INDOOR CYCLING ASSOCIATION

Audio Master Class

The Anatomy of a Sprint Ride

A Training for Sprinters

Created by **Bryon Black**
Training Type: **HIT**
Working HR Zones: **Zone 3 to Zone 5b**
Total Class Length: **60 minutes**

Profile Description

This ride differs from what we would normally consider a Tour de France profile. During Le Tour, many indoor cycling instructors will simulate a real Tour stage. I know I have set out on this mission—in late June or early July, I want to share all my love and passion for Le Tour with my indoor cycling students/clients.

Often, I will try to mimic the terrain of a particular stage in a condensed, compressed format. While it is fun to share my love and passion for this amazing event, the end result for me falls a little short, especially during the first week, where the stages are flat and there are only a couple of intermediate sprints and then a final sprint in each stage. If you try to actually compress a flat sprinter's Tour stage, you end up with about 50 minutes of riding tempo and three 30-second sprints, which adds up to a dull profile. I have taught this exact type of profile many times and no matter how I try to tweak or enhance it, it just does not have enough structure or engaging elements to make it meaningful and memorable.

Instead, we will delve a little deeper into the anatomy of the actual sprint. This profile does not mimic a Tour stage; it is a very typical training or workout for a sprinter, and it does deliver a whopper of a training session. The actual training is deeply intense, and I have had students discover a more realistic view of the art of sprinting after completing the training.

The meaty part of the Anatomy of the Sprint profile is composed of 20 full-gas, HIT sprint efforts, separated by a short, "almost adequate" recovery. The Anatomy of a Sprint profile gives the student a deeper understanding of how a stage-ending sprint is executed by revealing the three main components of the sprint and then having students execute up to 20 repetitions of the sprint effort.

Sprinting

Sprinting is the arena where the most colorful, powerful, and fastest men and women on bikes ply their trade. The sprint in a Tour stage is the climax or culmination of the stage.

The sprint is very short in duration, done over a very short distance, and it is violent and powerful. Most of all, the sprint is decisive, where the winner of the stage is determined, often by the difference of a width of a bicycle tire, or a few thousands of a second.

Most Tour stage final sprints are about 300 meters or less in length and last about 20 seconds. This happens after 150 or 200 km of road racing.

The Sprinters and Their Teams

In the cycling jungle, the sprinter plays the role of the cheetah. Like the cheetah, sprinters are all about going warp-speed fast for short distances. They have the ability to pedal their bikes in an all-out sprint and hit 45+ mph on a flat road. Sprinters also have the ability to accelerate to this speed from a rolling 30 or 35 mph up to 45 mph in a short 100 to 150 meters and will turn the pedals at over 120 rpm. This type of acceleration is very powerful, and from a power perspective, a sprinter like Peter Sagan or Mark Cavendish will hit wattages in the area of 1800W for a period of 20 seconds.

Sprinters' physiques are different than those of other bike racers in that they have a more sturdy build and look bigger and more cut than their climber counterparts. Their leg muscles are generally much larger and in some cases more developed than the other team members like the climbers or GC (general classification) contenders. Perhaps the notion that cycling makes your legs bigger came from someone who has seen a lot of sprinters, because in general sprinters do have much larger and more muscularly developed legs. Sprinters also have a more developed upper body, which is used to help stabilize their balance while sprinting out of the saddle and to help create leverage and additional power with their arms and upper body.

As a side note, that type of muscle development is not an accident. It's the result of resistance or weight training in the gym and some very sprint specific genetics from Mom and Dad; it is not mainly due to riding six-hour training rides or doing training rides on an indoor trainer or spin bike.

While the above description is a generality, sprinters really do come in all shapes and sizes. For example, in the current pro peloton, sprinters like Mark Cavendish are short and stocky; Peter Sagan has a medium sinewy build; and Gerald Ciolek, and Marcel Kittel are much larger-framed, muscle-bound bike racers. Hall of fame sprinters like Palo Bettini, Alessandro Petacchi, and Mario Cipollini were are also a variety of shapes and sizes. Regardless of their physical size, all of these sprinters have the physical goods to deliver the knockout punch when it comes time to sprint for the finish line.

So while sprinters, like cheetahs, can ride very fast, it comes at a cost. Since cheetahs have really keen eyesight, they don't have to waste a lot of energy following and stalking prey. They instead find a nice spot in the shade or tall grass to hang out, then watch for something tasty to show up. When something tasty does show up they quietly spring into action, stalk their prey, and run it down using an all-out effort of power and speed to catch their next meal. After this all-out effort the cheetah is pretty much spent. They dine on some tasty gazelle or antelope and then take a nap, followed by hanging out and recovering for another day's hunt.

The sprinters will hang out in the peloton all day, staying out of the wind, following the steady wheels of their teammates, conserving energy until it is time to go on the hunt for a stage win or an intermediate sprint. As the sprint unfurls, the sprinter will quietly start to assemble their lead-

out train of teammates or try to hitch a ride on another team's lead-out train, and then wait in the draft as the speed of the peloton dramatically increases on the approach to the intermediate sprint or finish line. With about 500 meters to go, the sprinter is nearly at full speed and is ready to press the launch button when they get inside of the 300 meter mark; then, with an all-out, rocket-powered effort, they explode toward the finish line with the hope of being first. After an intermediate or mid-race sprint, the sprinter goes back to energy conservation mode and hides in the draft of the peloton. If the sprint was the actual finish of a stage, the sprinter immediately starts on recovery for the next day, which to large degree is composed of simply resting.

Cheetahs also have the ability to turn and switch direction while at full speed. As their prey tries to elude capture by switching directions, the cheetah switches direction easily and can slow down and accelerate up to top speed very quickly. Sprinters are also cheetah-like in that they are consummate bike handlers. They have an uncanny knack for getting their bikes through the tiniest of spaces, around corners at top speed, to change directions or jump to other wheels as their path to the finish line becomes blocked by slower riders. Sprinters also have the ability to ride aggressively and decisively in very tight quarters, sometimes elbowing or head-butting riders next to them to get better position all while rolling at 40+ mph.

While sprinters are perhaps the fastest riders in the peloton, they do have their weaknesses. Their main weakness is the inability to climb steep hills and mountains as fast as the other riders in the race. On the steep mountain stages of a grand tour like the Tour de France, sprinters will often just barely finish inside the prescribed time limit, many minutes behind the leaders. This is due to having much more muscle mass, which on the bike equals weight; the sprinters struggle to remain in contact with the much lighter climbers and GC contenders when going up steep hills for long periods of time.

The twenty teams of the TDF are composed of nine men. Each team comes to Le Tour with a specific plan. Some teams will come with the goal of winning the overall general classification. They will bring nine riders with specific skill sets or talents that will be helpful in attaining the goal of winning the overall championship. Other teams will come to Le Tour with a specific plan to contest and win as many sprint stages as possible. Those teams perhaps do not have a rider capable of winning the GC. Instead, those teams will go on the hunt to win the flatter, sprinter-oriented stages and contest for the many intermediate sprints that are a part of the sprinter stages.

Some teams will attempt to do a little of each and will have a legitimate GC contender and a sprinter in the crew of nine men. This was the case in 2012 when Team Sky had Bradley Wiggins, who won the overall GC. They also had superstar sprinter Mark Cavendish in tow. That particular situation created some controversy in that Mark Cavendish was not happy with the team's support for him for the sprint stages. The team focused on making sure that Wiggins had plenty of support, protection, and resources since he was in contention for winning the GC, and Cavendish was left more or less on his own to hunt for stage wins on the sprint stages. Normally Cavendish would have had the team's full support and lead-out train, and since sprinters are very determined and fierce competitors, it made for some intra-team drama, fun Twitter quotes, and an eventual change of teams for Cavendish to a sprinter-based team.

The winner of the overall GC will don the prestigious *maillot jaune* (yellow jersey) and receive a handsome amount of prize money. The sprinters also have a prestigious competition complete with their own jersey, the *maillot vert* (green jersey), which comes along with a cash prize and positive exposure for team sponsors.

In the green jersey competition, points are awarded for winning a sprint, either at the finish of each stage or at the one or two intermediate sprints during a stage. Points awarded for each stage vary depending on the length of stage, the difficulty of the profile, and where each sprinter finishes on the stage. Higher placings receiving more points. After each stage the sprinter that has the most points for the green jersey competition will don the green jersey for the next stage. The green jersey is a very prestigious competition, second only to the yellow jersey, and wearing it even for a day will raise the value of a sprinter. Win the green jersey at the end of the Tour, and that sprinter is going to get a huge cash bonus and a much better contract next year. The green jersey is a big deal.

Teams that are focused on winning the sprint-oriented stages, and ultimately the green jersey completion, will staff their team of nine riders to help the chances of their sprinter attaining victory. This is accomplished by staffing or building their team with the notion of having something called a lead-out train.

The lead-out train is usually a group of four to six riders, including the sprinter. As the peloton gets closer to an intermediate sprint or the finish line, the lead-out train assembles toward the front of the peloton. The lead-out train's riders form a single-file paceline, where the team's star sprinter sits fourth or fifth in line, protected from the wind. The three or four riders in front of the sprinter ride at a very high pace and will try to stay at the front of the peloton by constantly increasing their speed, so as to discourage other teams from moving in front of their team. The sprinter sits comfortably in their draft, saving energy until the very last moment (inside of 300 meters of the finish or intermediate sprint line). Each rider at the front of the train will take a turn (or "pull") at the front. The rider at the front during the early stages of the lead-out train will take longer-distance pulls. As the train gets closer to the finish line, each subsequent rider will take shorter-distance pulls that require much more power due to being at a much faster speed. Each rider in the train will go until they hit their physical limit and then pull off to the right or left side, making way for the next rider and the rest of the lead-out train.

Typically lead-out trains start to assemble anywhere from 3 to 7 km from the finish or intermediate sprint line, depending on the course profile. A very technical twisty or narrow run in to the finish will see lead-out trains assemble a little sooner, whereas wider, straighter finish line approaches or uphill finishes will start much closer to the finish line. The reason for the teams starting the lead-out trains sooner on technical profiles is to be closer to the front, where they can pick their own path or line through technical twisty sections. Being farther back in the pack is dangerous and not as fast since they may not be able to pick the fastest line, might get blocked by other teams and riders, or may end up in or behind a crash.

As outlined above, the early frontmen of the lead-out train will take longer pulls, somewhere in the neighborhood of 1 to 2 km at high speed. After the number two lead-out man pulls over, the speed increases greatly and the following riders will do much shorter .5 km pulls.

The rider just before the sprinter is known as the "lead-out" or "lead-out man," and does a very fast and hard 100–200 meter pull, which is essentially an early sprint right up the 200–300 meters before the finish line.

The lead-out man is a very gifted sprinter in his own right, considering he does a full-power sprint before the actual sprint in an effort to get his sprinter free of the other teams' lead-out trains and sprinters. Many lead-out men could be the star sprinter on other teams, but are recruited for top teams with top-level sprinters so they can deliver the star sprinter to the finish line. The lead-out man is often paid handsomely for his services.

All of this lead-out train action takes place in a two or three short minutes before the intermediate sprint or finish line, and the last part of the sprint where the lead-out man does his jump surge and sprint occurs inside of 20 or 25 seconds before the finish of the race.

Another wrinkle that happens during the lead-out train is that all the other sprint-oriented teams are assembling their own lead-out trains, vying for position at the front of the fast-moving peloton. With four, five, or six sprint-oriented teams jostling for position at 35+ mph, lead-out trains can get swarmed or disrupted by the other teams and lose position, or be broken up, and end up moving from the front tip of the peloton to twenty positions back in a few short seconds. Teams work very hard to keep their entire lead-out trains together, but with such chaotic and fluid changes of position, lead-out trains and their sprinters will get separated, causing the teams to fight to regroup. The sprinter might even have to jump wheels on to another team's train in an emergency.

Speaking of jumping on to another team's lead-out train, some sprinters will have a team that does not have a lead-out train. They are perhaps there to help their GC contender teammate, or through attrition during the Tour they have lost members of their lead-out train. These sprinters will become opportunists and will surf the front of the peloton during the run in to the finish, looking to hitch on to another team's lead-out train. This technique is legal, but many teams frown on having a sprinter from another team get a free tow to the finish line sprint. To combat this, the teams with a lead-out train will put a rider directly behind the designated sprinter whose sole purpose is to block another team's sprinter from hitching a ride on the lead-out train. This rider is called a "wheel scrubber." The wheel scrubber will lock onto the rear wheel of their team's sprinter and allow no gap or opportunity for another team's sprinter to hitch on. If an opposing sprinter tries to hitch on, the wheel scrubber will nudge, push, block, or create a gap to stop an opportunist sprinter from getting a free high-speed ride to the finish.

The lead-out train action during the last 5 km of a race is very exciting, chaotic, and downright dangerous. Dozens of riders in five or six lead-out trains all vying for the same precious real estate, fighting for the fastest line around corners and roundabouts. Riders in each train taking significant risks to keep their train on the front often result in accidents and huge pileups on the run in to the finish.

Due to all the potential dangers in the run in to a sprint finish, all of the GC contender teams will also be up at the front with their own "protection" trains. These GC protection trains are not

trying to win the sprint finish but are instead trying to keep their GC contender riders safe at the front of the pack until 3 km before the finish. Once past that point, the GC trains will ease off the front and let the sprinters' teams vie for the finish line, since any accidents inside of 3 km are neutralized and no time losses will be assessed.

Perhaps the best lead-out team of all time in my opinion was Team Cannondale Saeco with their superstar sprinter Mario Cipollini, who was known as the Big Red Machine and dominated sprints in all the major tours in the early 2000s. Mario had possibly the best lead-out man in history, Giovanni Lomardi, an amazing sprinter in his own right who consistently delivered Mario to the line for dozens of sprint wins.

Also formidable were the Alle-Jet years of team Fassa Bortolo, where Alessandro Petacchi won dozens of sprint stages in the grand tours with a powerful and precise lead-out train.

In recent times, Team HTC (Columbia, High Road) with Mark Cavendish had a stellar lead-out train and racked up dozens of sprit stage victories. I would recommend going on YouTube and watching some of these classic lead-out train performances.

Objective and Intensity

The Anatomy of Sprint is a training that a sprinter would typically use to develop their ability to sprint and increase their ability to deliver huge amounts of power in a short period of time. It is a simple yet very intense profile. Riders will perform 20 high-intensity sprints. Each of the sprints is exactly 20 seconds, not a second more. Between each of the sprints is a recovery period of 1 minute.

For each sprint the effort is "all in," full gas, as hard as you can go for 20 seconds. Riders should push themselves hard and deep.

While doing a single all-out sprint effort might seem fairly straightforward and might give the rider the idea that this profile is easy, they should be reminded to make that determination much later into the training. The repetitive nature of the sprint drill with limited recovery will take its toll on their strength and stamina.

This profile is indeed simple; it is not in any way easy.

Profile Setup

The Anatomy of a Sprint drill does require some setup and explanation. The goal is to fully explain the three basic elements of the sprint, have the class practice these elements by doing half-speed "form" sprints to help them understand and get a feel for executing the three elements, and then do a couple of three-quarter-speed form sprints with all three of the elements stitched together. In teaching this drill over the years I have found it takes about 10 to 15 minutes to fully explain the three basic elements of the sprint and do the lower-intensity, slower practice sprints.

Try not to rush the setup explanation. It is important that each rider understand the three elements of the sprint, how to execute each element, how element one flows into element two, and element two into element three. It is also important to have what I call the "safety talk" with them.

I also recommend spending some time talking about the actual duration of the sprint effort. I have taught a few thousand indoor cycling classes, and I have been a student or witnessed a few thousand additional classes where I have heard instructors give cues for a sprinting that did not match up with the actual activity. The cues were not very authentic.

A sprint is a short, VERY high-intensity effort. In a pro bike race the actual all-out effort of sprinting lasts about 20 seconds. Our profile today limits our sprint efforts to exactly 20 seconds, no more, no less. Once the class gets a few "real" sprints under their belt they will understand that 20 seconds is completely adequate or perhaps too much.

Over the years I have heard cues for sprinting similar to "We are going to sprint for the next 5 minutes..." This duration for a sprint is not reasonable, nor is it authentic. A "5-minute sprint" is actually a 5-minute time trial effort—not a sprint. A sprint is, by definition for this profile, a short, sub 30-second effort done at or near maximal power.

The Three Elements

The three elements of the sprint are defined by three movements. I like to use a three-letter acronym to describe them: J – A – K.

J is for Jump.
A is for Accelerate.
K is for Kick.

The **Jump** is the initial phase of the sprint. It is a transitional element where the rider moves from the seated flat road to a more aggressive and powerful standing position on the flat road, driving the legs hard so as to make the bike accelerate quickly and explosively.

I like to think of the Jump phase in terms of a rocket launch or huge explosive effort. The idea behind the Jump is to create separation or distance between the sprinter and the riders following the sprinter. The Jump is short in duration—3 to 10 seconds, depending on the sprinter and their abilities.

The **Accelerate** phase is performed directly after the Jump and is where the sprinter accelerates the bike up to its maximum speed. After the explosive Jump phase, the sprinter continues to pour power into the bike, making the bike accelerate, working through the gears, and ramping up the rpms of the pedals. Think of the Accelerate phase like an airliner moving down the runway—after the initial push off, there is a period of time where the airliner is rapidly gaining speed, just before the nose tips upward toward the sky. The sprinter wants to emulate the airliner rapidly gaining speed by pedaling faster and faster, and adding resistance (gearing up), making the bike roll faster and faster. The Accelerate phase lasts about 5 to 15 seconds.

The **Kick** phase is a bit more subtle, and difficult to fully understand. The term "Kick" comes from the track and field world, where a runner will put on a burst of extra speed as they near the finish line. For a bike-riding sprinter, the Kick is the ability to deliver an additional burst of speed after the Jump and Accelerate phases. The Kick phase in a real bike race is all about getting your bike to surge past the other sprinters while at top speed by adding more energy (pedal power) to the bike. All professional sprinters have the ability to Kick. Once they have their bike up to full speed after the Jump and Accelerate phases, they can continually add bursts of energy to their bike, causing it to surge ahead of their competitors.

Another way to think about Kicking is to imagine a gun, and having the ability to fire it repeatedly. The Kick requires you to "reload" or "recharge" the gun before you can surge again.

One of the best Kick sprinters in the pro peloton today is Mark Cavendish. Look up some of his sprint wins on YouTube and watch how he is able to Kick or surge multiple times at the end of a sprint. I have seen him produce multiple Kick efforts in the last 100 meters of a sprint, which is impressive and enhances his ability to win races at the finish line.

For us mortal bike riders, the Kick effort is something that only some of us posses. If you can Kick, in my view you have a genetic gift. I feel also that you can train yourself to Kick multiple times, but it takes lots of weight room work and plyometric workouts to develop the skill.

The Kick phase duration is about 5 to 10 seconds.

In the entire effort, all three phases happen inside of 20 seconds! Jump! – Accelerate! – Kick!

In cueing the training, I explain each of the three phases, which are done in a standing position with the hands on the bar ends:

- **Jump** is used to transition the bike from rolling to accelerating. The Jump is EXPLOSIVE!
- **Accelerate** is used to make the bike roll faster and faster. Drill it!
- **Kick** is repeated bursts of speed once the bike is rolling at top speed.

Executing the elements is important. I would avoid just turning a class loose with instructions on stitching the three elements together into a full-power effort. What I have found successful is to have them do the three elements in a slower, half-speed version, something I call a "form sprint." We are executing the Jump, Accelerate, and the Kick with impeccable form, but we are not yet

focused on high power or speed. I will do the form sprint three, four, or more times, just make sure that the group has the choreography down.

The form sprint is exactly the same duration as the full-speed sprint—20 seconds long—while resistance and speed are about half of a full effort. Have the class do the Jump by transitioning from seated to standing with the hands on the bar ends. Have them use a substantial amount of resistance and increase their power and cadence. Instruct them not to go full power, just go harder while getting a feel for the rhythm and timing of the Jump and maintaining their balance standing. After 10 seconds, have them add resistance and accelerate the bike to maybe 75% of full power while standing. Go for about 5 seconds, then have them Kick, or surge, for about 5 seconds once or twice to have them feel the burst of speed after Jumping and Accelerating.

Once completed, have them slow down, and repeat the drill. Instruct them to make the three elements flow together seamlessly. Jump, Accelerate, Kick! Have them repeat this at half or three-quarter speed three or four times, no more than 20 seconds per rep.

As an instructor you are looking for fluid movements and transitions between the elements. You are looking for riders to be using more than adequate amounts of resistance; you also want to see clean form and good biomechanics from each rider. I usually don't start the full-speed drill until everyone has found a rhythm and some good form. There is no reason to rush into the drill; simply make sure everyone is on track. I will often see riders not using enough resistance in order to attain higher leg speeds. I suggest you encourage everyone to load up on the resistance. Share with your students that this drill is more about power than leg speed. Power equals speed!

Safety Talk

Before starting the drill you will need to address some basic safety concerns. Since this sprinting drill is a full-power, high-intensity drill, you need to outline some of the potential risks and ways to mitigate them.

Make sure riders use plenty of resistance. Yes, I just stated this, but it is very important. Remember that sprinting is about POWER, not so much about speed. If you see riders freewheeling or using way too little resistance, hand out speeding tickets and have them add on resistance.

Since the sprint is done out of the saddle, adequate resistance will help keep riders safe and balanced. Again, resistance makes the training more effective.

I also mention that if at any time a rider feels a little off balance or during a sprint or they feel a little disconnected or unsettled, they should take that as a direct cue from their body to immediately sit down and wait out that sprint rep. There is no sense in trying to force their way through a rep. If you get a little knee hitch or feel uncoordinated don't risk injury—simply sit down and wait for the next rep. There are plenty of repetitions, so be safe!

The Warm-up

Conduct the warm-up at the same time as you explain the three sprint elements (J-A-K). It normally takes about 10 minutes to roll through the explanation. Have the group ride at tempo while gradually increasing resistance.

> Initial warm-up is 10 minutes in Zone 1–2, with moderate pedaling to get the legs up to temperature. Gradually and continually increasing resistance.
>
> Toward the end of the 10 minutes, we perform the form sprints at half to three-quarter speed; these are perfect spin-ups for a warm-up. Perform 3 to 5 or even more form sprints. Each form sprint is 20 seconds. After each form sprint, add some coaching cues to help the students address their form and resistance. Take about 1 minute between each form sprint for a recovery.
>
> During this section of the warm-up, coach students not to push too hard—just let the body come up to temperature and let the legs start to feel warm. It is a gradual increase of intensity. Use a mix of cadence and resistance to raise intensity.
>
> Focus on rolling at the same cadence before and after each form sprint.
>
> As the legs start to warm and open, gradually add on turns of resistance while keeping the cadence steady.
>
> At the end of the warm-up (last 2 minutes), students should be solidly in Zone 2 and could easily move up to Zone 3 as they press on their "gas pedal" during the form sprints.

The Ride

You will need a stopwatch or clock with a second hand to accurately time the sprints and recoveries. You also need to count how many sprint efforts you perform. You can do as many as 20 sprint efforts but it is advised that you do not do more than that.

If the efforts performed are indeed full-power, "all-in" efforts, most students will hit exhaustion well before 20 sprints. Pushing past 20 has no training benefit and is therefore something that should be avoided.

The ride is composed of multiple 20-second full-power sprint efforts to Zone 5, followed by a 1-minute recovery in Zone 2 or 3. Please note, the recoveries are purposely not full recoveries. The repeated high-intensity efforts and minimal recoveries are meant to take a toll. The idea is that each rider will at some point hit their limit and become physically exhausted. Historically I have seen that most riders can do 10 to 15 solid all-in efforts in an hour session before there is a steep decline in their speed and overall effectiveness.

Once muscular exhaustion sets in it is noticeable that the riders cannot sprint as fast, or as long, or will have less seamless transitions between the J-A-K phases. They will look tired and not have the snap of the first few repetitions.

Before performing the first sprint, have the riders accelerate and increase their intensity to a high tempo pace in Zone 3, to simulate the run in to a sprint or finish line.

Count the sprint down, telling the riders when there are 30 seconds before the sprint, then another update at 10 seconds before the sprint, then count down "5, 4, 3, 2, 1…Jump!"

Cue them to do the "Jump"! Jump hard and powerfully; make the bike launch like a rocket—this should be an explosive all-out effort.

After 5 to 10 seconds, have them start to "Accelerate" while standing. Make the bike go faster, much faster—do not hesitate to use resistance and pour on the power. Think of the resistance as a bigger, harder gear that will drive your bike farther down the road with each pedal turn.

With about 5 seconds left, cue them to "Kick." The Kick is a surge of energy, almost like a Jump but done a full speed while standing. Be aware that some riders can Kick more than once, while some will not Kick at all and just keep a steady fast speed. Let the riders know that it is OK if they are not able to Kick or surge due to being maxed out. Some riders may not have a very strong Kick and that is also OK.

At the end of 20 seconds, cue them with: "Finish line! Cut your power and immediately ride tempo in Zone 2 or Zone 3."

Start the recovery timer for 1 minute. During the recovery give them reminders for the next sprint—to use adequate resistance and to explode into the next Jump, to remember to Accelerate, and Kick, Kick, Kick!

At the end of 1 minute, start the countdown to the Jump again: "5, 4, 3, 2, 1…Jump," followed by "Accelerate!" and "Kick!"

Continue to repeat the 20-second sprints followed by the 1-minute recoveries.

The first few sprint efforts can be a little rough and might lack coordination. It takes a few sprints for the riders to get their choreography down at full speed. Ask them to focus on being smooth through the transitions from Jump to Accelerate and Accelerate to Kick.

If you sense they are not getting it or everyone looks rough between transitions, take control and have them do a couple of form sprints at a lower intensity. Remember, it is more important that they execute the sprints with good form and smooth, seamless transitions rather than complete all 20 efforts.

The length of the three different elements can and should vary. In fact, they may vary by rider—some riders might be able to do a 10-second Jump effort, or they might be able to do a 15-second

Accelerate but only 2 seconds of Kicking. In the first sprint outlined above the Jump is 10 seconds, the Accelerate is 5 seconds, and the Kick is 5 seconds. Those times are not set in concrete, and instructors should feel free to alter or vary these times to suit specific class conditions or specific riders.

For the first four or five efforts try to keep your timing the same, but once they start to get the hang of Jumping, Accelerating, and Kicking then you can perhaps shorten the Jump and lengthen the Accelerate or Kick elements.

After 9 or 10 efforts instructors will start to see who the real sprinters are in the class. Some will perform the elements with seamless transitions, and excellent power and speed. The instructor will also see some who might have a weakness in their J, A, or K. The profile is actually training, not a real race, so impart to the class that learning by observing is key for the participants.

If you find that your class is performing the sprints at a high level with good transitions, solid balance, and deep, powerful efforts, you might want to change the timing cues from the instructor telling them when to Jump, Accelerate, and Kick, to only doing the countdown of when to start and cueing only the Jump, and allowing them to FEEL their way through the Accelerate and Kick transitions. This is very freeing and actually the way they would sprint in real life.

Since the profile is repetitive the cueing is straightforward:

The Jump is all about being explosive and powerful. They want to create a gap between themselves and the sprinters around them.

The Acceleration is all about making the bicycle fly and move faster and faster as it speeds toward the finish line.

For the Kick, can you reload the gun and fire it a second or third time? Can you surge ahead of the sprinter next to you?

I will often ask the group questions like:

Can they Jump for 10 seconds? Or do they fizzle out and lose power after 5 seconds? Do they need to sit down after the Jump to be able to Accelerate? Can they Kick once or at all?

Can they make a change in resistance, or the duration of J, A, or K to bring strength or balance to the sprint?

Other coaching elements:

Digging deep
One of the things I often see when I teach this drill is that students will endeavor to do every single rep. If we target doing 20 reps, the riders will modify their intensity so that they can do all of them. By modify I mean they will reduce their intensity to ensure that they make it to the end.

For this particular drill, it is best that they actually do each effort at the maximum ability. The drill simply works best if you go all in! They need to dig deep—really deep—on each interval. There is no holding back. Each effort is either all or nothing.

The maximum reps is 20…can we do less?
As for the exact number of reps, 20 is the most you would do in an hour. If time does not allow for all 20, it is perfectly fine to do less. Modify as you see fit. If you need to take a longer setup and fewer reps, then simply do fewer reps.

Know when to sit down
Listen to your legs and body. If riders don't feel perfectly balanced and in control standing, they have the freedom to modify the drill by sitting. Remember, it is always better to sit and be safe.

Seated is OK
After a few sprints, some participants might not have the leg strength to safely do the drill while standing. For these riders it is perfectly OK to modify and perform the entire drill in a seated position. I have, in real-life races, been so cooked at the end that I knew I could not sprint standing up without fear of leveling the entire pack, so I sat down and sprinted and finished without crashing.

Cooked and burnt but not *done*
If riders are feeling cooked, feeling muscular exhaustion or overexertion, it is perfectly fine to sit out one or more repetitions. Since the formal recovery is only 1 minute, there is a good chance that some riders will not be fully recovered at some point deep into the ride. They can modify the drill by simply riding a comfortable tempo pace (Zone 2) until they are recharged.

Add some recovery
If the entire group is looking ragged after 10 or more reps, you can start to extend the recovery section from 1 minute to 2 minutes. It is a nice treat to reward them with a longer recovery if they as a group give a really special effort on a sprint. I also extend the recovery when I feel I need to convey some extra coaching or cueing. While the length of the sprint is no more than 20 seconds, the instructor can vary the recovery time as they deem wise.

Cooked and burnt and DONE
If you see a rider that looks like they have given their all and cannot sprint, or they have lost a substantial amount of their power or leg speed, it is perfectly fine to let them know that their training is complete for today even if there are multiple reps left to go. There is no reason to push through all 20 reps if they don't have anything left to give. Have them ride a steady flat road in Zone 2. Congratulate them for a job well done!

Sprinting and feelings
I know in doing this specific training on my own I have experienced some very interesting and intense feelings.

On some occasions I have felt light to moderate nausea due to exertion. This is normal for this type of effort. Some riders might experience this and if they do, they would be considered cooked, burnt, and DONE for the day.

When repeatedly giving their all, it is possible that some riders might feel some deep emotion bubble up at some point. I have had this happen to me on a few occasions where I went "profoundly" deep on a few sprints, and all of a sudden I was feeling waves of emotion. This, I understand, is normal as well. If you encounter a rider feeling some deep emotions, it's a good time to do a little one-on-on coaching to let them know what they are feeling is OK, and that they can take as much time as they need to get collected before attempting another rep, or it is also OK to simply call it a day of good training and ride the flat road to the end of class.

Playlist and Cues

The playlist and cues are, like the actual ride, a bit untraditional in that the songs are not tied to any specific cues or any specific timing. Simply start the music and let it go. Free yourself of trying to match the ride choreography to the actual music. The Anatomy of a Sprint training is music independent; since the training has its own timing—sprint for 20 seconds and recover for 1 minute—it is advised to simply let the music play beneath the ride. I have selected a list of tracks that will keep the energy driving, yet leave you, the instructor, plenty of space to instruct and give cues. Enjoy!

Anatomy of a Sprint Playlist

Song Title	Time	Artist	Album	Source
Warm-up				
Composure	5:34	Bernhard Fleishmann	The Humbucking Coil	iTunes
Latin Lover (Original Mix)	8:01	Presslaboys	Latin Lover Vol 1 EP	iTunes
Feel the Spain	6:28	Aerofeel5	Feel the Spain (Remixed)	iTunes
1977	3:22	Ana Tijoux	1977	iTunes
The Game (DJ Tarkan & V-Sag Remix)	8:14	Christos Stylianou & Ganga Ft. Irene Zeva	The Game Single	iTunes
Demonstration Track	5:38	Blackstrobe	Back from Beyound	iTunes
Skiff	8:00	Jane Maximova	Concept 3d – Vol 2	iTunes
The Sound of Aerofeel5 (Remix)	5:52	Aerofeel5	Aerofeel5 – WMC Bombs 2011	iTunes
Buena Vista Park (Allan Zaz Remix)	9:00	Rachel Margaret and Alex Torn	Buena Vista Park Single	iTunes
Cool-down:	**8 Min**			
Harvey and the Old Ones	4:01	Banco de Gaia	The Magical Sounds of Banco de Gaia (Special Edition)	iTunes
Total Time:	**60 Min**			

