MTBO Injury Database Analysis
(2012-2018)

Summary

This is a short analysis of the MTBO competition injuries reported in the MTBO Injury Database. This analysis focuses on the accidents which happened between 2012 and 2018.

This set of 45 reported injuries over 7 seasons suggests that some of the preconceptions on high risk MTBO situations are likely to be myths.

- **Preconception:** Urban MTBO competitions are more dangerous.
  Data: Only 1 of the 45 reported injuries happened in an urban setting.

- **Preconception:** Injuries are caused by encountering traffic or loss of control.
  Data: The most frequent cause is hitting objects, second is map reading.

- **Preconception:** Highest risk is associated with two riders colliding on narrow paths.
  Data: The most serious injuries happened with single riders on narrow paths, and with riders colliding on wide roads (typically while map reading).

- **Preconception:** To reduce MTBO competition injuries organizers must do more.
  Data: Most injuries are the responsibility of athletes. Most accident situations are not competition specific, but inherent to riding a bike on terrain, reading a map while riding, and lack of situational awareness on wide roads.

This data shall help athletes to become more aware of high risk situations, like map reading on wide roads at high speeds. It should also help organizers, course setters and event advisers to finetune their approach to managing risk at MTBO events.

Please continue reporting injuries in the MTBO Injury Database. Thank you!

March 2019 MTBO Commission and Sandor Talas

Background

The MTBO Commission together with the MTBO Athletes Commission started to collect data on MTBO competition accidents and injuries in April 2016, including historic data.

MTBO is the orienteering discipline that inherently carries a higher level of danger and possibility of serious injuries due to high speed travel over unknown terrain in competition situations. Athletes and organizers accept this risk and consider it as part of our sport. Nevertheless, we have to try to work together and improve safety as much as reasonable by reducing controllable risk and preparing athletes to manage uncontrollable risk.

The objective of the data collection is to improve safety of MTBO competitions through fact-based advice to organizers, athletes and coaches on typical accidents and injuries. The data collection is voluntary. Names of the athletes involved are not shared.

Currently the database contains information on 45 unique accidents from events between 2012 and 2018. These are mainly from IOF elite events, but there are also some reports from national events and non-elite classes.

Due to the voluntary nature of reporting the database may help to identify patterns, but it is not suitable to identify changes in event safety over time.

Accidents by competition area

	Total	Terrain	Urban
Number of accidents	45	44	1

Urban competition settings were always considered more dangerous for MTBO events, yet only one accident (2 % of total) was reported from an urban competition. This may reflect a higher level of attention of both organizers and athletes, both during preparation and during competition.

Accidents by gender and number of riders involved

	Total	Single rider	Multi rider
Female	16	7	9
Male	29	22	7
Total	45	29	16

The gender split reflects the typical 2:1 ratio of men and women riders. It is interesting to note that while large impact multi rider collisions dominate collective memory, the reports suggest that single rider incidents, and especially male single rider incidents, are the most likely ones.

Multi rider incidents were categorized by the gender of the (more) suffering athlete. No clear explanation was found for the relatively high number of female multi rider accidents.

Accidents by competition format and number of riders involved

	Total	Single rider	Multi rider
Long	12	9	3
Middle	14	10	4
Sprint	8	4	4
Subtotal individual format	34	23	11
Mass start	1	0	1
Sprint relay	4	3	1
Relay	6	3	3
Subtotal mass start format	11	6	5
Total	45	29	16

The domination of accidents at individual start competitions (34/45) reflects the larger number of those competitions.

Multi rider accidents average close to 50 % in mass start formats (5/11), whereas in individual start formats 33 % of accidents (11/34) are multi rider accidents. Most multi rider incidents happened during individual start competitions (11/16 = 69 % of total).

Multi rider accidents during sprint may be related to typically higher rider density and higher demand on map reading during sprint competitions. The higher proportion of single rider accidents at Long and Middle competitions is probably related to rider fatigue.

Cause of accidents by riding conditions and number of athletes involved

	Total	Difficult riding	Single track	Wide road	Paved road	Junction	Off track	No info
Multi rider								
Traffic	9	1	4	3		1		
Map reading	6		1	5				
Unclear	1		1					
Subtotal multi rider	16	1	6	8		1		
Single rider								
Loss of control	8	3	3		1		1	
Hitting object	13		8	1	1	1	2	
Map reading	6	3	3					
Unclear	2			1				1
Subtotal single rider	29	6	14	2	2	1	3	1
Total	45	7	20	10	2	2	3	1

The cause of accidents was categorized as follows:

- Traffic (collision with other riders) – mainly riding on wrong side of road, cutting corners, no attention to others
- Map reading – anything that resulted after a head down position
- Loss of control – mainly downhill, over the bars after an endo, or due to washed out wheel
- Hitting object – mainly hidden objects (ditch, tree, stone) not noticed due to speed or misjudged

Riding conditions were categorized as follows:

- Difficult riding – mainly very rocky, very slippery or very steep situations
- Single track – narrow tracks, good rideability
- Wide road – forest road or gravel road where riders can pass at high speed
- Junction – any junction with steep turn, changed surface or low visibility challenge

Not all riders remembered details of their accidents, including cause and riding conditions.

It is important to note that almost half of the accidents (21 of 45) were caused by loss of control or hitting objects. These are inherent risks to competitive riding on unknown terrain. Due to the size of the area and nature of orienteering, organizers can make only limited effort to mark the most dangerous places like very steep downhills, hidden ditches or fallen trees.

Map reading, another inherent risk to orienteering, is responsible for 27 % of all accidents (12/45). This can be reduced only through rider education and training.

Traffic, responsible for 20 % of all accidents (9/45) is the only cause that could be managed partially by organizers by managing flow through course setting and marshalling highest risk junctions and crossings. Yet, this is an area where athletes also have to be more attentive especially when it comes to cutting corners and riding on the wrong side of the road.

Organizers should note that single track - single rider accidents form 30 % of all accidents (14/45). These are the accidents that are most difficult to learn about when they happen and most difficult to manage a rescue, if needed. During planning of events organizers have to consider their possible actions should something serious happen on single tracks.

Accidents by injury recovery time and number of riders involved

	Total	Single rider	Multi rider
No time lost	13	7	6
1-3 days	6	4	2
1-3 weeks	7	5	2
4-6 weeks	12	8	4
2-6 months	7	5	2
Total	45	29	16

Athletes' self-reported recovery time to ride again on terrain can be used as proxy for the severity of the injury, though this is a rough approximation. An athlete reporting a 2-day recovery time after a head on accident resulting in amnesia and overnight hospitalization may be considered more serious than bruises requiring over a week to heal.

Interestingly half of the reported multi rider accidents resulted in light injuries requiring no time lost to recovery. This may be due to a combination of higher likelihood of reporting multi rider accidents even without major injuries, and a level of higher attention of athletes in mass start competitions.

It should be also noted that really serious injuries were mainly the result of single rider accidents. This suggests that athlete education and training may be the key to improved safety record.

Injury recovery time by most common situations (31 cases)

	Total	Single rider - difficult ride	Single rider - single track	Multi rider - single track	Multi rider - wide road
Light	10	1	5	3	1
1-3 days	5	2	1	2	
1-3 weeks	4		2	1	1
4-6 weeks	7		4		3
2-6 months	5	2	2		1
Total	31	5	14	6	6

Single rider accidents on single tracks are the most common showing full range of injuries. These appear to be inherent to the sport. Typically, organizers can do very little to reduce these accidents beyond marking the danger points that could surprise riders on a given terrain.

It is notable that only 2 serious injuries were suffered under difficult riding conditions (steep, stony tracks). It suggests that riders can handle these situations when prepared. Only one of the two was due to loss of control, the other was an attempt to read the map.

It is interesting to note that the same number of multi rider accidents was reported on single tracks and wide roads, but the severity of injuries increases with higher speeds on wider roads. Raising the awareness of athletes of such situations seems to be the key action to reduce this type of accidents.

Should you have any questions about the injury database or the above analysis, please contact the MTBO Commission (mtbo.commission@gmail.com), or Sandor Talas (sandor.talas@gmail.com) for more details.

Please keep reporting MTBO competition injuries: MTBO Injury Database