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The Flash of the Blade

As speed demons on skates carve up the ice in Sochi, Emily Beers explains the differences between short- and long-track speed-skating events.

By Emily Beers

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Matthew Stockman/Getty Images

In short-track racing, taking a sharp corner at 30 mph requires skill, courage and sometimes a little bit of luck.

1 of 9



One of the most famous medals of the 2002 Salt Lake City Winter Olympic Games was Steven Bradbury's iconic gold in the 1,000-m men's short-track event.

The Australian veteran had competed in three previous Olympic Winter Games, but he was not expected to win a medal in Salt Lake City. In fact, Bradbury only snuck out of his quarterfinal race after Canadian Marc Gagnon was disqualified for obstructing another skater.

During his semifinal, Bradbury hung out behind the other skaters because he knew he wasn't as fast. When three other top competitors crashed, Bradbury glided to the line, finishing second and earning a spot in the final.

So there he was in the final with the likes of favorite Apolo Anton Ohno. Lap after lap, Bradbury hung out behind the

pack, way off the pace of the top skaters. But with 50 m to go, all four of the other athletes collided while jostling for position, ricocheted off the boards and ended up in a four-man pileup on the ice.

Bradbury, who was 15 m behind the group, avoided the crash site and cruised to Olympic gold, while the others frantically tried to get to their feet and find their way across the line to collect the silver and bronze medals.

Bradbury's improbable victory had a lot of people shaking their heads and comparing short-track speed skating to a roller derby on ice. And many others who watch long-track races once every four years don't understand the effort required when hunched-over athletes employ giant quads to cruise around the track at speeds over 40 mph.

With both the short-track and long-track competitions in full swing in Sochi, speed-skating expert Barry Publow takes a closer look at the finer points of both disciplines, dispels the common misconceptions and talks about their connection to inline speed skating.



Jamie Squire/Getty Images

What goes around comes around: Steven Bradbury falls in the heats of the 1,500-m event in the Salt Lake City Olympics in 2002. In the 1,000 m, he won gold after the other skaters fell.

Short Track: All in the Game

Barry Publow is a speed-skating athlete and coach, as well as an exercise physiologist and the author of *Speed on Skates*, the only book in the world dedicated to both inline and ice speed skating.

Publow has worked with many Olympic speed skaters over the years, including 2010 Olympic short-track champion Olivier Jean of Canada and American long-track Olympian Jilleanne Rookard, both of whom will compete in Sochi.

Publow has been researching human movement through speed skating for many years. It's his passion, and he's willing to share his knowledge with anyone who wants to learn how to go fast on skates.

**“When you look at it statistically,
the crashes are very rare.”**

—Barry Publow

Although his love for the sport is unmatched, Publow understands why the general public gets frustrated watching top short-track athletes take each other out in Olympic finals. He understands why many people think short track involves too much luck. But Publow explained that such collisions—and the Bradbury story in particular—are not always representative of the sport.

“Bradbury was half a lap behind and wasn't in contention at all. That situation is pretty rare,” Publow said.

What's more common is for evenly matched skaters to bunch up, so the race becomes incredibly tight and victory is up for grabs. It's these tight races that lead to high-speed jostling for position, disqualifications and collisions.

“It's not uncommon for the lead skater to crash, and the worst part is because they're so close in speed, when someone falls, they almost always take out someone else,” he said. “But when you think about it, considering how many laps they do in training, plus heats, semis and finals, when you look at it statistically, the crashes are very rare.”

In fact, Publow believes collisions are more frustrating for confused viewers than they are for the skaters competing.

SHORT TRACK VS. LONG TRACK

EVENTS

Short-track individual events at the Olympics range from 500 to 1,500 m, while long-track events are 500 to 10,000 m long for the men. The longest women's event is 5,000 m. Short track also includes a 5,000-m relay event for the men and a 3,000-m relay event for the women, while long track has a pursuit event, in which three athletes work together as a team, much as they do in pursuit races in cycling.

FORMAT

In short-track events, four to six athletes race head-to-head, jostling for position and often bumping into each other on tight corners. Athletes advance from heats to quarterfinals, semifinals and finals based on their placing in each race. In a long-track race, on the other hand, only two athletes race at a time, and each athlete skates in his or her own lane. The 500-m winner is decided by adding the times from two races, while all other individual distances do not involve heats. The pursuit races involve quarterfinals, semifinals and finals.

TRACK

Short-track takes racing place on an international-size hockey rink. The circumference of the track is 111 m, while the long track is a 400-m oval.

ATHLETES

Generally speaking, short-track athletes tend to be smaller and more compact because a larger mass can be a disadvantage when going around tight corners. On the oval, long-track sprinters often look like large, muscular rowers, while middle- and long-distance skaters benefit from being taller, longer and leaner.

BLADES

Exact blade length depends on the athlete, but most Olympic long-track blades are between 17 and 17.5 inches long, while short-track blades are up to 18 inches long. Long-track blades are also slightly thinner. The biggest difference is that short-track blades are fixed to the skate at both the toe and heel, while long-track athletes wear “clap blades,” which allow the athlete's heel to rise while the blade remains on the ice. This allows the athlete to more efficiently transfer power.



Matthew Stockman/Getty Images

With athletes evenly matched in most races, tight packs of skaters jostle for position. One mistake can drop you from first to last or send you tumbling out of the race.

"It's frustrating if the crash is a result of someone doing something high risk, but when you're going around a corner at a tight radius at 30 mph, even the best skaters in the world, a tiny little imperfection in the ice and—boom—they're down or get taken down ... It's just part of the sport," he said.

Another thing that's just part of the sport is being disqualified from time to time. For all distances in short track—500, 1,000, 1,500 and 3,000 m—skaters take off in a mass start. And in most international competitions, including the Olympic Games, skaters must finish in the top two in their heat to move on to the next round. Tension tends to be high in the fast-paced sport, and positioning is everything.

There's a chief official in charge of making sure all skaters follow the rules; he's in charge of disqualifying athletes who commit passing fouls that hinder another skater. An example of a passing foul is called "charging the block," which occurs when a skater passes on the inside of a

congested area in a corner. In a race, the lead skater always has the right of way, and the skater who overtakes another is essentially responsible for any collision that occurs as a result. If a slower skater gets lapped, the chief official may signal that skater to move to the outside of the track to prevent impeding the others. If he or she is lapped again, the athlete is removed from the race.

A second faux pas is for a skater is to "change lanes" at the finish, though no lane markers appear on the ice. Competitors are supposed to travel in a straight line from the final corner to the finish line. Veering off line to maintain position—cutting someone off—can result in disqualification.

Short-track relay events are even more chaotic. Watching them can make you dizzy and confused. But there's a method behind the madness of sharpened blades churning about a hockey rink at high speed.

Relays—5,000 m for men and 3,000 for women—usually involve four teams of four skaters, and each skater must take at least one turn on the track. Generally, skaters will follow a rotation that allows each a chance to maximize his or her speed before passing off to a fresh teammate.

No baton is passed between skaters; instead, the incoming skater must be tagged by the current skater before he is allowed to enter the race. Often, the incoming skater crouches and receives a push from a teammate before tackling the track. To avoid congestion at the end of the race, the final two laps must be skated by the same athlete.

As you might expect, short-track speed skating requires a ton of strength, speed and stamina training in addition to regular technical work on the ice.

Publow explained that the competitive short-track season is generally from October to March, while the late-spring and early summer months are for offseason training for strength, endurance and power. Two of the main priorities

during the offseason are maintaining and building aerobic fitness as well as anaerobic conditioning. Speed skaters—both short and long track—tend to do a lot of cycling during the offseason to build that base.

On top of this, training for speed and power is also very important. Plyometric training, Olympic weightlifting and squat work are generally incorporated into the athlete's routines.

"Lots of power clean, lots of squats, as well as squats involving lateral movement," Publow said. He explained that most of their weight training is done with free weights: barbells, dumbbells and kettlebells.

But it's not only the legs they need to work. Publow said many athletes are on year-round upper-body strength programs. Upper-body strength is required at least partially because of the physical nature of the sport, and athletes need to be able to hold their ground when they get bumped at speeds of 25 mph with sharp blades under their feet.



Jamie Squire/Getty Images

On the oval, speed skaters use precise technique to maintain speed. Their fluid, powerful movements often obscure the stress they're under as lactic acid builds up in the muscles.



Jasper Juinen/Getty Images

World record holder Cindy Klassen (right) leads Maria Lamb in the 5,000-m event at the 2010 Olympics. The race is the longest of the Olympics for the women, and it takes top athletes about seven grueling minutes.

A 10,000-M Squat

Close-quarters battles for position, collisions and multi-athlete pileups are not a part of long-track speed skating, though falls can happen on the larger ice surface, too. Long track is a simpler sport in some regards but comes with its own gross misconceptions.

Watching long-track speed skaters compete is incredibly deceiving. It looks like they're simply not trying that hard, as if they're gliding effortlessly on perfectly treated ice. But the reality is these large-legged athletes are in significant amounts of pain, with lactic acid filling their muscles for the duration of the race. While this might not sound so grueling for a 35-second 500-m sprint, long-track events of 5,000 and 10,000 m have athletes suffering in the range of six to 13 minutes.

Publow, a former high-level hockey player, said long track is the most deceiving sport he's ever participated in.

"Imagine holding a static squat and exploding, and then dropping back into the squat again and staying there for the entire race," he said.

"Imagine holding a static squat and exploding, and then dropping back into the squat again and staying there for the entire race."

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What makes it so painful, Publow explained, is the fact that the body's blood vessels get completely closed off as a skater holds a squat position, so there's limited blood flow to the muscles for much of the race. That means lactic acid builds up, causing discomfort and threatening to limit performance.

"Once the lactic acid sets in, it screws up your neuromuscular coordination, and this affects balance, as well. So the best skaters are the ones who can keep their technique

and their balance ... the ones who can maintain proper alignment even when the muscles are drowning in lactic acid," he said.

"As far as localized muscle pain, there's nothing that compares," Publow said.

And the longer the race, the worse the lactic-acid burn. The world-record time for the men's 500-m sprint is just 34.03 seconds (Jeremy Wotherspoon), but the men's 10,000-m race lasts closer to 13 minutes, with a world record of 12:41.69 (Sven Kramer). The women's 500-meter world record is 36.36 seconds (Lee Sang-hwa), while the 10,000-m world record is 13:48.33 (Martina Sáblíková). The women's 10-km race is not contested at the Olympics.

Generally, athletes specialize in sprints, middle-distance or long-distance races. Body type and physiology recommend athletes to sprints or distance events much the same way a 100-m runner is clearly not suited for a 10-km race.

The challenge with getting into long-track speed skating is its relatively low accessibility compared to other sports such as basketball and soccer. While the sport is much more popular in certain countries in Europe—such as the Netherlands and Norway—long-track venues are hard to come by in North America.

There are only a handful of long-track venues in the United States today. In fact, the Netherlands alone has more facilities than all of North America. Even the oval used for long-track speed skating at the 2010 Olympic Games in Vancouver has been repurposed for court sports, hockey and other activities.

Roller Speed Skating: The Foundation for Modern Speed Skating

In 1993, American roller speed skater K.C. Boutiette hung up his four-wheeled skates, got off the asphalt and turned his attention to the ice. He successfully made the transition from roller speed skating, also called inline skating, to ice speed skating and competed at the 1994 Winter Olympics in Lillehammer, Norway.

By making the transition from wheels to blades, Boutiette essentially paved the way for other inline speed skaters to make the switch. Derek Parra, Jennifer Rodriguez and Joey Cheek—all American speed skaters—followed Boutiette's lead and got on the ice. Between the three of them, they took home five Olympic medals in long-track speed skating in Salt Lake City in 2002.



Skating expert Barry Publow works with inline athletes, but he's equally comfortable on the ice.

Courtesy of Barry Publow

After that, the trend continued, and the early 2000s saw more and more roller speed skaters quickly transitioning to the ice—and finding success. Even Olympic short-track star Ohno came from an inline-skating background. American inline skater and world-record holder Chad Hedrick saw Parra win his medal on TV and decided to make the switch as well. A few years later, he won the title at the 2004 World Allround Speed Skating Championships. He won three medals—including gold in the 5,000 m—at the Turin Olympics in 2006, and he took another two in Vancouver in 2010.



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***Athletes compete in the Central American Games in San José, Costa Rica, in 2013.
Inline skating is extremely popular in the region, especially in Colombia.***

Clearly, inline skaters could make the jump.

The sport of roller speed skating has been around for many years; world championships in the sport date back to the 1930s, but it hasn't gained huge notoriety in very many countries. One exception is Colombia.

"It's huge there. There are crowds of 10,000 at some competitions ... second to only soccer," Publow said of the South American country's love for roller speed skating.

Most major competitions for inline skaters, such as the World Championships and the Pan American Games, are races on 200-m tracks with slightly banked corners. Racing distances range from 300- and 500-m sprints to 1,000- and 1,500-m middle distances. At the far end of the spectrum, 10- and 20-km pack races feature up to 40 athletes racing at once. These pack races look very different from 300-m sprints, which are raced solo, and 500-, 1,000- and 1,500-meter races, which are raced in groups of five to seven.

There are also road races, and common distances include the 21-km half marathon and the 42-km marathon race.

Roller speed skating looks similar to ice speed skating, and in spite of some technical details, the sports are similar enough to allow athletes to find success in both.

Outside of Colombia, inline skating generally offers little funding and very few opportunities each year and bestows little prestige on great athletes, according to Publow. Ice speed skating, on the other hand, is an Olympic sport. There are greater opportunities in both short- and long-track events, more funding and more glory. Once inline skaters realized they could make the transition to the ice in just a year or two, the switch made even more sense.

Getting athletes from the asphalt to the ice is where Publow has had the greatest impact on his sport. After spending many years researching the human body and the sport of speed skating, he understands all the minor technical nuances—such as body angles—required for the sport. And he's able to distinguish the tiniest technical details in both sports.

"To the untrained eye, the technique looks identical (between inline skating and speed skating), but there are

a lot of small fine-tuning finesse things and small changes in body movements that an athlete has to learn how to make," Publow said.

"The physical mechanics of a thin, hard, flexible blade (are) very different than separated wheels on asphalt. There are small changes in timing, in body position and in balance that athletes have to learn," he added.

As more and more inline skaters tried their hand on the ice, Publow decided to share his knowledge with them. He started running weekend training camps in Lake Placid, N.Y., for athletes who wanted to make the switch.

From recreational skaters to Olympic hopefuls, Publow worked with anyone who wanted to learn. And what he found was the inline skaters had a special knack for speed skating on ice—to the point that they are often more talented than skaters who have spent 10 years in the sport.

"Inline speed skaters don't tend to specialize in sprints or long distances, but speed skaters do. So you have all these inline speed skaters coming to the sport, and instead of taking 10 years to figure out if they should be a sprinter or a long-distance athlete, they usually show that in a year or two years they know where they'll specialize," Publow said.

"They come onto the ice more well rounded than athletes who begin on the ice," he added.

There has to be some truth to Publow's theory: today, two-thirds of the top North American short- and long-track speed skaters—including many members of the U.S. Olympic Team—started out on four-wheeled inline skates.

Beyond the Olympic Oval

CrossFit athlete Jennifer Morris, 43, insists you can start speed skating in your 20s with no intention of ever going to the Olympics and still get a ton of value out of it. That's what she did.

Morris had been skating her whole life but only began ice speed skating as an adult. She attended one of Publow's camps and spent a good deal of time competing as a masters athlete in both short- and long-track speed skating.

Today, she spends her time coaching and training at CrossFit Altitude in Burlington, Canada, but her speed-skating memories are alive—especially the ones made on the long track.

"In short track, my performance was so dependent on what others around me were doing. So much was out of

my control. But in long track, it's just you and the clock and going after it yourself," Morris said.

"When you get on those skates and you realize how fast you can go, it's awesome. I love that feeling of speed," she added.

Morris is exactly the type of athlete Publow likes to work with. He has helped coach and train many Olympic ice speed skaters, but it's the masters athletes, the weekend warriors and even the athletes who never plan on competing that he enjoys training most. He can relate to those who simply love to train.

Publow treats the weekend warrior the same as an elite skater. Although they are often busy, career-oriented parents with just a little spare time to train on the weekends, their workout regimen and training plans look the same, just with less volume.

"The volume and intensity are highly scalable. But most athletes I coach want to 'train just like the pros.' So structure is identical, as is periodization . . . Most of them crosstrain—weights in the winter, cycling in the summer," Publow said of his clients, some of whom race in competitions, while others choose just to train for the physical and emotional benefits it gives them.

"It's about the process, the preparation. I love the training. I don't know whether I love training or competing more, to be honest," Publow said. "You don't have to compete to be an athlete. You just have to have a passion to be the best you can be. You don't even have to have good genetics."

He added: "You can still follow the same path that the top guys do. That's what I love about the sport."

The Olympic short-track competition runs Feb. 10-21 in Sochi, and the long-track events run Feb. 8-22. On the oval, only one distance is contested each day, with the pursuit events for teams held on the last day of competition. Exact times and a full schedule for the Olympics can be found on the [Sochi 2014 website](#).



About the Author

*Emily Beers is a **CrossFit Journal** staff writer and editor. She competed in the 2011 Reebok CrossFit Games on CrossFit Vancouver's team, and she finished third at the Canada West Regional as an individual in 2012. In 2013, she finished second in the Open in Canada West.*