnormal motion which can lead to pain. Clinical features include pain, spasm and limited range of motion.

Subacute- (Instability or Intermediate). Duration- 1 to 3 months. There is further degeneration and laxity of the facet joint capsule resulting in more prolonged episodes of pain. Features include pain and restrictions on occupational / recreational activities.

Chronic / stable- (Stabilization). Duration- more than 3 months. Fibrosis of the facet joint capsule along with osteophyte formation represents the body's attempt to self stabilize a motion segment. Features include pain and functional limitations.

Specific secondary or associated conditions and complications: facet joint dysfunction is commonly present in patients with concomitant degenerative disc changes and possible disc related pain. Additional complications that can arise from Facet Arthropathy include headaches (particularly with C1-2 and C2-3 Joints), degenerative spondylolisthesis, facet joint cyst and neuroforaminal stenosis which can result in cervical or lumbar radiculopathy.

Essential of assessment

1. **History** - The primary pain pattern includes lower back, SI Joint and lateral hip with referred pain to the lumbar region, gluteal region, trochanteric, lateral thigh, posterior thigh and groin. In the cervical spine primary pain pattern includes the neck, shoulder blade area and headaches. Facet joint pain is primarily dull, ache and at times stabbing pain with non - radicular symptoms. Tend to be worse in the morning and with extension activities.
2. **Physical Examination** - Palpation (point tenderness along paravertebral regions and transverse process) and note any end range restrictions and referral patterns. Range of motion evaluation to include limits and pain evoked with flexion, extension, rotation, lateral flexion. In the cervical spine also include protrusion and retraction. Neurologic examination is usually normal except when facet joint cyst or foraminal narrowing causes nerve root compression. Salient characteristic of facet pain include positive pain on extension or repetitive end range extension and with rotation-extension combined movements with flexion direction of preference and point tenderness along paravertebral regions.
3. **Functional assessment: mobility, self- care cognition/ behavior/affective state**- Posture, transfers assessment and lifting of light objects and note deficits on body mechanics. Look for signs of inappropriate illness behavior as well as signs of depression/anxiety.
4. **Laboratory studies**- Laboratory studies only obtained if suspicious underlying Rheumatologic condition, inflammatory disease or infectious process.
5. **Imaging**- Plain radiographs are a good screen to detect instability (include flexion/ extension views), fractures, abnormal lesions and osteoarthritis. SPECT images and less optimally bone Scan- is useful for spondylolysis, metastasis, infection or occult fracture.
   Computed Tomography (CT) Scanning- further evaluate osseous structures of the spine, fractures and progression of fusion. Magnetic Resonance Imaging (MRI) indicated if disc herniation or Z-Joint Cyst causing nerve root entrapment is suspected.
   Degenerative findings facet joints on radiographic studies have not been found to correlate with Z-Joint mediated pain.
6. **Supplemental assessment tools** - Pain diagram should be compared to the established Z-joint referral pain diagrams. Fluoroscopic guided medial branch blocks or intra-articular arthrographic-confirmed anesthetic injections are considered the "gold standard" for diagnosis with at least 50% and preferably 75 to 90 % reduction of pain. Two separate blocks utilizing different duration anesthetics is recommended in guidelines to minimize the false positive response (38%) with one injection.
7. **Impairment-based measurements** - In the 6th Edition of the AMA Guides to the Evaluation of Permanent Impairment, when an individual with facet joint dysfunction is found to be at the point of Maximal Medical Improvement it will be classified under Class 0 or Class 1 depending on symptoms, physical exam , non organic findings, Pain Disability Questionnaire. This results in a whole person impairment of 0% for Class 0 or 1 to 3% for class 1 depending on net adjustment equation results. Other disability scales that can be use include the Oswestry Low Back Pain and the Neck Disability Index.

8. **Early prediction of outcomes**-Psychiatric co- morbidity is associated with diminished pain relief after Medial Branch Blocks in the cervical and lumbar spine. Bone scintigraphy with SPECT can help identify patients who would benefit from facet joint injections.
9. **Environmental** - Low socioeconomic status and lower level of education are associated with disability retirement from back pain. Poor ergonomic positioning, worker dissatisfaction, monotonous tasks, obesity, tobacco use and perceived poor general health status are factors that make a patient vulnerable to low back pain disability.
10. **Social role and social support system**- Psychosocial variables and cognitive factors such as attitude, passive copying and fear-avoidance beliefs have more impact than biomedical factors on back pain disability and with transition from acute to chronic pain disability. Patients adopt a "sick role" where interaction with their environment, social obligations and normal responsibilities become more difficult.
11. **Ethical and legal consideration**- Facet pain is commonly present in Motor Vehicle and Work accidents with questions on causal relationship, maximal medical improvement and Impairment Ratings. Unethical treatment can be present at times with providers performing blocks or radiofrequency ablation without following established guidelines.

A. Rehabilitation Management and Treatments

1. **Available or current treatment guidelines** – The evidence for accuracy of diagnostic facet joint nerve blocks is level I or II-1 in the diagnosis of lumbar and cervical facet joint pain as per Manchikanti et all. The therapeutic evidence of facet joint nerve blocks, injections and radiofrequency ablation is limited for intraarticular, moderate for facet joint nerve blocks and strong for Cervical radiofrequency. In the lumbar spine the evidence is moderate for intraarticular injections, moderate for MBB's and moderate for Lumbar radiofrequency.
2. **At different disease stages**
    A. **New onset/ acute** –Initial treatment emphasizes on education, local pain control with NSAID's, topical cream, some modalities and physical therapy to include instructions on therapeutic proper posture and spine mechanics, activity modification, exercises avoiding direction of pain and spinal mobilization or manipulation. On occasion an early Facet Joint injection may be indicated for pain relief and to facilitate participation in Physical Therapy.
    B. **Sub-acute**- (Recovery phase). The main focus of this phase is to increase stability, strength and restore motion. Rehabilitation exercises primarily with spine neutral posture or flexion biased to reduce stress on facet joints. Spine stabilization, core stabilization exercises, posture correction and strengthening program follow by restoration of functional movements.
    If residual pain medial branch nerve blocks are indicated and if positive response to diagnostic and confirmatory blocks then Radiofrequency Ablation indicated.
    C. **Chronic Stable**- This will be the maintenance phase in which more eccentric muscles strengthening exercises follow by functional exercises (standing in multiple planes) with transition to a home program is indicated. If pain persist on this phase and positive response to diagnostic and confirmatory medial branch nerve blocks then Radiofrequency Ablation indicated. Judicious use of medications such as NSAID's, narcotics on selected patients can be necessary to maintain or improve function and quality of life.

3. **Patient and family education** - Coping mechanisms, home exercise program and family teaching is an essential part of the Rehabilitation program.

4. **Emerging/ unique interventions** - RF therapy is performed using either conventional continuous RF current (standard of care) for RF facet denervation, or pulsed RF current. In conventional continuous RF therapy, probe tip temperatures reach more than 60°C and are intended to produce long-term pain relief through more uniform and larger lesion. Pulsed radiofrequency, which consists of short bursts of current, is suggested as a possibly safer alternative to thermal radiofrequency. However, temperatures for pulsed radiofrequency do not exceed 42°C and caused primarily temporary neural blockade and if beneficial it will be of shorter duration than conventional RF.

5. **Measurement of Patient Outcomes** - Oswestry Low Back Pain Questionnaire, Neck Disability Index, Pain Disability Questionnaire, SF 12 or 36, McGill Pain Questionnaire facilitate evaluation on effectiveness of treatment interventions, functional improvement and quality of life.

6. **Translation into Practice: practice "pearls"/ performance improvement in Practice (PIPs)/ Changes in clinical practice behaviors and skills**. Standard of care remains education, activity modification, Physical Therapy and medications. Diagnostic and therapeutic use of facet joint nerve blocks and Radiofrequency Ablation are treatment options. It is important to follow available established guidelines to minimize false positive results and unnecessary treatments.

D. Cutting edge concepts and practice - Laser Facet Joint Denervation and Nu-fix Fusion stabilization of facet joints require further research studies to look at biomechanical results and specific sub-groups that might benefit of these procedures.

E. Gaps in evidence – based knowledge - chiropractic or osteopathic manipulation, back braces, traction, acupuncture, and facet interventions (injections, ablation procedures and surgical interventions) are treatment interventions that can be of help for facet joint pain with more evidence of short term benefits and long term benefits for Radiofrequency ablation. Further research is necessary to further establish the short term and long term benefits.

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