

## Pre-Injury or Acute Predictors of Prolonged Concussion Symptoms (> 1 Month Post-Injury) Based on Good Quality Studies

Predictor	Supporting Literature
Pre-Injury	
Female sex	3, 5, 7, 10, 11, 14, 15, 18, 19
Older age	3, 4, 11, 12
Prior concussions	8, 11
Psychiatric or mental health issues	1, 3, 5, 6, 8, 11, 12, 13, 19
Headache	6, 15
Sleep disturbances	14, 15
Acute	
Loss of consciousness due to concussion	2, 9
Higher symptom burden	2, 7, 10, 11, 16
Neck injury during concussion	10, 11, 17
Headache	11
Psychiatric or mental health issues	3, 5, 10, 16
Sleep disturbances	11

### Key References (Up Until End of May 2023):

1. Madhok DY, Yue JK, Sun X, et al. Clinical Predictors of 3- and 6-Month Outcome for Mild Traumatic Brain Injury Patients with a Negative Head CT Scan in the Emergency Department: A TRACK-TBI Pilot Study. *Brain Sci.* 2020;10(5):269.
2. Nelson, L. D., Furger, R. E., Ranson, J., Tarima, S., Hammeke, T. A., Randolph, C., Barr, W. B., Guskiewicz, K., Olsen, C. M., Lerner, E. B., & McCrea, M. A. Acute clinical predictors of symptom recovery in emergency department patients with uncomplicated mild traumatic brain injury or non-traumatic brain injuries. *Journal of Neurotrauma.* 2018;35(2), 249-259.
3. Ponsford J, Cameron P, Fitzgerald M, Grant M, Mikocka-Walus A, Schonberger M. Predictors of postconcussive symptoms 3 months after mild traumatic brain injury. *Neuropsychology.* 2012;26(3):304-313.
4. Schmidt, B. R., Moos, R. M., Könü-Leblebicioglu, D., Bischoff-Ferrari, H. A., Simmen, H.-P., Pape, H.-C., & Neuhaus, V. Higher age is a major driver of in-hospital adverse events independent of comorbid diseases among patients with isolated mild traumatic brain injury. *European Journal of Trauma and Emergency Surgery.* 2018;45(2), 191-198.
5. Silverberg ND, Gardner AJ, Brubacher JR, Panenka WJ, Li JJ, Iverson GL. Systematic review of multivariable prognostic models for mild traumatic brain injury. *J Neurotrauma.* 2015;32(8):517-526.
6. Yue, J. K., Cnossen, M. C., Winkler, E. A., Deng, H., Phelps, R. R., Coss, N. A., Sharma, S., Robinson, C. K., Suen, C. G., Vassar, M. J., Schnyer, D. M., Puccio, A. M., Gardner, R. C., Yuh, E. L., Mukherjee, P., Valadka, A. B., Okonkwo, D. O., Lingsma, H. F., & Manley, G. T. Pre-injury comorbidities are associated with functional impairment and post-concussive symptoms at 3- and 6-months after mild traumatic brain injury: A track-TBI study. *Frontiers in Neurology.* 2019;10.

7. Coffeng SM, Jacobs B, de Koning ME, Hageman G, Roks G, van der Naalt J. Patients with mild traumatic brain injury and acute neck pain at the emergency department are a distinct category within the mTBI spectrum: a prospective multicentre cohort study. *BMC Neurol.* 2020;20(1):315.
8. Cnossen MC, Winkler EA, Yue JK, Okonkwo DO, Valadka AB, Steyerberg EW, Lingsma HF, Manley GT; TRACK-TBI Investigators. Development of a Prediction Model for Post-Concussive Symptoms following Mild Traumatic Brain Injury: A TRACK-TBI Pilot Study. *J Neurotrauma.* 2017 Aug 15;34(16):2396-2409.
9. Roy D, Peters ME, Everett A, et al. Loss of consciousness and altered mental state predicting depressive and post-concussive symptoms after mild traumatic brain injury. *Brain Inj.* 2019;33(8):1064-1069.
10. Cnossen MC, van der Naalt J, Spikman JM, et al. Prediction of Persistent Post-Concussion Symptoms after Mild Traumatic Brain Injury. *J Neurotrauma.* 2018;35(22):2691-2698.
11. Sage NL, Chauny JM, Berthelot S, et al. Post-Concussion Symptoms Rule: Derivation and Validation of a Clinical Decision Rule for Early Prediction of Persistent Symptoms after a Mild Traumatic Brain Injury. *J Neurotrauma.* 2022;39(19-20):1349-1362.
12. Langer LK, Alavinia SM, Lawrence DW, et al. Prediction of risk of prolonged post-concussion symptoms: Derivation and validation of the TRICORDRR (Toronto Rehabilitation Institute Concussion Outcome Determination and Rehab Recommendations) score. *PLoS Med.* 2021;18(7):e1003652.
13. Lumba-Brown A, Teramoto M, Zhang R, et al. Multicentre evaluation of anxiety and mood among collegiate student athletes with concussion. *BMJ Open Sport Exerc Med.* 2023;9(1):e001446.
14. Rowe BH, Yang EH, Gaudet LA, et al. Sex-based differences in outcomes for adult patients presenting to the emergency department with a concussion. *J Neurosurg.* 2021;136(1):264-273.
15. Skandsen T, Stenberg J, Follestad T, et al. Personal Factors Associated With Postconcussion Symptoms 3 Months After Mild Traumatic Brain Injury. *Arch Phys Med Rehabil.* 2021;102(6):1102-1112.
16. Schneider ALC, Huie JR, Boscardin WJ, et al. Cognitive Outcome 1 Year After Mild Traumatic Brain Injury: Results From the TRACK-TBI Study. *Neurology.* 2022;98(12):e1248-e1261.
17. Cheever K, McDevitt J, Phillips J, Kawata K. The Role of Cervical Symptoms in Post-concussion Management: A Systematic Review. *Sports Med.* 2021;51(9):1875-1891.
18. Levin HS, Temkin NR, Barber J, et al. Association of Sex and Age With Mild Traumatic Brain Injury-Related Symptoms: A TRACK-TBI Study. *JAMA Netw Open.* 2021;4(4):e213046.
19. Mikolic A, Groeniger JO, Zeldovich M, et al. Explaining Outcome Differences between Men and Women following Mild Traumatic Brain Injury. *J Neurotrauma.* 2021;38(23):3315-3331.