

## “Bamboo spine” starts to bend - Something is wrong

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EXPERIMENTAL RHEUMATOLOGY 2000.

**Key words:** Ankylosing  
spondylarthritis, bamboo spine,  
cervical spine, spinal fracture.

### ABSTRACT

*A typical complication of ankylosing spondylitis with an atypical patient history is reported and the topic is discussed. The diagnosis of a spinal fracture may be difficult in a "bamboo spine".*

### The case

The patient is a 61-year-old Caucasian male with ankylosing spondylitis (AS) diagnosed when he was 18 years old. An ankylosed kyphotic ‘bamboo spine’ had developed but his peripheral joints remained healthy. The inflammation had been inactive for years. He had used non-steroidal-anti-inflammatory-drugs for decades.

In April he was ice fishing on a lake and drinking vodka to keep warm and became inebriated. He came home by bus, but fell from the bus-stairs, and hit his head heavily when falling on the street pavement. He remained conscious, but his neck was painful. He was taken to a general practitioner, who took a cervical radiograph, but only AS changes were seen. He was admitted to a surgical ward at a local hospital. A computerized tomography (CT) of the neck was performed. The examination was technically difficult, because of the severe kyphosis and a painful neck. No traumatic lesions were detected. He was treated conservatively and discharged home with the neck continuing to be painful in spite of painkilling medication and with new symptoms of slight numbness and weakness in his legs and right arm.

The neck was still very painful 6 weeks after the injury, and he was admitted for rehabilitation to the Rheumatism Foundation Hospital. At his arrival (2 weeks later), the numbness and weakness of the feet and right hand continued, but he was able to walk and use them. The lower part of his neck was painful. He felt that his kyphosis had become a little more severe. He was glad that his neck had started to move slightly after the injury, but unfortunately the movement caused pain.

His back was ankylosed, producing a severe thoracic kyphosis, so that the lower part of the cervical spine was practically in a horizontal position. The extension posture of the upper cervical spine made it possible for him to look

forward. Palpation of the lower part of the neck caused pain. No synovitis was detected. The Babinski reflex was positive in both feet.

The abnormal position of the neck and shoulders meant that only the 5 most cranial vertebrae (with ‘bamboo spine’ changes) were visible in a cervical spine radiography. The body of the 6th cervical vertebra (C6) could not be seen, but its spinous process was in an abnormal position. Traditional tomography of the lower, painful and ‘bending’ part of the neck was performed. A fracture through the body of C6, with a dislocation of 8 mm, and angulation was seen (Fig. 1). A stiff custom-made collar was produced, and he was admitted to a clinic of neurosurgery.

The former CT-pictures were re-evaluated, and retrospectively it was possible to judge the C6 to be abnormal, but diagnosis was difficult because of AS changes and the abnormal position of the neck. Magnetic resonance imaging (MRI) could not be performed due to the thoracic kyphosis and the position of the neck.

### Discussion

The cervical spine is often affected by AS which may cause total ankylosis, but subluxations are also possible (1-6). In advanced AS cases the ossification of the annulus fibrosus and syndesmophytes results in the so-called ‘bamboo spine’ with typical radiographic findings (1, 4).

The doctors who treated our patient after the injury were not familiar with AS. Plain radiography and CT examination were performed, but no fractures were diagnosed because of technical difficulties and severe chronic AS changes. Thus, the treatment was non-specific and conservative.

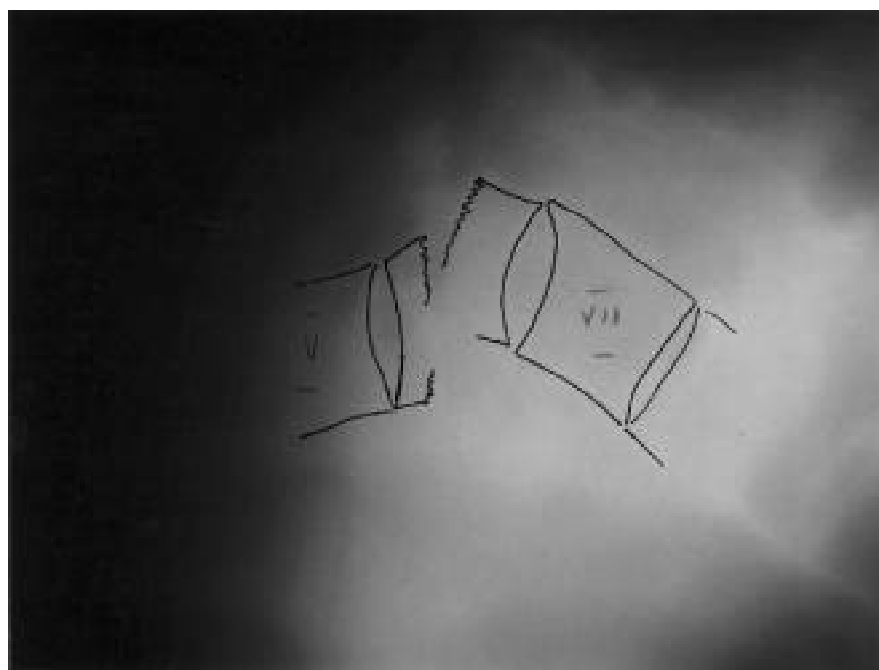
In the rheumatological unit we paid attention to the unusual patient history. He had had cervical ankylosis for decades, but after the injury his posture was more kyphosed and a small painful movement was present. Thus, the cervical spine radiographs were re-evaluated and signs of the C6 fracture were detected. The diagnosis was confirmed by tomography. The fracture-line with dislocation passed horizontally through the corpus of the C6 (Fig. 1). This is an atypical vertebral frac-

ture, but it seems to be peculiar to 'bamboo spine' cases (we previously had a similar patient) (3-4, 7). The most common path of vertebral fracture in AS is through the disk space (transdiskal), the weakest point in the ankylosed spine (3, 8).

'Bamboo spine' is inelastic and may be osteoporotic, which makes it vulnerable and fragile (2-4, 7-10). The incidence of spinal fractures in AS has been reported to be 4 times that of the normal population (10). These fractures may be complicated and even fatal (2-5, 7-14). The mortality rate of AS patients due to spinal trauma has been reported to be 0.7 - 2.8% (3). The elevated risk of spinal fractures, which may be atypical, makes it important that particular attention be paid to the injuries of patients with AS. Mostly because of diagnostic difficulties, old fractures are sometime found long after the trauma (3, 9, 11-13). Delay in the diagnose may lead to severe neurological sequelae (11-14).

Up to 75% of all spinal fractures in AS patients occur in the lower cervical spine and cervico-thoracic junction (C5-T1), as in our case (8, 14). It may be difficult to diagnose a fracture in this area by plain radiography, especially in patients with AS changes and osteoporosis (11). A so-called "swimmer's view" through the armpit with the arm elevated (if the patient is able to raise it) may help to visualize the area, and tomography offers some additional information on the bony structures. CT (with or without myelography) and especially MRI are able to give more detailed data of the examined area and improve the chances of a correct diagnosis, although there exists the risk of displacing a fracture by placing the patient with kyphotic back in the lateral or supine position (11-12). A horizontal fracture may be difficult to find by CT if routine horizontal slices are used. MRI has been recommended for screening purposes when detecting occult fractures in AS, although it does not directly demonstrate bony fracture (11). Modern open-type MRI devices may enable the imaging of patients with severe deformities.

The development of sophisticated radiological methods (CT and MRI) has made us rely upon them, but not all patients



**Fig. 1.** Tomography of the C 5-7 area, showing dislocated fracture through the corpus of C6. The cervical spine is in an abnormal horizontal position because of the severe thoracic kyphosis.

can be examined by MRI and the CT also has limitations. Plain radiography is the basic radiological examination in the rheumatoid cervical spine, but the difficulty of making the diagnosis of spinal fracture on the initial presentation in a patient with advanced AS is well recognized (4, 11). A careful patient history is still an indispensable part of the diagnostic procedure. In cases of AS it has to be remembered that if a 'bamboo spine' starts to bend, something is wrong.

#### Acknowledgements

We thank Dr Elaine Smith from the Department of Rheumatology at Guy's Hospital, London, UK for her help with the writing of this article.

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