

Table 1. Definitions of mild traumatic brain injury used and modifications made

Definition Number	Lead author	Original definition	Adjustments and Clarifications	No of citations*
<i><b>GCS Alone</b></i>				
1	Hollingworth <sup>31</sup>	GCS 13-15 and blunt head trauma Exclude penetrating injury	No change	5
2	Pentland <sup>32</sup>	GCS 13-15	No change	2
<i><b>GCS and Clinical Symptoms</b></i>				
3	Levin <sup>33</sup>	GCS 13-15 and LOC<30 min and closed head trauma Exclude: penetrating injury, present >24 hours since injury	LOC<30 min = LOC <5 min	31
4	Hawley <sup>34</sup>	British Society of Rehabilitation Medicine (BSRM) <sup>35</sup> : GCS 13-15 and LOC<15 minutes	LOC<15 minutes = LOC< 5 minutes	15 BSRM- 0
6	Halley <sup>36</sup>	GCS 13-15 and closed head injury and LOC/ amnesia <5 minutes Exclude: intoxicated or suspected non-accidental injury	No change	3
8	Babikan <sup>37</sup>	AIS 1-2: <sup>38</sup> 1: GCS 15 and at least two: nausea, vomiting, headache, dizziness or a concussion diagnosis which includes any of: diplopia, ringing in the ears, or seeing	1: No nausea, dizziness, diplopia, ringing in the ears or seeing stars 2: Considered 'some symptoms' to be the same symptoms as	11 AIS- 603

		stars symptoms usually disappear in the emergency room. 2: GCS 13-14 and LOC < 1 hour or some symptoms with or without skull fracture or no neurological deficits and level of consciousness and sensorium improving	outlined for criteria 1. LOC <1 hour= LOC >5 min 'level of consciousness and sensorium improving' = no deterioration in GCS	
7	Grubenhoff <sup>39</sup>	1) Isolated blunt head trauma <24 hours and 2) with altered mental state: isolated blunt head trauma <24 hours and: GCS 13-14/witnessed LOC (time undefined)/PTA Exclude: alcohol and open skull fracture	No change	6
4	Yeates <sup>40-44</sup>	Blunt head trauma and: LOC < 30 minutes or GCS 13-14, or at least two of the following symptoms: PTA, transient neurological deficits, vomiting, nausea, headache, diplopia, dizziness, disorientation, and other mental status changes (i.e., dazed, foggy, slow to respond, lethargic, confused, asks repetitive questions sleepy) Exclude: neurological deterioration	LOC <30 min = LOC <5 min "transient neurological deficits" = those resolved before discharge. No nausea, double vision or dizziness available. 'foggy and asks repetitive questions' = did not include  'dazed' = slow to respond or altered mental state. 'lethargic and sleepy' = drowsy	396
5	Tham <sup>45</sup>	GCS 13-15 and any period of transient confusion/disorientation/impaired	'transient confusion/disorientation' =	11

		consciousness. PTA<24h or neurologic or neuropsychological dysfunction	disorientated or PTA 'neurologic dysfunction'= neurologic deficits. 'neuropsychological dysfunction' unavailable	
10	Gagnon <sup>46-48</sup>	ACRM <sup>7</sup> : any LOC; 2) any loss of memory for events immediately before or after the accident; 3) any alteration in mental state at the time of the accident (e.g., feeling dazed, disoriented, or confused); and 4) focal neurological deficit(s) that may or may not be transient; but where the severity of the injury does not exceed the following: i) LOC of approximately 30 mins or less; ii) after 30 mins, GCS 13–15; and ii) PTA ≤ 24 hours	'any loss of memory'= PTA 'any alteration in mental state' = disorientated/altered mental state. LOC>30 minutes = LOC >5 minutes GCS 13-15 at arrival PTA >24hours = unavailable	124 ACRM-681
<hr/> <b><i>GCS, Clinical Symptoms and Neuroimaging</i></b> <hr/>				
11	Roncadin <sup>49</sup>	GCS (or children's modified GCS) 13-15 and loss/ disruption of consciousness <15 min and no neurosurgical intervention, and negative neuroimaging other than linear skull fracture	Loss/ disruption of consciousness <15 min = LOC <5 minutes/drowsiness	12
12	Anderson <sup>50-53</sup>	Exclude: inflicted injury, gun shot injury GCS 13-15 and no abnormality on CT/MRI scans and no neurologic deficits and altered consciousness	No change considered 'altered consciousness' = any LOC/drowsiness.	587

15	Blinman <sup>54</sup>	Exclude: neurologic/radiologic abnormalities, or suspected non-accidental injury GCS (or children's modified GCS) 15 and blunt head trauma and no focal neurologic examination findings and negative head CT scan. However CT only for: LOC/ amnesia/ headache/seizure/nausea/ vomiting/confusion/sleepiness	Confusion = disorientated Sleepiness = drowsy  No nausea	13
14	Spencer <sup>55</sup>	GCS 14-15 and with or without abnormalities on head CT scans	No change	1
13	Luis <sup>56</sup>	Exclude: penetrating injury GCS 13-15 and normal CT scan and neurologic examination findings, and absence of depressed skull fracture	No change	9
<hr/> <i>Clinical Symptoms Only</i> <hr/>				
16	AbdelMalik <sup>57</sup>	Grade 2-4 of 7 grade head injury system (Geyde <sup>58</sup> ) Grade 2: minor head injury and no LOC and no history of being stunned or dazed Grade 3: minor head injury with momentary LOC only or history of being stunned or dazed Grade 4: head injury with LOC more than momentary but less than 1 hour, and/or dizziness, confusion, and/or behavioral changes in the days following. AbdelMalik defined momentary as <2 minutes	Grade 2: Stunned or dazed =1 Grade 3: Stunned or dazed =slow to respond or altered mental state. 'Momentary LOC' = LOC 5- 5mins Grade 4: LOC = >5 min. Confusion= any PTA. No behavior change in days following or dizziness.	17 Geyde- 82

17	Korinthenberg <sup>59</sup>	LOC<1 min or not at all and ability to answer questions at time of admission and no intensive care admission or contusion/intracranial haemorrhage	LOC<1 min =LOC<5 seconds. 'ability to answer questions at time of admission' = not slow to respond or altered mental state	7
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GCS= Glasgow Coma Scale, LOC= Loss of consciousness, PTA= post-traumatic amnesia, AIS= Abbreviated Injury Scale, ACRM = American Congress of Rehabilitation Medicine, min= minutes \*citations sourced from PubMed