

DEFINITION

1. **Spondylosis** is a spinal disorder in which degenerative changes occur in the intervertebral discs with secondary changes in the adjacent vertebrae. Similar changes frequently occur in the articular cartilage of the neighbouring apophysial joints between the vertebrae. At this site the changes are usually termed **spinal osteoarthritis**.

PATHOLOGY

2. The intervertebral discs lie between the adjacent surfaces of the bodies of the vertebrae, being adherent to the cartilage plate which covers the upper and lower surfaces of the vertebral bodies. The periphery of the disc consists of a ring of tough fibro-cartilage known as the **annulus**, whilst lying between the cartilage plates and surrounded by the annulus is soft, gelatinous, highly elastic material under tension known as the **nucleus pulposus**.
3. Degenerative changes probably start between 15 and 45 years of age with swelling and deformation of the nucleus. The annulus degenerates and is encroached upon by the expanded nucleus, nuclear material possibly being extruded into one or other of the vertebral foramina, causing pressure on nerve roots or even the spinal cord.
4. Dehydration of the disc nucleus leads to impaired nutrition of the cartilage plate with resultant changes which are indistinguishable from osteoarthritis and include the formation of osteophytes at the margins. This stage occurs between 35 and 70 years of age.
5. Eventually, there may be complete fibrosis of the disc and bony bridges sometimes from between adjacent osteophytes. This is seen in people over the age of 60 years.

CLINICAL MANIFESTATIONS

6. These depend upon the part of the vertebral column affected and the stage of the disc degeneration. Cervical and lumbar regions are most commonly involved.

Cervical region.

7. The majority of cases do not have any symptoms. In the rest, symptoms are usually caused by pressure effects on the nerve roots or spinal cord by extruded material from the degenerated discs or osteophytes.
8. The onset of symptoms is usually gradual with occipital headache and pain radiating from the neck to the shoulder and down the arm. The pain is worse at night and exacerbated by movement. Motor symptoms are less prominent but there may be muscular weakness. Where **spinal cord compression** occurs, the effects are nearly always noticed gradually; the first symptoms being sensory and followed by major symptoms such as weakness, stiffness and unsteadiness of the limbs. A further group of symptoms may arise through pressure on the vertebral arteries if the collateral circulation is already inadequate on account of atherosclerosis.

9. Examination shows limitation of neck movements and forcing of the head over to the side of the pain usually exacerbates it.

Lumbar region

10. The commonest symptom is mild, intermittent low backache. It is usually of gradual onset, worse on exertion and eased by rest. Movements of the back become restricted.
11. The condition may be episodic with pain free intervals of months or years but there is a tendency to recurrence and eventually there may be chronic pain and disablement.
12. Degenerating intervertebral discs may protrude especially in the lumbar spine following strain or injury. This may lead to sciatica, motor and rarely to autonomic dysfunction.

AETIOLOGY

13. Spondylosis is not normally caused by external factors. Rather it is part of the normal ageing process during which the intervertebral discs undergo a gradual loss of fluid and elasticity. In some degree, these changes are found universally in persons over the age of 50 years. External factors **can** cause spondylosis if present in childhood. Infections of the disc or disc and vertebrae at a young age can cause spondylosis. Typically pyogenic infections involve the lumbar spine while in tuberculosis the dorsal and lumbar sections are affected. Similarly, congenital vertebral anomalies present from birth or arising during childhood may lead to local premature spondylosis.
14. The course of spondylosis - which is usually slowly progressive - may be accelerated or rendered more severe ie aggravated - by undue physical stress or strain either by direct injury to the disc or by distant injury which alters the mechanics/loading of the disc. Undue stress/strain may arise in several ways.
15. Direct local injury to the intervertebral disc or neighbouring parts of the vertebrae can accelerate the progress of disc degeneration. Axial mechanical loading of a normal disc does not cause disruption. However especially if combined with lateral and torsional forces - a degenerate disc can be affected by such a force.
16. Repeated excessive mechanical stresses in the spine can hasten the progress of spondylosis. Certain **occupations** - which involve repeated bending and lifting, lifting heavy objects (up to 20 Kg) or upper limbs vibration are associated with increased age-adjusted odds ratios for spondylosis. Repeated spinal flexion and extension in parachuting and acceleration/deceleration injuries associated with ejection seats can give rise to progression of cervical spondylosis - although that is not so for lumbar spondylosis. It should be noted that in most of the reported series, in addition to ongoing repetitive strain to the cervical spine, there is usually at least one significant discrete injury to the cervical spine giving rise to acute symptoms and signs.

17. There is no evidence that normal activities of daily living, recreational sport including team sports, running and jogging affect the progress of spondylosis. Some studies report an increased incidence of lumbar spondylosis in former professional fast bowlers and similarly an increase in cervical spondylosis in those who dive or box professionally.
18. The relation between whiplash injuries and spondylosis is not clear. Where spondylosis is present, an accelerating role for whiplash injuries cannot be ruled out.
19. Less commonly distant causes can alter the stresses on the spine. Examples include longstanding postural scoliosis, structural scoliosis, gross limb length discrepancy leading to a pelvic tilt, abnormal gait and posture due to lower limb conditions such as ankle ankylosis. These may all affect the progress of lumbar spondylosis.
20. Muscular and neuromuscular conditions affecting the spinal muscles (poliomyelitis, spinal muscular atrophy, muscular dystrophies) can lead to spinal deformities which in turn accelerate the progress of spondylosis.
21. Deformities of the spine due to damage to thoracic wall (pleural thickening and thoracoplasty) or abdominal wall (burns or retroperitoneal fibrosis) are known causes of scoliosis and again can accelerate the progress of spondylosis.
22. Chronic deformities of the neck due to burn scars, tumours or torticollis associated with neurological disorders can result in an early onset of clinical cervical spondylosis.
23. Tumours of the vertebrae, osteoporosis, spondylolisthesis, operations on the spine such as spinal fusion may also be associated with an accelerated progress of spondylosis.
24. Mental stress, emotional disturbances, climatic conditions and general infections do not have any effect on spondylosis other than to temporarily exacerbate the symptoms.

CONCLUSION

25. Spondylosis in adults is almost always an age-related degeneration of the intervertebral discs where constitutional factors are of prime importance. The progress of spondylosis can be affected by external factors - including local disc trauma and altered biomechanics of the spine due to injury or stress distant from the site of the spondylosis.

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