

### 32. Degenerative Disease

Longstanding disk herniations or bulges may result in the formation of hypertrophic end plate spurs (i.e. osteophytes). The severity of symptoms resulting from osteophytes (which are typically asymptomatic) does not correlate with their imaging appearance. Osteophyte distribution within the cervical spine directly varies with spinal axis mobility: the mobile lower cervical spine is affected initially with superior spread as disease worsens. Figure 32.1 A demonstrates a case of moderately advanced degenerative disease with disk osteophyte complexes at the C3-7 levels. GRE T2WI aid in distinguishing osteophytes from similarly appearing disk herniations on FSE T2WI: the nucleus pulposus and inner disk annulus, due to their mucopolysaccharide matrix, demonstrate moderate to high SI on GRE, whereas osteophytes - due to the presence of dense bone - have a very low SI appearance. The osteophytes in the FSE T2WI of Figure 32.1 A result in a mild degree of central canal stenosis—note the lack of CSF surrounding the cord at the involved levels. More severe stenosis is present on the FSE T2WI of Figure 32.1 B where an osteophyte compresses the thecal sac and flattens the cord at the C4-5 level. The normal anteroposterior diameter of the cervical canal (best measured on axial FSE T2WI) is over 13 mm, while a canal less than 10 mm in diameter is stenotic. Additional degenerative findings in Figure 32.1 B include disk space height loss at the C4-5 and C5-6 levels and a slight anterolisthesis of C2 on C3—both common degenerative findings.



Fig. 32.1

As osteophytes form around the uncovertebral joint (present from C2-3 to C6-7), neuroforaminal narrowing, most typically anteromedially, may occur. The uncovertebral

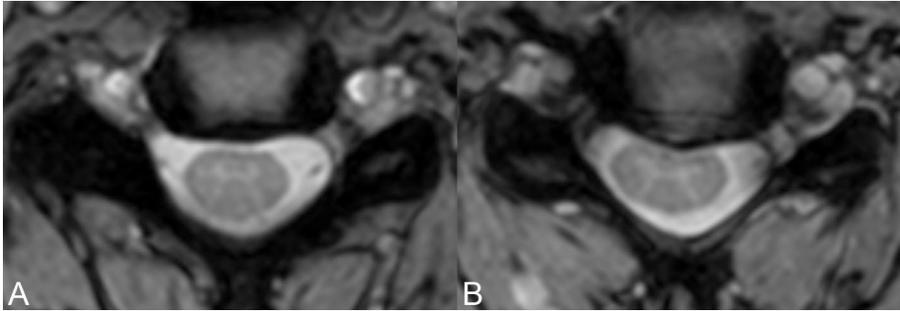


Fig. 32.2

joint is formed by the uncinat process of a given vertebral body extending superiorly to articulate with a depression in the adjacent end plate of the superior vertebral body. Foraminal narrowing may be exacerbated by disk space height loss. Stenosis of the foramen can compress the exiting nerve root resulting in radiculopathy. Foraminal caliber is often difficult to evaluate due to its small size relative to standard slice thickness (3 to 4 mm) and orientation oblique to the axial (or direct sagittal) plane. Thin-slices, oblique sectioning, and three-dimensional imaging—in which interslice gaps are eliminated—may improve visualization, although delineations between mild, moderate, and severe narrowing may still vary between readers. Axial GRE T2WI—often used in daily clinical practice for evaluating the neural foramen—in Figure 32.2 A, B demonstrates (A) moderate right neural foraminal narrowing in a patient also with a (B) disk-osteophyte complex that impinges the central canal, flattening the normal elliptical shape of the cervical cord. A disk herniation (see Chapter 31) may be superimposed on degenerative changes. The herniation seen on the

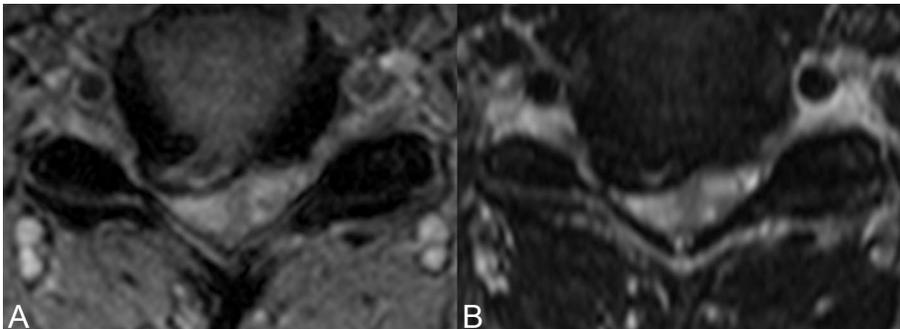


Fig. 32.3

FSE (A) and GRE (B) T2WI of Figure 32.3 severely narrows the neural foramen on the right. Moderate narrowing is present on the left. It is difficult to prove a herniation to be acute, although osteophytes were seen superior to the herniation in Figure 32.3, implying a chronic process. In this image, the herniated disk deforms the cord, resulting in cord hyperintensity reflecting either edema or gliosis. Given the suspected chronicity of the

lesion, the latter is more likely. As evident in this case, cord hyperintensity is typically more clearly seen with FSE than GRE T2WI.



Fig. 32.4

Figure 32.4 demonstrates a particularly severe case of cervical spondylitic disease. (A) Central canal stenosis is present at multiple levels on sagittal FSE T2WI. Axial images at the most severely narrowed level (C2-3) further highlight moderate to severe canal stenosis and marked cord flattening. Both the (B) axial GRE T2 and (C) T1WI also demonstrate a thick band of low SI posterior to the vertebral body. This represents dense calcification in the region of the posterior longitudinal ligament (PLL) suggestive of PLL ossification. An ossified PLL is a fairly uncommon cause of spinal stenosis that typically involves the spine at multiple levels. Unless fatty marrow is present, it appears as low SI on GRE and T2WI. Patients with an ossified PLL are at higher risk of traumatic spinal cord injury.