



Nick Payne, hitting Thredbo's One Hit Wonder jump. On one jump a crash left him dazed but the scan test gave him the all clear. Photo: Colin Levitch

The Concussion Discussion

By Colin Levitch

Last season's One Hit Wonder didn't quite go according to plan. It happened to coincide with the Blizzard of Oz 3.0, where metres of snow fell, leaving 100 foot snow drifts off the jump and nearly burying the infamous OHW RAV4.

There were also a few mishaps with the athletes. Many may remember Italian rider Christof Schenk's catastrophic crash, over-rotating a double cork 1440 and landing directly on his head, knocking himself unconscious for several minutes – luckily after a trip to Coomera Medical Centre, he walked away with nothing but a sore neck. There was, however, another less spectacular crash just two days prior.

With so much snow, and the event venue essentially needing to be rebuilt from scratch, the athletes had no commitments other than to enjoy the pow. Out freeskiing, Hotham rider Nick Payne under-rotated a backflip, catching his tips and breaking the fall with his face.

Conscious but woozy, confused and quite dazed, after a bit of triage we got Payne down to the Thredbo Medical Centre to have him evaluated for a concussion. He passed the SCAT5, and 24 hours later, after a second evaluation, he was medically cleared to compete, going on to set the unofficial world record for most shifts on a single jump.

I'm about as far from a medical professional as you can get, but having experienced more than my fair share of concussions, the symptoms of Payne's confusion not knowing where he was, where he was staying and general instability on his feet. I couldn't help but wonder if Payne was cleared to compete despite being in a concussed state, or at the very least should have been prescribed a graded return to sport.

I relayed this story to Dr. Peter Braun, the Medical Director at the Olympic Winter Institute of Australia, who shared my suspicion.

"Obviously I can't make a definitive diagnosis not having been there, but what you described immediately afterwards, you used words to the effect of they were a bit groggy or unsteady. Straight away with that story, I would say concussion, or my antenna would be up and I'd be very highly suspicious that that would be a concussion.

"Besides the loss of consciousness, your next most useful sign of concussion is dazed, groggy or unsteady on their feet. It might only be for a few moments and then that person went to the medical centre and they passed the SCAT 5, but you can't exclude a concussion until you've observed what's happened over the first 24 to 36 hours."

Concussions have become a hot-button issue the past couple of years, with Chronic Traumatic Encephalopathy (CTE) dominating the headlines, and sporting leagues from the AFL to the NFL instituting new protocols in an effort to protect athletes' heads.

Unfortunately, head injuries have become part of the territory when it comes to freeskiing, and just about every athlete you speak with has stories of head trauma.

"I went skiing with my mum in the fog at Mount Buller and there was that old hand dug halfpipe. It was super foggy and the walls were a little sketchy – plus I didn't know how to ride halfpipe very well," former Olympian Anna Segal reflects on her first concussion. "I boosted off the

wall, landed right in the middle of the pipe and was fully knocked out.

"Ski patrol came to check me out. I don't remember this but for the recap from my mum, I got really angry, which is a common side effect when a person is concussed. Apparently, I was swearing and shouting at the patroller and wouldn't get on his sled and was telling him to 'get his dirty mitts off me', that one was pretty bad," she says. "I didn't remember anything and I just kept repeating myself for the next 24 hours."

Nick Goepper, the 2018 Olympic Silver Medallist, said he was in the Dew Tour in Snowbasin Utah, "I hit my head on a trick and I was knocked out for a couple minutes and started having little mini-seizures, I don't remember much of it," he says. "I came to, but as a precaution I was airlifted to the nearest hospital. I remember being in the helicopter and being like, 'What the hell is going on?' and then waking up in the hospital."

BRAIN BUSTERS

There are a lot of misconceptions when it comes to concussions and recovery, the most common Dr. Braun hears being that loss of consciousness is the main indicator of concussion.

"When you fall, forces can be transmitted through the brain through a direct impact to the head, but it can also be through indirect forces. You don't actually have to hit your head to get indirect forces to the brain."

"If there is enough force with acceleration or deceleration of the head, that can produce force transmis-

sion to the brain which can result in a concussion, like whiplash in a car accident,” he says.

The brain is a bit like an egg yolk, it’s padded by a layer of fluid like the eggwhite, with the skull acting as a hard protective shell. So your brain can slosh around, and when you land sideways and get thrown down into the snow, it’s that acceleration followed by the abrupt stop that’s so dangerous.

While concussions are serious injuries, they are less tangible than something like a broken arm or a torn ACL, and, as Dr. Braun points out, there is no definitive test to determine the severity of a concussion or whether a concussion is present at all in the black and white way an X-ray identifies a fracture.

“With concussion, we’re still in that early phase of using a descriptive understanding rather than having a specific diagnostic test,” Braun says. “We consider it to be an evolving condition, sometimes it’s obvious straight away.

“But I’ve had instances where you’re chatting with someone and half-an-hour or even a couple hours later, they just start rambling and not making sense, that might alert you to the fact that, ‘Gee maybe that was a significant transmission of force to the brain.’”

NO REALLY, I’M FINE

With descriptive tests like the SCAT5 being the main diagnostic tool for concussion, there are also baseline tests like ImPact and CogSport which are utilised by the Olympic Winter Institute of Australia (OWIA).

These baseline tests usually come in the form of a phone app and measure reaction time, memory capacity, speed of mental processing, and executive functioning of the brain; areas that are often affected by concussions and providing a more concrete gauge of the severity of a concussion and how an athlete is recovering.

When Segal suffered a concussion at the 2013 X-Games in practice, it was the CogSport test that revealed the severity of her injury.

“Practice had gone the best it ever had for me, I was killing it on the course. I came out of a blind-two on a little rail and caught an edge, I was on the ground for like 37 seconds twitching, I smashed my helmet and it

(the rail) was literally like two feet off the ground,” she says. “I went down to the ESPN medical team, and passed all the tests – they just said, ‘Take the rest of today off, and you should be fine tomorrow.’ But I knew I wasn’t fine. At that point, I had support from the OWIA. My health and wellbeing was being monitored really closely and I’d done the pre-concussion CogSport test.”

The OWIA told Segal that she needed to pass the CogSport test before she could compete. Despite passing the concussion protocol administered by X-Games medical team, the OWIA took a hardline stance, either she passed the CogSport test before she skied, or she was off the team.

“I had three days until I was set to compete and I failed three times. I’d be in a dark room all day just doing nothing and resting and then I’d try to do it at night, I failed every time. I knew I wasn’t right, I’d come out to the light and my head was still woozy, and if I looked at the TV screen I’d get nauseous. I was really mad at the time, but it was the best thing for me and I’m so happy that I had to go through that.”

In freeskiing today the athletes, especially those at top level, are under huge amounts of pressure from both internal and external sources to compete and do well, sometimes to their own detriment. Because concussions aren’t as tangible as a broken arm, it’s easier for them to downplay or hide symptoms and ski in an effort to reach their goals.

“Two seasons ago at the NZ Open one of the Korean athletes fully knocked himself out in the halfpipe on the last day of practice,” NSWIS rider Ryley Lucas recounts. “He had an American coach who was adamant that he shouldn’t compete, and he understood the dangers, but the Korean Federation and the athlete himself wanted to do it. So he competed the next day and KOed himself again.”

Even Segal, who is no stranger to injuries, admits to feeling this pressure.

“When I crashed at X-Games the Dakine team manager was there in the crowd, the K2 manager was there too, and I felt on fire. I was skiing so well and everything was lining up,” she says. “I didn’t get invited the next year because I didn’t have a result from the one before. It’s not like sponsors said to

me, ‘You should compete, we’re really looking forward to you competing,’ it’s more the pressure you put on yourself to perform to get the rankings.

“It’s a bummer and it’s really hard to put your health before your goals. When you’re really goal orientated you think you’re immortal, pretty much.

“It’s not like knee pain or a bruised heel that you can just push through, it’s your head. And if you hit your head, you’re more likely to hit your head again because your coordination and your reaction times are a lot slower.”

TIMES, THEY ARE A CHANGIN’

As we’ve learned more about concussions and head injuries, the attitude has changed. For a long time there was very much a ‘shake it off’ mentality towards getting your bell rung. Mike Douglas’s career as a pro has spanned the entirety of the freeskiing movement and while in his own observations the number of concussions are decreasing, the severity of these injuries also seems to be getting worse.

“I grew up in the ’70s and ’80s and it was all ‘shake it off’. I don’t remember anybody having concussion symptoms like a lot of riders today are having,” he says.

“When I was young the philosophy was, ‘You ok? Let me look at your eyes, yeah you look alright, you’re good to go,’” Douglas says. “And now I can probably count off ten people I know that have been down for months because of concussion, and in a couple of cases years – literally a two-year recovery, which to me is just incredible.

“In general, the body beatdown factor is crazy, beyond just concussions. When I look at what the kids are putting their bodies through, from 15-years-old to 20-years-old, and I compare that to what I was doing at that same age, good luck to a lot of them if they think they are going to be skiing and feeling good at my age,” he continues.

“It’s just purely the size of the features. These guys have so much more skill than I ever had, but at the same time the human body hasn’t evolved in one generation to take these massive impacts.”

Lucas is one of these riders who suffered prolonged concussion symptoms after a nasty crash in Breck-



Alex Brown is probably thinking about how he is now going to land without smashing himself. Fortunately he did without hurting himself. Photo: Colon Levitch

enridge that left him unconscious for five minutes. He was rushed to the hospital and underwent a CT scan as well as an X-ray on his collarbone to make sure everything was still intact, before being sent home and told to rest.

“I didn’t even know how I got home from the hospital or what happened that night,” he recounts. “At the time I’d just qualified for my first World Cup, and I don’t remember flying to Europe a week after the accident. I literally remember sitting on the train in the Swiss mountains and being like, ‘Ah, Switzerland.’”

After his big head knock, Lucas’s balance on his right foot was really bad, and he struggled to track objects with his eyes, which is key for air awareness and spotting your landing.

“In the sport that we do, any tiny brain malfunction or nervous system fault can create a huge difference and might expose you to a big risk of hurting yourself,” he says.

According to the British Journal of Sports Medicine, the vast majority of concussion symptoms dissipate two weeks after the injury, however a growing contingent of athletes suffer from lingering headaches, balance problems and other issues that don’t resolve on their own.

“They are starting to identify the axons of nerves, especially those that are long in length, may be affected by concussions,” explains Brett Jarosz, a sports chiropractor who has a strong practice interest and further education in neuro-orthopaedic rehabilitation. “One white matter tract (axons of nerves) in particular that has to do with eye movements and travels from the cortex of the brain down into the brain stem, is one of these longer pathways and some research is starting to show pathways such as these can be injured by concussions.

“The research suggests 80-to-90 per cent of concussions will tend to resolve in about 10-14 days in adults, but some of the new advanced neuroimaging technology is starting to show that the pathways being injured in concussion may not have fully recovered in this amount of time.”

When these axons are damaged, it affects the smooth flow of the messaging from the brain to particular parts of the body, a bit like how potholes can

impact the smooth flow of traffic down the street. Luckily the nervous system is quite plastic, and with treatment these problems can often be rehabilitated. But Jarosz is quick to caution that every injury is unique and, without the direction of a trained professional, generalised treatments can actually make things worse.

One of the potential long-term effects from concussion which has dominated the headlines is of course Chronic Traumatic Encephalopathy. With CTE being found in deceased athletes ranging from the NFL to ice hockey and pro wrestling, it didn’t hit home in the action sports community until the high profile death of BMX pro Dave Mirra, who was found to have the brain disorder.

However, while the research appears to show a correlation between concussions and CTE, both Braun and Jarosz are quick to point out that there has not been a definitive link proving that concussions directly cause the brain disorder – there is still a lot of work to be done before we can say there is a conclusive cause and effect relationship.

BRAIN BUCKETS, BASELINES AND MORE

So what can be done in an attempt to mitigate the risk of head injuries in skiing? Helmets are a good start, though they are not the ultimate solution.

“There was a time when I actually thought that helmets were more dangerous than going without one, but I don’t think that anymore because helmet technology has come so far,” says Douglas, who has worked closely with the helmet design team at Salomon.

“I’ve done enough research and talked to enough experts who have studied head injuries. Essentially what you’re trying to do is cushion the blow and the impact these injuries have on the brain. There are good and bad helmets out there, of course, but as a whole, I think they definitely help.”

Braun offered a similar sentiment. “Even though a few select studies show that there is not a benefit to wearing a helmet, when you look at the bigger studies that involve a meta-analysis, they have shown actually wearing a helmet does reduce the incidence of concussion and reduce the severity of head injuries.”

When it comes to the athletes, Segal is very much a proponent of baseline testing to ensure the best possible diagnosis and recovery.

“When you do get a concussion, even if it isn’t a major concussion, having a small concussion a number of times can lead you down a path of not being fully functional, which is pretty scary,” she says.

“I think everyone, whether it’s 12-year-olds competing in a slopestyle comp or the Olympic team, just as they have to sign a waiver to be part of a team or compete, they should have to do a CogSport test. It takes 20 minutes and it takes the liability off the coaches.

“If you ask a young kid after a crash, ‘Hey are you feeling dizzy?’ and the kid wants to ski, they will say, ‘No, I’m fine,’ and you can’t tell. I think having something like a CogSport or a cognitive computer test that every athlete on a team has to do, that would be a really good step in the right direction.”

Goepper, on the other hand, isn’t convinced mandates and protocols are the answer.

“I do think it’s important for athletes to educate themselves and make sure that they are doing what’s best for them, and at the end of the day it’s your body and you’re in charge.”

Jarosz also believes education is part of the equation, but a proper diagnosis and recovery are just as important.

“For me, one of the biggest things is raising awareness and making sure that everyone involved in that sport is aware and recognising this as a condition, and is putting the appropriate steps in place for the diagnosis, recovery and rehabilitation.”

At the end of the day ‘it’s your body and you’re in charge’, as Goepper points out, but you only get one brain. Skiing is an inherently dangerous sport, but there is more to life than skiing.

Segal’s mother put it best when giving her daughter a bit of tough love following an injury. “Think about the people that love you, because this is a really risky sport. If you incapacitate yourself, think about how heartbreaking that is for everyone around you.”