

Chance fractures, also referred as [seatbelt fractures](#), are flexion-distraction type injuries of the spine that extend to involve all three spinal columns. These are unstable injuries and have a high association with intra-abdominal injuries.

Pathology

Mechanism They tend to occur from a flexion injury of the vertebral body and distraction type injury of the posterior elements 1. Typically the flexion fulcrum occurs anterior to the abdomen. The most shared history is that of a back seat passenger restrained by a lap seatbelt (without shoulder strap) and involved in a motor vehicle accident or that of a person who has fallen from a height. The anterior and middle columns fail in compression, and the posterior column fails in distraction.

Location This fracture most commonly occurs about the upper lumbar spine (with the thoracolumbar junction accounting for ~50% of cases 3), but it may be observed in the midlumbar region in children.

Associated injuries There is a high incidence of associated intra-abdominal injuries (especially the pancreas and duodenum) that can result in increased morbidity and mortality. Associated intra-abdominal injuries appear to be more common in the paediatric age group with an incidence approaching 50%.

If unrecognized, Chance injuries may result in progressive kyphosis with resulting pain and deformity.

Radiographic features

Anterior wedge fracture of the vertebral body with horizontal fracture through posterior elements or distraction of facet joints and spinous processes.

Radiograph empty vertebral body sign: can be seen on an AP radiograph and results from the vertical separation of the posterior elements displacing the spinous processes or spinous process fracture fragments off the vertebral body on the AP projection transverse fractures across the transverse processes, laminae, and articular processes widening of the interpedicular distance: often suggests a burst component widening of the facet joints and increased intercostal spacing widening of the interspinous spaces CT more accurately delineates fracture details Treatment and prognosis

The fractures generally can be reduced by placing the patient on a Risser table with hyperextension applied to the thoracolumbar junction prior to applying a fiberglass or plaster cast.

If immobilization is impractical (large body habitus) or the patient has polytrauma, surgical management may be indicated.

History and etymology

It is named after George Quentin Chance, British radiologist who first described it in 1948 2.

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