

liver have been inferred because of the sex and age incidence, particularly since the lesions are occasionally observed during pregnancy.

TRADE and GENERIC NAMES of DRUGS

Delalutin® Hydroxyprogesterone caproate
Ortho-novum® Norethindrone with mestranol

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Flexion Fracture of the Lumbar Spine Due to Lap-Type Seat Belts

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HIGH SPEED COLLISIONS on the highways result in more mortality and morbidity than any single disease entity. More deaths were reported over a major holiday weekend due to auto accidents than to combat in a four-month interval in Vietnam.

Seat belts appear to contribute to the modification of injury patterns. Only in the most severe crash conditions are serious injuries likely to be casually associated with use of seat belts. Even in these circumstances, evidence derived from Automotive Crash Injury Research of Cornell University (ACIRC) clearly indicates that automobile occupants are better off with seat belts than without.¹

When the seat belt is firmly fixed across the pelvis, the forces incurred by collision are distributed more evenly than with a loosely fitting belt placed higher on the abdomen. In the latter instance, on impact the seat belt acts as a fulcrum about which the body pivots, with the major vector of force directed toward the lumbar spine. The following case report illustrates these points.

Report of a case

A 14-year-old boy was involved in a head-on collision while wearing a lap-type seat belt placed at the level of his umbilicus. He was seated in the passenger seat in the front, and at the time of impact he was pivoted forward rapidly and with great force, following which he felt himself veer slightly to the left and then once again return to a sitting position. At the time of impact the other car was traveling at 65 miles an hour, and the

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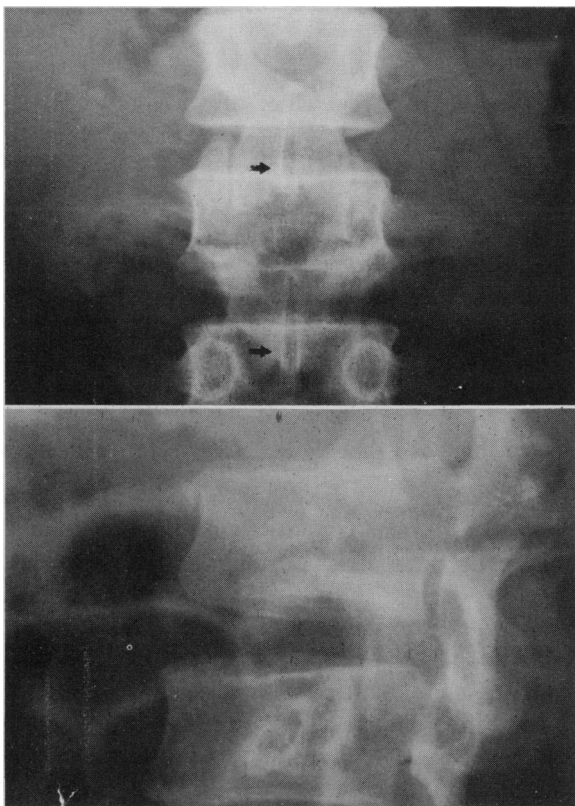


Figure 1.—Antero-posterior and oblique views of the lumbosacral spine reveal a horizontal splitting fracture of the third lumbar vertebra. The fracture line can be seen extending from the tip of the transverse process on one side through the pedicles and lamina to involve the opposite transverse process. The fracture extends slightly anteriorly to involve the posterior aspect of the body of L₃. On the antero-posterior view, there is wide separation of the neural spines indicative of rupture of the posterior ligamentous structures as well (see arrows).

car in which the patient was riding at about 35 miles per hour. Both automobiles were demolished beyond repair.

On physical examination of the patient, point tenderness over the region of the third lumbar vertebral body was noted, together with splinting of the paravertebral musculature. There was a positive straight leg raising sign and pain on motion of the back, localized to the region of the third lumbar vertebra. A band-like zone of ecchymosis was noted immediately below the umbilicus. There was no evidence of a ruptured viscus, nor were there any positive neurologic findings.

X-ray films of the lumbosacral spine revealed a horizontal splitting fracture extending through the pedicles and posterior elements to involve both transverse processes at the level of the third

lumbar vertebra. The fracture extended slightly to involve the posterior aspect of the vertebral body at the same level. Wide separation of the neural spines indicated rupture of the posterior ligamentous structures as well (Figure 1). Abdominal films showed evidence of a paralytic ileus, considered secondary to associated retroperitoneal hemorrhage. This cleared after two or three days.

The patient was treated entirely with thoracolumbar support for the several weeks' duration of symptoms. At the time of this report there was a minimal gibbus at the involved level, but no other positive findings.

Discussion

The longitudinal splitting fracture of the lumbar spine in the case here reported is typical of those seen following high-speed collisional injuries associated with the use of lap-type seat belts. Despite the injury associated with the use of belts, however, there are 35 percent fewer "major fatal" grade injuries when they are used than when they are not, as they prevent ejection of the passenger. Smith et al² defined a specific pattern of injury characterized by the following:

- A disruption of the posterior elements of the lumbar spine, with the disruption osseous, ligamentous or both.
- A longitudinal separation of the disrupted posterior elements.
- No decrease or minimal decrease in the anterior vertical height of the involved vertebral body.
- No (or minimal) forward displacement of the superior vertebral fragment or vertebra, with no (or minimal) lateral displacement of this fragment or the superior vertebra.
- Localization of the disruption between the first and third lumbar vertebrae in the majority of cases.
- Seat-belt contusions usually visible on the abdomen.

Seat belt injuries to the lumbar spine may present with gross separation of the posterior elements due to rupture of the lumbodorsal fascia, interspinous ligaments, ligamentum flavum and the posterior longitudinal ligament. This results in widening of the interspinous distance and increase in the height of the intervertebral foramen. In many cases no neural arch fracture is seen.

In Chance-type¹ fracture, the force is directed

entirely through the osseous structures, causing the splitting fracture of the posterior elements, but in this instance there is sparing of the ligamentous structures. The fracture usually extends horizontally from the tip of the transverse process on one side through the pedicles and laminae to the tip of the opposite transverse process. It may extend into the posterior aspect of the vertebral body, and occasionally there may be avulsion of one or both of the superior articular processes. Involvement of the anterior aspect of the body is not a constant feature, and when it does occur it is usually not severe.³⁻⁷

Visceral injuries may be associated with either kind of fracture, but neurologic deficits are uncommon, since major subluxation is ordinarily not a feature of this syndrome.

In the case herein reported, both ligamentous and osseous elements were involved—a horizontal splitting fracture and rupture of the posterior ligamentous structures. This is the first known instance of this combination.

Summary

Seat belt fracture in the case herein reported resulted from wearing the seat belt high over the abdomen at the level of the umbilicus rather than over the pelvis. In injuries of this kind, at the time of impact the belt acts as a fulcrum around which the body pivots, directing the major vector of force toward the lumbar spine. This may result in one of several injury patterns. There may be gross separation of the posterior elements due to rupture of the posterior supporting ligamentous structures, or the force may be entirely absorbed by the osseous structures. In the latter instance there is a horizontal splitting fracture of the neural arch which extends through the lamina and pedicles to involve both transverse processes.

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Primary Invasion by *Clostridium Sphenoides* In a Patient with Periodic Neutropenia

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PRIMARY INVASION OF HEALTHY undamaged tissue by any of the pathogenic *Clostridia* is an improbable event. The presence of necrotic tissue is a prerequisite for the establishment of a focus of anaerobic infection. Primary invasion by a nonpathogenic species of *Clostridium* is almost unique. The case to be described represents the first reported instance of *Clostridium sphenoides* infection in a human being. It involved the non-traumatized colon of a patient with periodic neutropenia and led to rapid death.

The patient was a 6-year-old Eurasian girl who had a lifelong history of recurrent attacks of otitis media, oral ulcers, periodontal abscesses and chronic gingivitis. At age 2 she was found to have neutropenia, which was persistent but, as determined by specific investigation, was not of rhythmic pattern. In a total of 21 leukocyte differential determinations in her lifetime, the neutrophil count was within normal limits on only one occasion, not associated with an episode of infection. (Chart 1). Occasionally atypical lymphocytes were noted. Platelets were normal and the hematocrit ranged from 31 to 40 percent, usually being in the mid 30's. Bone marrow examination during the neutropenia showed a delay and partial arrest in granulocytic maturation. The gamma globulin level was normal. Results of repeated urinalysis were within normal limits.

Because of the high frequency of the patterns of infection described above, the patient often received antibiotic therapy, and once for a period of a year she received erythromycin in prophylactic dosage. Coagulase positive *Staphylococcus*

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