## Clinical History:

A 43-year-old man presented with neck and shoulder pain. Cervical spine radiographs (**Figures 1 & 2**) were taken.

**Figure 1: Lateral cervical spine radiograph, taken in flexion**

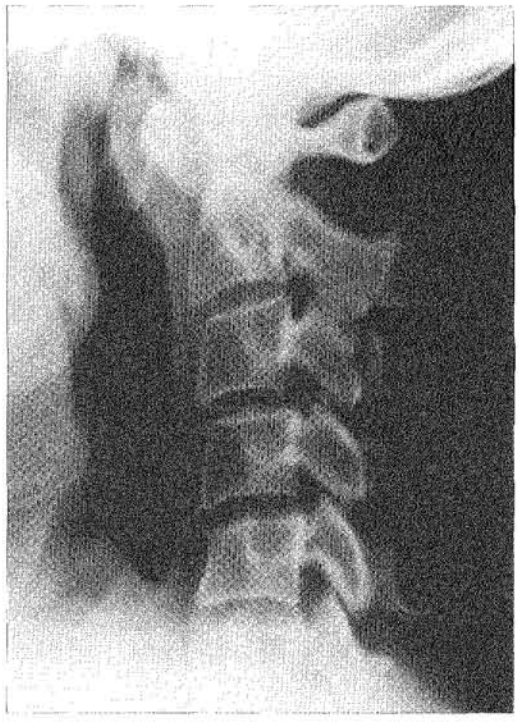
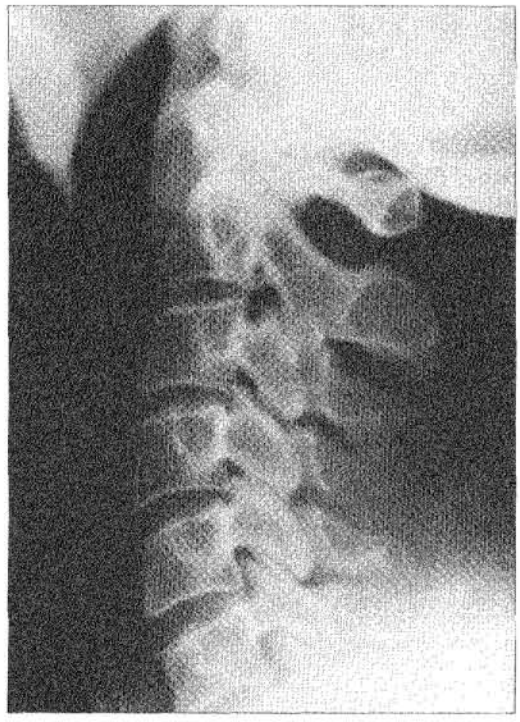


**Figure 2: Lateral cervical spine radiograph, taken in extension**



Answer on page 82

## What is the diagnosis?

a) Rheumatoid arthritis

b) Ankylosing spondylitis

c) Klippel-Feil syndrome

d) Metastasis to C2 vertebra

e) Retropharyngeal abscess

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# RADIOLOGICAL CONFERENCE

## Answer:

a) Rheumatoid arthritis

## Radiological findings

On the radiographs of the cervical spine, the atlanto-axial distance is increased on the flexion view (**Figure 3**). It measures approximately 8 mm in this patient. Normally, it should measure up to 3 mm in adults and up to 5 mm in width in children. The atlanto-axial distance is normal on the extension view (**Figure 4**). No bony erosion is seen in the odontoid process, and the rest of the cervical vertebra is otherwise normal. There is no abnormal prevertebral soft tissue swelling.

**Figure 3: Same radiograph as Figure 1 with the addition of arrows. The widened atlanto-axial distance is indicated by arrows**

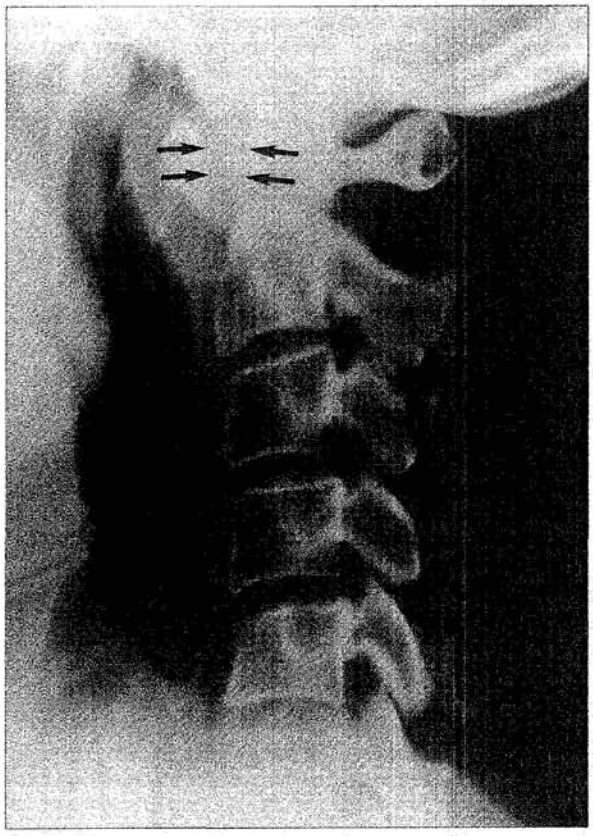
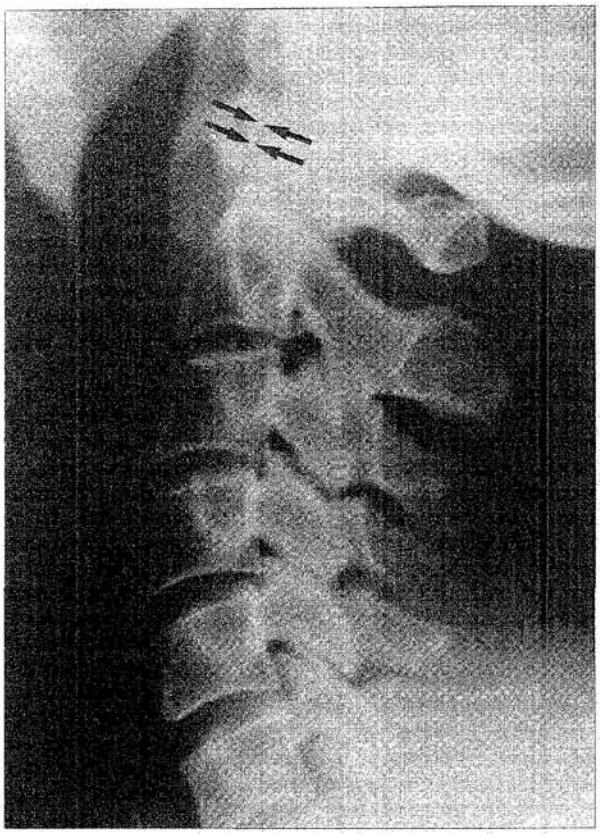


**Figure 4: Same radiograph as Figure 2 with the addition of arrows. The atlanto-axial distance (arrows) is normal in this position**



## Discussion

### Rheumatoid arthritis

The radiological findings are typical of anterior atlanto-axial subluxation. The condition is suspected when the distance between the posterior border of the anterior arch of C1 and the anterior border of the odontoid process of C2 vertebra exceeds 3 mm in adults and older children, or 5 mm in younger children, or if the interosseous distance changes considerably between flexion and extension on lateral radiographs.[1] Atlanto-axial subluxation occurs in 20-25% of patients with rheumatoid arthritis, and may be evident in early stages of the disease.[2] It is related to transverse ligament laxity due to synovial inflammation and hyperaemia of the adjacent articulations.

# RADIOLOGICAL CONFERENCE

Apart from anterior subluxation, vertical subluxation at C1-C2 is also observed in rheumatoid arthritis patients, which when extensive, can be fatal as the spinal cord and cervicomedullary junction of the cord may be compressed. It occurs in 5-22% of patients.[2] Lateral subluxation of the atlanto-axial joints affects 10-20% of cases. The clinical course of patients with atlanto-axial subluxation is variable, ranging from non-progressive mild symptoms to disabling neurological abnormalities that require operative intervention. Magnetic resonance imaging performed with patient in both flexion and extension positions would be helpful to assess the adequacy of the neural canal to exclude cord-compression. Since rheumatoid arthritis is a multi-organ disorder with symmetrical erosive arthritis of the synovial joints, further investigation would depend on the clinical presentation.

## Ankylosing spondylitis

Ankylosing spondylitis is a chronic inflammatory disorder affecting principally the axial skeleton, causing alterations in synovial and cartilaginous joints, and at sites of tendon and ligament attachment to bone. Insidious onset of back pain in a young adult would be the typical clinical manifestation. Classically, radiographical changes are initially noted in the sacroiliac joints, and then the thoracolumbar and lumbosacral junctions. Cervical involvement tends to occur in the later stages of the disease.[2] By that time, other typical features such as bamboo spine, posterior element fusion and established sacroiliitis should be evident, none of which is present in our patient.

## Klippel-Feil syndrome

The Klippel-Feil syndrome is a rare disorder characterised by a short neck, low hairline and limited neck movement due to cervical vertebral fusion. Segmental defects in the cervical spine produces block vertebrae, most commonly affecting C2-3 and C5-6 levels. This syndrome is frequently associated with other anomalies, such as moderate-to-severe scoliosis, Sprengel's shoulder, cervical ribs and genitourinary abnormalities.[1] Our patient does not have any of the clinical or radiological features of this syndrome.

## Metastasis

The spine is a frequent site of skeletal metastases, with the thoracic and lumbar levels mainly being affected. Metastases occur more commonly in the vertebral bodies than in the posterior elements.[2] Carcinomas of the lung, breast and prostate are among the most frequent malignant tumours producing spinal metastases. Metastasis to C2 causing atlanto-axial subluxation is rare. There is no osteolytic or sclerotic lesion present on the radiographs, and moreover, our patient has no known primary tumour.

## Retropharyngeal abscess

Retropharyngeal abscess may be caused by upper respiratory tract infection, perforating injury of the pharynx or oesophagus, or suppuration of infected lymph nodes. It usually occurs in patients less than one year old, with a clinical presentation of fever, neck stiffness and dysphagia. Radiographically, there is thickening of the retropharyngeal space exceeding ¾ of the anteroposterior diameter of the vertebral body. The retropharyngeal swelling may contain gas or a gas-fluid level.[3] The airway may be displaced anteriorly. Both the clinical and radiological features of retropharyngeal abscess are absent in our patient. ■

## References


1. Chapman S, Nakielny R. *Aids to Radiological Differential Diagnosis*. 3rd ed. WB Saunders Company, London. 1995;p83.
2. Resnick D. *Bone and Joint Imaging*. WB Saunders Company, Philadelphia. 1989;pp277-279,309,871-873,1199.
3. Dähnert W. *Radiology Review Manual*. 3rd ed. Williams & Wilkins, Baltimore, 1996;p293.