

AO Spine Upper Cervical Injury Classification System

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In the pediatric [population](#). While moderate to substantial [agreement](#) was found, [limitations](#) to applying the Upper Cervical Injury Classification System to the pediatric population exist, and thus the UCCS can be considered a starting point for developing a pediatric classification ¹⁾

Accuracy

Early phase [validation](#) demonstrated classification of upper cervical spine injuries using the AO Spine Upper Cervical Injury Classification System to be accurate, reliable, and reproducible. Greater than 80% accuracy was detected for injury classification. The intraobserver reproducibility was excellent, while the interobserver reliability was substantial ²⁾

The AO Spine Upper Cervical Injury Classification System can be applied with high accuracy, [interobserver reliability](#), and [intraobserver reproducibility](#). However, lower classification [accuracy](#) and reliability were found in regions of [Africa](#) and Central/[South America](#), especially for severe atlas injuries (IIB and IIC) and atypical hangman's type fractures (IIIB injuries) ³⁾.

A study reported an acceptable reproducibility of the new AO UCCS and safety in recommending the treatment. Further clinical studies with a larger patient sample, multicenter and international, are necessary to sustain the universal and homogeneity quality of the new AO UCCS ⁴⁾

Type A

[AO Spine Upper Cervical Injury Classification System Type A.](#)

Type B

[AO Spine Upper Cervical Injury Classification System Type B.](#)

Type C

[AO Spine Upper Cervical Injury Classification System Type C.](#)

Atlas fracture

see also [Atlas fracture classification](#)

Axis fracture

see also [Axis fracture classification](#),

AOSpine subaxial cervical spine injury classification system

[AOSpine subaxial cervical spine injury classification system.](#)

The AO classification according to Magerl et al. is used for the subaxial spine, whereas the upper

cervical spine should be classified separately because the anatomy is different at each level⁵⁾

1)

O'Neill NP, Mo AZ, Miller PE, Glotzbecker MP, Li Y, Fletcher ND, Upasani VV, Riccio AI, Spence D, Garg S, Krengel W, Birch C, Hedequist DJ. The Reliability of the AO Spine Upper Cervical Classification System in Children: Results of a Multi-Center Study. *J Pediatr Orthop*. 2023 Apr 1;43(4):273-277. doi: 10.1097/BPO.0000000000002363. Epub 2023 Jan 30. PMID: 36706430.

2)

Vaccaro AR, Lambrechts MJ, Karamian BA, Canseco JA, Oner C, Vialle E, Rajasekaran S, Dvorak MR, Benneker LM, Kandziora F, El-Sharkawi M, Tee JW, Bransford R, Joaquim AF, Muijs SPJ, Holas M, Takahata M, Hamouda WO, Kanna RM, Schnake K, Kepler CK, Schroeder GD. AO Spine upper cervical injury classification system: a description and reliability study. *Spine J*. 2022 Dec;22(12):2042-2049. doi: 10.1016/j.spinee.2022.08.005. Epub 2022 Aug 12. PMID: 35964830.

3)

Lambrechts MJ, Schroeder GD, Karamian BA, Canseco JA, Bransford R, Oner C, Benneker LM, Kandziora F, Shanmuganathan R, Kanna R, Joaquim AF, Chapman JR, Vialle E, El-Sharkawi M, Dvorak M, Schnake K, Kepler CK, Vaccaro AR; AO Spine Upper Cervical Injury Classification International Members. Global Validation of the AO Spine Upper Cervical Injury Classification: Geographic Region Affects Reliability and Reproducibility. *Global Spine J*. 2022 Aug 29;21925682221124100. doi: 10.1177/21925682221124100. Epub ahead of print. PMID: 36036763.

4)

Maeda FL, Formentin C, de Andrade EJ, Rodrigues PAS, Goyal DKC, Shroeder GD, Patel AA, Vaccaro AR, Joaquim AF. Reliability of the New AOSpine Classification System for Upper Cervical Traumatic Injuries. *Neurosurgery*. 2020 Mar 1;86(3):E263-E270. doi: 10.1093/neuros/nyz464. PMID: 31642504.

5)

Rieger M, Mallouhi A, El-Attal R, Kathrein A, Knop C, Blauth M, Jaschke W. Akutdiagnostik des Wirbelsäulentraumas [Acute diagnosis of spinal trauma]. *Radiologe*. 2006 Jun;46(6):527-41; quiz 542-3. German. doi: 10.1007/s00117-006-1355-x. PMID: 16607557.

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