

Degenerative facet joint disease

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The facet joints (zygapophyseal or z-joints) –FJ- are paired synovial joints at the posterior aspect of the spinal column. Each joint consists of the articulation between adjacent superior and inferior articular processes arising from adjacent vertebrae. The cervical facet joints are typically oriented in an oblique sagittal plane angled superior to inferior in a posterior direction. The thoracic facet joints are nearly vertical and coronal in orientation, while the superior lumbar facet joints are oriented in a more sagittal oblique plane. All FJ make a tripod support for each spinal level with the intervertebral disc. Because of their rich innervation, FJ are an important source of pain especially when degenerated and sometime they are often underestimated especially in evaluating patients with low-back pain(LBP) or neck pain(NP) or sciatica. Symptoms are non specific and overlap with other diseases (cervicogenic headache, shoulders or scapular pain).

Clinical investigations include:

- pain aggravated by palpation of paraspinal muscles, standing, spinal extension and facet joint loading with rotation with ameliorated by sitting and flexing the spine,
- morning pain and stiffness,
- occasional improvement with anti-inflammatory drugs.

Degenerative changes of FJ include osteophyte formation, hypertrophy of the articular processes, osteosclerosis, thinning of the articular cartilage with erosions and subchondral cyst formation, vacuum joint phenomenon or

joint effusion, hypertrophy and/or calcification of the joint capsule and ligamentum flavum. These changes may play an important role in the development of acquired spinal stenosis. The imaging for the evaluation of facet joint degeneration are standard x-ray (limited value)with dynamic projection, MDCT and MRI. More subtle changes, e.g. cartilage changes, and subchondral erosions can be better analyzed on MDCT with MPR reconstruction or MRI (protocol Sagittal T1W,T2W and T2 STIR,axial T2W,sagittal and axial T1W-fat sat after i.v contrast element). CT is the imaging modality of choice to demonstrate bone degenerative finding with the evaluation of the intervertebral foramina and spinal canal stenosis associated, spondylolisthesis with or without spondylolisthesis or Baastrup's disease. MRI is the best choice to evaluate the associated soft tissue changes including ganglion cysts, ligamentum flavum hypertrophy and ligamentum flavum cysts or FJ synovial cyst. Hypertrophy facet joints finding or accumulation of fluid in the joint capsule or MRI-enhancement locally are typical finding of degenerative FJ or FJ syndrome in MRI. On MR imaging, intraspinal synovial cysts are depicted as sharply marginated epidural masses near the facet joint. In some cases, MR imaging may demonstrate the communication with the facet joint. The signal intensity of the cysts is equal to or slightly greater than that of cerebrospinal fluid (CSF) on both T1- and T2-weighted images. CT and MR imaging demonstrate degeneration of the facet joints and associated spondylolisthesis and the sagittal orientation of the facet joints can be evaluated. Both techniques allow for direct visualization of disc degeneration and disc bulging. Sagittal images demonstrate narrowing of the central canal, lateral recess and intervertebral foramina with associated compression of the cauda equine and exiting nerve roots. Thickening of the ligament flava may add to central

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canal and lateral recess stenosis. Anterior slip of the inferior articular process will narrow the inferior aspect of the lateral recess and the intervertebral foramen.

Clinical diagnostic approach include also the use of flexo-extension X ray and dynamic MRI. Typically patients with degenerative joint disease and spinal canal stenosis tend to improve in flexion while they worst in extension. Thanks to dynamic study it is also possible to exclude the presence of an instability and microinstability with indication to surgical fixation or to minimal invasive spine procedures.

Dynamic MR tend to improve diagnostic accuracy up to 15% of cases in selected patients with normal or minimally abnormal basic MR. Dynamic stand-up MR can show the

presence of micro-instability, herniated disk, facet joints subluxation and synovial cyst.

Interventional spine Neuroradiology has an important role treating this type of disease with aspiration of synovial cyst, radiofrequency of facet joint and inter-articular and epidural steroid injection.

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