



Unusual mechanism of Chance fracture in an adult

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Flexion-distraction injuries of the upper lumbar spine typically occur in case of a head-on motor vehicle collision, while wearing a lap seat belt without shoulder strap. According to Smith and Kaufer the axis of flexion is situated at the point of contact of the belt with the abdominal wall. This results in a horizontal separation of the anterior, middle and posterior columns. The lesion is called a Chance fracture when it involves primarily bone, rather than ligaments. However, a Chance fracture can happen in unbelted persons: the present case concerns a 30-year-old man who fell from a height.

INTRODUCTION

Böhler (2), Conwell and Reynolds (5), and Holdsworth (6) already described Chance fractures in unbelted persons. The author adds a similar case.

CASE REPORT

A 30-year-old male fell from a height of 20 feet. He sustained a closed fracture of both calcanei, and an open fracture of the left tibia. He complained of pain in the lumbar area; palpation revealed local tenderness. The neurological examination was normal. Radiographs (fig 1) and CT-scan revealed a transverse fracture of L2, and more specifically a horizontal split of the posterior elements, extending anteriorly into the vertebral body. An L1-L3 fusion was carried out, using metal cages anteriorly and pedicular screws and rods posteriorly. A hyperextension cast would have been a valuable alterna-

tive (3). Three months after the injury the patient was free of pain, and he resumed work two weeks later. He needed no rehabilitation.

DISCUSSION

A Chance fracture consists of a horizontal splitting of the spinous process and of the neural arch of a vertebra, ending in an upward curve which usually reaches the upper surface of the vertebral body, almost without lateral displacement or rotation of the fracture fragments (4, 7). The fracture has been reported in children, involving the first, second, third and fourth lumbar vertebrae (1, 8, 9).

Howland *et al* (8) and Hubbard (9) also described Chance-type fractures of a lumbar vertebra in children and adolescents, produced by lap seat belts. Smith and Kaufer (11) reported a series of 24 lap seat belt fractures; 5 of these were Chance fractures.

They hypothesized that the mechanism of injury consists of a sudden deceleration, with hyperflexion of the spine over a fulcrum such as a seat belt; the axis of flexion is at the point of contact of

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Fig. 1. — Chance fracture of L2

the belt with the abdominal wall, anterior to the spine.

This subjects all three columns of the spine to tension stress. According to Smith and Kaufer the same type of injury might occur in a fall when the anterior abdominal wall comes in contact with some object such as a tight wire or a fence, which acts as a fulcrum and forces the body into acute flexion (7, 11).

The patient described in this report fell from a height of 20 feet. There was no history of an object acting as a fulcrum. The calcaneal fractures imply that the patient landed on his feet and that the acute flexion of the spine was secondary.

Abdominal bruises and a palpable tender posterior gap may be the first indication of a flexion-

distraction injury. The incidence of neurological complications in flexion-distraction injuries is low in patients who do not frankly dislocate. But the intra-abdominal injuries may be life-threatening, and require immediate attention. Lateral radiographs of the spine will confirm the diagnosis.

Definitive treatment of these injuries depends upon the anatomic structures involved and the amount of displacement. Lesions occurring entirely through osseous elements can be managed in hyperextension orthoses (3). This would have been a valuable alternative in this case.

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