



# Cervical Spine Injury Following Motor Vehicle Accident

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## Case

A 28-year-old male was brought to the emergency department via air ambulance following a motor vehicle accident as an unrestrained passenger.

## History of Present Illness

Upon arrival, the patient was intubated and a cervical collar was in place. On exam, he was found to have multiple traumatic injuries and pupils were unequal and sluggish. A longitudinal computed tomography (CT) scan of the cervical spine without contrast was performed.

## Differential Diagnoses

- Occipital-condyle fracture
- Jefferson fracture
- Atlanto-occipital dislocation
- Wedge fracture
- Spinous process fracture
- Rheumatoid Arthritis
- Odontoid fracture



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## Discussion

This image demonstrates atlanto-occipital dislocation. Atlanto-occipital dislocation occurs when severe flexion and extension exists at the upper cervical level. Atlanto-occipital dislocation is a disruption of the ligaments located between the occiput and upper cervical spine often without concurrent bony fractures.<sup>2</sup> Due to the forces needed to produce this injury, most patients do not survive the inciting event.

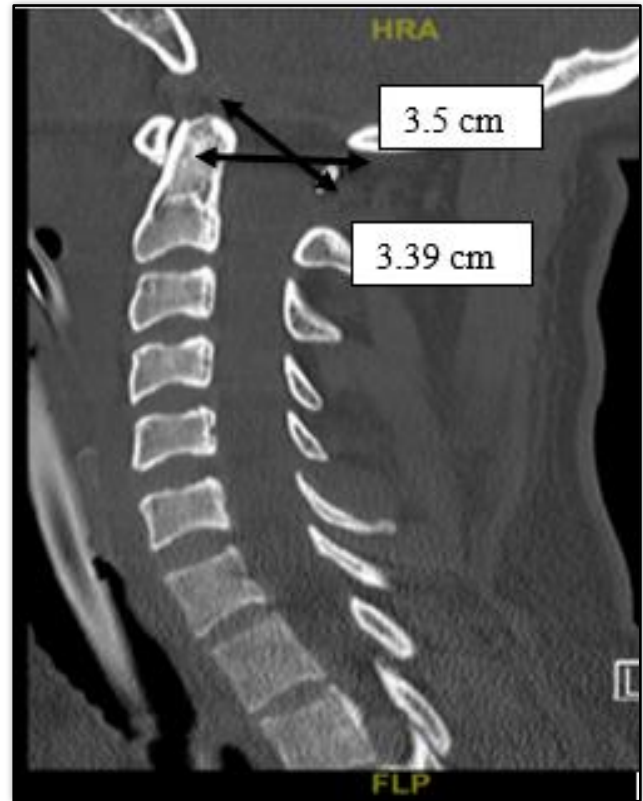
## Diagnosis

'Powers ratio' and 'Harris rule of 12' can be used to diagnose atlanto-occipital dislocation. Powers ratio is used to diagnose atlanto-occipital dislocation. The distance from basion to posterior arch (3.39 cm) is divided by the distance from the anterior arch to opisthion (3.50 cm). Ratio of greater than 1.0 suggests anterior dislocation.<sup>1</sup>

Ratio of less than 1.0 raises concern for posterior dislocation or odontoid fracture. Harris Rule of 12: Basion-dens interval or basion-posterior axial interval >12 mm suggest occipitocervical dissociation.

## References

1. Rojas CA, Bertozzi JC, Martinez CR, Whitlow J. Reassessment of the craniocervical junction: normal values on CT. *Am J Neuroradiol.* 2007;28(9):1819-1823. doi:10.3174/ajnr.A0660
2. Powers B, Miller MD, Kramer RS, Martinez S, Gehweiler JA Jr. Traumatic anterior atlanto-occipital dislocation. *Neurosurgery.* 1979;4(1):12-17. doi:10.1227/00006123-197901000-00004



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