

## C. S. I. – Cycling Safety Issues

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A coach has to wear many hats when they work with athletes. There are always the usual expectations like developing practical training programs, physical testing, improving the athlete's mental outlook, bike handling skills, tactical knowledge and overall racing skills. They are also that nagging little voice that reminds you to remember to do all those boring basic things everyday. However, every so often a coach is asked to step beyond the expected realm and assist the athlete with more difficult problems. Every athlete hits a point in their career where they have a setback. It can be the result of physical or mental failure at a key moment in competition, or it may be the outcome of an accident. Setbacks can come in a variety of

sizes from minor to catastrophic. The old cliché about getting the rider back on the horse is often far more difficult than it sounds. It is one thing to immediately get back into the race when the cause of the accident is obvious, but quite another if the athlete was injured and doesn't know what went wrong. Simply getting back on the bike may do nothing to relieve the fear that it could happen again. This fear can be magnified greatly if the athlete has teammates counting on them in each event. Perhaps a look at a real case will make this clearer.

Collegiate Track Nationals is an event that many student athletes prepare for the entire racing year. All their training and racing revolves around making them better prepared for this one series of events. The pressure on the athlete can be increased if there are performance expectations added in. Living up to a past personal or team result may be a source of encouragement or stress to an athlete. The more experience the athlete has, the more likely they are to be encouraged by the challenge ahead.



Unfortunately that can all come apart if the athlete has a mishap. Crashing on a bicycle at any speed is at best an unpleasant experience. It can become something much worse if the athlete is seriously injured. The physical and mental recovery can be a long slow process as the athlete not only attempts to heal, but also deal with the various things that may have been the cause of the accident.

Things get even stickier if the athlete's mishap caused others, especially teammates to also get injured. There is a level of guilt that often goes along with such accidents, even if the athlete was not responsible for the crash.

Ken Nowakowski is the Team Director for the Marion College Cycling Team. Marion has had the distinction of being a top ranked school team for many years. So it was no surprise when he announced to his team that Collegiate track Nationals would be contested at the Major Taylor Velodrome, that the Marion College athletes decided to work extra hard to get ready. Laurel Stevens decided that it was big enough to focus her whole season on being ready for this event.

I first met Laurel when she was twelve years old and a beginner cyclist in Iowa. She got interested in the competitive aspects of the sport and in a few years was racing for the Pepsi Junior Cycling Team. Over the years of coaching her I watched her interest and determination grow. She went through the usual things cyclists go through and some far more difficult than most people ever go through. Each experience made her a little wiser and all the more determined. She grew interested in track racing and decided to follow in the footsteps of her personal hero, Rebecca Twigg. She even nicknamed her bicycle Twiggy.

Before she was finished with high school, she had already decided that she wanted to go to Marion College and race track. During the summer of her senior year in high school she went to her first track Nationals and on her way home stopped at Marion College to meet Ken and see the school. Most important, she wanted to see the Major Taylor Velodrome. The velodrome is the home track for Marion College and is located about one half mile from the campus. It is a 333 meter, concrete velodrome with a very wide apron and 28.5 degree banking. It is a well designed velodrome and has been the home of numerous National level competitions. Laurel fell in love with the track.

We flash forward to Collegiate Nationals and things are going well for the Marion Team. Laurel has been calling me daily updates on the team's progress. She also e-mails me pictures of the races. The last day of competition comes and they only have one more event to go; the Italian Pursuit.



It is an event similar to the Olympic Pursuit, in that two teams line up on opposite sides of the track. When the race starts, the athlete on the inside moves forward as quickly as possible. Each team member moves to their left and falls into a single file line behind the leader. At the end of each lap the lead athlete pulls off to their right and the rest of the team continues on until only one athlete remains. The first team across the finish line at the end wins.

Laurel's job in this event was to pull her team for the first lap and things started off well, with her team starting on the home stretch

going into turn one. Things suddenly fell apart on the back straight coming out of turn two. Laurel went over her handlebars, breaking her carbon fiber front wheel in half. The two teammates immediately behind her crashed as well, with one going to the hospital with Laurel. Despite the fact that everyone was watching, no one knew for sure what had happened. Not even the athletes riding right behind Laurel. Because she had been in the front and was the athlete who crashed first, it became a concern that Laurel must have done something wrong and lost control of her bicycle. In the days following this mishap, Laurel began to personally take the blame, assuming she had done something wrong which took down her teammates. As soon as Laurel was able to go home from the hospital, I drove to Indianapolis to find out what happened.

I went to visit Laurel with two goals; to find out what had happened and to get her back on her bike as soon as possible. The physical injuries were extensive and some of them were pretty bad, including a head injury. She had a narrow abrasion down the front of her left shin and a dark bruise about the size of a quarter on her left thigh just above the knee. In addition there were a variety of bruises everywhere along with small amounts of road rash on the left side of her face, both arms and one hip. The worst injury was on her left shoulder, where a hole was ground through her skin and went through part of her trapezius muscle just over the spine of the scapula.



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After looking at her injuries and talking to her for about an hour I

asked to see her helmet, skinsuit, glasses and cycling shoes. The skinsuit was badly damaged and had been cut off at the hospital. Her helmet was badly damaged from sliding across the apron of the track. She also had a pair of Smith sunglasses that were ground down on the left side and the bottom part of the frame had been split.

The glasses and helmet are shown here. Note the abrasion marks on the helmet that indicate the helmet was scraped from the top of the helmet towards the bottom. This made me think that at some point Laurel was sliding forward, head first and face down. The sunglasses have similar grind marks.



The last thing I looked at was her cycling shoes. Like many athletes, Laurel uses LOOK pedals and like many athletes she has a bad habit of walking around in her cycling shoes without covering the cleats. I have seen just about every kind of cleat fail.

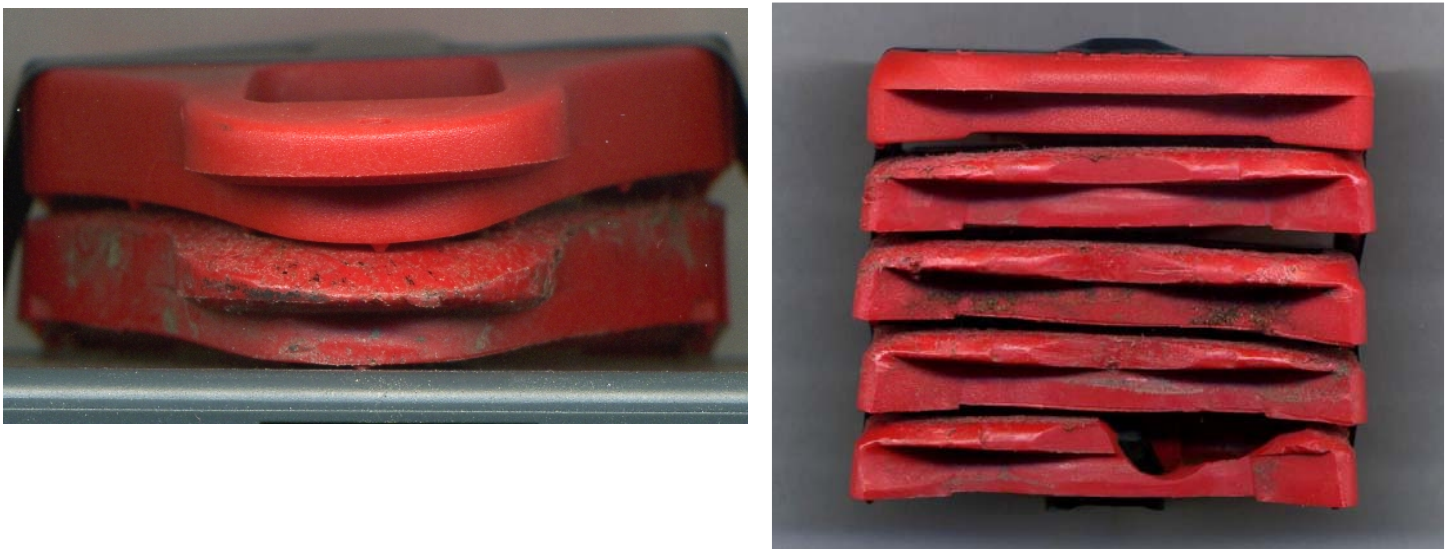
The main reasons for cleat failure are usually wear and damage to the cleat, or failure in the attaching screws. I examined both of her cycling shoes and found the cleats were both beyond their safety range. The cleat on the left shoe was shattered at the back and a large chunk was missing from the rear of the cleat. The cleat on the right shoe was missing a screw.

The cleat on the left is an unused aftermarket LOOK Arc Cleat. Note the condition of the pedal contact surface and the molding imprints. Every detail can be clearly seen. The cleat on the right was the shattered cleat I removed from Laurel's left shoe. The front of the cleat was worn badly at the point where it contacts the pedal.



Note the worn bottom surface and large chunk missing from the lower right section.

The two cleats on the left below show the difference between the front of a new cleat and the front of a worn out cleat. Note the dramatic difference between the new cleat and the worn out cleat. The tab which holds the front of the cleat into the pedal has been badly ground down and is now severely weakened.



The stack of cleats at the right shows the gradual stages of wear at the rear of the cleat until the cleat reaches the point of complete failure. The cleat on the top of the pile is brand new. The worn out and broken cleat at the bottom of the pile is the one I removed from Laurel's left shoe. Note that the wear shown on these cleats is not on an inner surface that contacts the pedal, but on a surface that would be in contact with the ground when walking.

After looking at all the injuries, the helmet, sunglasses and clothing, and talking to Laurel and members of her team I came up with the following thoughts about the crash.

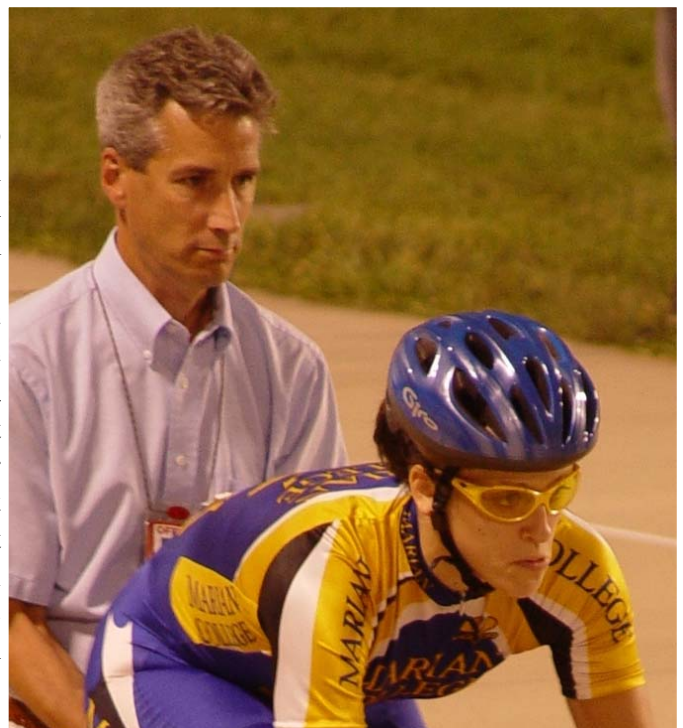
Going into the last event, the Italian Pursuit, Laurel had been using a seriously worn pair of Look cleats. As the starting rider for her team, her job would have been to bring the entire team up to speed as quickly as possible. Going into the first turn the entire Marion College team would be standing on the pedals and accelerating into a single line behind Laurel. As the team continued into turn two they would all be lined up in the sprinter's lane, still standing on their pedals and accelerating.

Now one of the skills Laurel had been practicing for some time was making a smooth transition from standing on the pedals to being seated, without losing her forward momentum. As she entered the straight on the far side of the track, Laurel would have begun to make her transition to being seated. This is what I think happened next.

Laurel had practiced pulling up with her left foot while she slowly pushed herself down onto the saddle. The idea was to keep the pressure on the pedals without causing the bike to move down the track toward the apron. The pressure on the left crank arm would tend to move the bike slightly to the right, while the shape of the track itself would work against the bike actually moving to the right. I think that this upward pressure was enough to finally break off the back of her left cleat. This would have immediately released her left foot from the pedal and thus cause her left leg to fly forward into the handlebar. The small round bruise on her left leg was almost exactly the same size as the plug on her handlebar. Once her leg hit the handlebar it would have caused her to turn the bars to the right. Since her left leg was no longer attached to the pedal, it would continue forward into the wheel. This would explain the long thin abrasion on the front of her left leg probably caused by the front tire rubbing her leg.

The next thing that probably happened was the front wheel would have bounced into the air. If the wheel was turned at enough of an angle, it would no longer want to roll forward, but would slide sideways in the direction of the momentum of the bike. The friction between the rubber of the tire and the surface of the concrete would cause the wheel to stop turning immediately. I would guess that given the speed at that moment and the weight of Laurel's body bearing down on the front of the bike, that this is what had caused her Zipp Front wheel to snap in half.

Once the wheel broke, Laurel was thrown face first onto the surface of the velodrome. This would explain the depth and direction of the abrasions on her face, helmet and sunglasses. In the photographs of earlier races I got from Laurel, she is shown wearing her sunglasses with the earpieces under the straps of her helmet. I always advise athletes to wear their glasses with the earpieces on the outside of their helmet straps. That way in the event of a crash, the glasses can fly off the athlete's face. I think part of the reason why she had such bad cuts and bruises on her face was because the glasses could not fly off when she hit the concrete and dug into her face. I also feel at this point she must have flipped or rolled over and slid forward on her shoulder, which caused the grinding injury. When she finally came to a stop, she was lying with her feet forward in the direction of travel, flat on her back.



After discussing the various aspects of this possible explanation with Laurel, I spoke to Ken Nowakowski and a few of Laurel's teammates. They remembered several things happening that night, but two of them especially remembered a sound similar to someone clicking out of their pedals at the moment of the crash. The fact that Laurel's shoe had a broken off cleat on it convinced everyone that the cleat had indeed been the cause of the crash. Having a reasonable explanation that made sense to everyone not only helped Laurel to deal with the crash, but helped her teammates as well.

At the beginning of this story I mentioned the fact that a coach sometimes has to help an athlete get over a setback. I have seen Laurel overcome extreme problems that would have finished most athletes. She has been able to recover from injuries both physical and emotional, but they had always been her own injuries. This time the burden that weighed the heaviest in Laurel's mind was the fact that a simple, careless habit had caused not only her injuries, but those of her teammates. It caused her to doubt herself and even when she was back on her track bike, she still had great difficulty riding in a group at speed. It took her almost a year to feel comfortable in a pack on the velodrome again. We had a lot of talks during that time. Some of them were the usual coach/athlete discussions, like racing, training and equipment set up. Then there were the long ones about attitude and confidence. Over the years I think the thing that strikes me the most is how even the best athletes can sometimes doubt themselves. When you deal with experienced athletes, most of the time you don't really have to tell them a lot about training, but you do spend a lot of time reminding them who they are and how they got there.

If there is any other lesson to be learned from this, it is taking proper care of all your equipment. No matter how inexpensive or simple that equipment might be. A single screw, if left to rust or loosen, can cause terrible consequences. The basic bike care steps are still critical, no matter how advanced or talented an athlete may be. Even if you are a professional athlete with a team mechanic looking after your bike, you still need to keep an eye on things. So look after yourself, look after your team and keep your equipment safe.