

Cervical spine injury epidemiology

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Approximately two-thirds of cervical [spine injury](#) occur within the [subaxial cervical spine](#).

Approximately 5-10 % of unconscious patients who present to the ED as the result of a [motor vehicle accident](#) or [fall](#) have a major injury to the [cervical spine](#). Most [cervical spine fractures](#) occur predominantly at 2 levels. One-third of injuries occur at the level of C2, and one-half of injuries occur at the level of C6 or C7. Most fatal cervical spine injuries occur in upper cervical levels, either at craniocervical junction C1 or C2.

[Odontoid fractures](#) are the most common fracture of the [axis](#) and the most common [cervical spine fracture](#) in patients over 65.

As such, the incidence of spinal fractures in young children is less than that of adults due to increased pliability of the immature bones. The presence of unfused synchondroses in these children predisposes them to an infrequent pattern of fractures that traverse through ossification centers. Such synchondral injuries are uncommonly reported in the C1 and C2 vertebrae. Those that have been occasionally described in C1 involved the anterior [synchondrosis](#). Furthermore, penetrating injuries to a pediatric spine are relatively rare ¹⁾.

The fractures occur most often at C6 and C7 and dislocations occurring most commonly between C5-C6 and C6-C7 ²⁾.

Age

There is a bimodal age distribution among patients with spinal cord injuries: the first peak occurs in patients between 15 and 24 years, and the second in patients over 55 years of age ^{3) 4) 5)}.

Norwegian population

In a retrospective [population-based study](#) (with prospectively collected data) from the Southeast Norway health region with 3.0 million inhabitants. Utheim et al. included all consecutive cases diagnosed with a [cervical spine fracture](#) between 2015 and 2019. Information regarding [demography](#), preinjury comorbidities, trauma mechanisms, injury description, treatment, and level of hospital admittance is presented. They registered 2153 consecutive cases with CS-Fx during a 5-year period, with an overall crude incidence of CS-Fx of 14.9/100,000 person-years. Age-adjusted incidences using the standard population for Europe and the World was 15.6/100,000 person-years and 10.4/100,000 person-years, respectively. The median patient age was 62 years, 68% were males, 37% had a preinjury severe systemic disease, 16% were under the influence of ethanol, 53% had multiple trauma, and 12% had concomitant cervical spinal cord injury (incomplete in 85% and complete in 15%). The most common trauma mechanisms were falls (57%), followed by bicycle injuries (12%), and four-wheel motorized vehicle accidents (10%). The most common upper CS-Fx was C2 odontoid Fx, while the most common [subaxial](#) Fx was facet joint Fx involving cervical level C6/C7. Treatment was external immobilization with a stiff [neck collar](#) alone in 65%, open surgical fixation in 26% (giving a 3.7/100,000 person-years surgery rate), and no stabilization in 9%. The overall 90-day mortality was 153/2153 (7.1%).

This study provides an overview of the extent of the issue and patient complexity necessary for planning the healthcare management and injury prevention of CS-Fx. The typical CS-Fx patient was an elderly male or female with significant comorbidities injured in a low-energy trauma. The overall crude incidences of CS-Fx and surgical fixation of CS-Fx in Southeast Norway were 14.9/100,000 person-years and 3.7/100,000 person-years, respectively ⁶⁾.

The [subaxial cervical spine](#) accounts the vast majority of [cervical spine injury](#), making up two thirds of all [cervical spine fractures](#).

The [subaxial cervical spine](#) is a common site of [cervical spine injury](#) with more than 50 % of injuries being located between C5 and C7 ⁷⁾.

The upper cervical spine was more frequently affected in young children. Older children more often suffered from subaxial pathologies. The majority of cervical spinal column injuries were treated conservatively. Nevertheless, 15% of the hospitalized children had to be treated surgically ⁸⁾.

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