

Triathlon Ontario Drafting Certification Manual Level I



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Introduction

What is Drafting?

If you spend most of your time pedaling solo, you may not fully appreciate the concept of drafting or a paceline. Drafting is when a group of cyclists work together to maintain a constant speed, conserving energy. The most important concept in drafting is that of maintaining a constant speed throughout the group. By working as a group, a paceline can save on average anywhere from 15-30% on energy expenditure depending on the number of people and efficiency of the group.



Drafting is a skill and like any other skill, it needs to be developed properly and practiced often. Ideally, to draft properly and to maximize its benefits, cyclists rotate through a line, taking turns riding up front or taking a “pull” before peeling off and tucking in behind the last rider in the group at the back. When riding like this, tucking in close behind another rider, the athlete expends less energy. Even paceline regulars may not fully understand how to best work a paceline to their greatest advantage. Recent studies on drafting effects, positioning and benefits have provided new information worth noting.

Leader's Bonus

Pulling is not a thankless job. According to research conducted by Bert Blocken, PhD, Professor of Physics at the Eindhoven University of Technology in the Netherlands, the first cyclist in a pack enjoys up to a 3.1% reduction in wind resistance courtesy of a low-pressure air bubble between riders. This low-pressure air bubble pushes the leader along. Therefore it’s important to keep a steady pace on the front to avoid surging away from the boost—and splintering the group.

Stay Close

To get the maximum benefit of a paceline, each rider needs to keep their front wheel as close as possible to the rear wheel in front of them. At the introductory level, for increased safety, athletes should ride in a staggered position with the front wheel just behind and to the side of the rear wheel of the rider ahead. As the skill level of the athlete increases the rider should ride directly behind the wheel of the rider in front to gain maximum benefit. The further back a rider is the less benefit they will enjoy, however, a rider can be as far back as 3/4 of a wheel length and still experience the benefit of conserving energy. Athletes should maintain their comfort zone and with improved cycling skills, move closer.

Sweet Spot

In Blocken’s studies, he found that the benefit of drafting gradually increases from the second rider to the fifth rider before starting to level off. In groups of up to five, the fifth rider enjoys the most aerodynamic benefit. But in a group of six to eight (roughly the number in a team time trial), the next-to-last position feels the least wind resistance. In a big, hard-charging pack, the best position is between fifth and eighth.



An athlete will feel the largest aerodynamic benefit and be less likely to get into a crash.

The Bungee Effect

The back of a paceline can get sloppy as riders accelerate and decelerate like an accordion in an effort to stay with the pack. Since there is no one behind the last cyclist to push the low-pressure bubble, it can feel harder to bring up the rear. As a rider drifts back, they should begin to increase their cadence starting at least two people before the back so when they are ready to slide in they won't have to play catch-up.



Level I - Drafting Certification

Triathlon Ontario has developed a Drafting Certification Course that begins with Level I. Level I skills are intended for new riders of any age looking to pursue the sport of triathlon along the High Performance pathway but are typically aimed at developing triathletes aged 12-15 or for those that may have entered the sport at later ages. International High Performance Triathlon is defined as Draft Legal and athletes must be draft legal certified to compete. Some of the competitions that define International High Performance Triathlon consist of the Olympics, Commonwealth Games, Pan Am Games, and ITU competitions (World Championships, WTS, World Cups and Continental Cups).

Level I begins by introducing the skill sets that are crucial for cyclists that will be in a drafting environment. All athletes must pass a Level I test administered by Triathlon Ontario before progressing to Level II. Once an athlete has passed the Level I test, they may begin to compete in draft legal races. Level II is a more advanced and aggressive series of skills and drills meant for more experienced draft legal athletes. There is no certification or testing required to complete Level II courses.

Skill Requirements

Athletes are expected to know and properly display the following skill sets and drills in order to pass the Level I test. The following skills/drills focus on the ability to comfortably control the bike, improve balance and efficiency and feel comfortable around small groups of riders.

- 1) Proper Pedaling Skills
- 2) Riding in a straight line
- 3) Balance
- 4) Cornering
- 5) Paceline Riding
- 6) Riding in 3's
- 7) Braking
- 8) Riding Safety

Coaching Cues

For each drill we have included coaching cues, the coaching cues are to be used to describe proper form while attempting the drills. Cues can be used as a guide for coaches to focus on to correct improper form and to reinforce good form.

Please note – All drills are to be done in a controlled environment (NO TRAFFIC) with plenty of space for each rider such as large, closed parking lots.

1. Proper Pedaling Skills

Proper pedaling refers to distributing the work load of each pedal stroke through the pedal rotation. Cyclists who constantly push down on each side not only waste energy but also shift weight laterally across the bike. This lateral motion means the riders balance on the bike is compromised and smooth riding will be impossible.

Equipment Needed – Bikes, clip in pedals and shoes

Drills

- Single Leg Pedaling (for each leg)
- Dead Leg Pedaling
- Body position (bike fit)
- Pressure points
- Relaxed hands and feet

Coaching Cues

Down Stroke



Bottom Stroke



Up Stroke



Top Stroke





2. Riding in a Straight Line

Cyclists must be able to ride in a straight line (with 2 hands, and one hand on the handle bars). Keeping the bike straight and in control at all times is important when riding in groups.

Equipment Needed – bikes, clip in pedals and shoes, parking lot with 25-50m straight lines (parking lines)

Athletes must ride along a painted straight line, keeping both wheels on the line. This drill should be done with both hands, the right and left hands individually.

Coaching Cues

Relaxed hands on bars

Relaxed feet on pedals

Look 10m ahead

Proper smooth pedal strokes

3. Balance

Developing good balance is the cornerstone to good riding. There are a number of drills that are used to introduce and improve balance on the bike. Good balance enables the athletes to feel confident and in control of his/her bike. Good balance allows the rider to corner faster, stop safer and control the bike in group riding situations. Balance as with all skill development starts at slow speeds where the athlete is in control and tempo is increased once basic skills are successfully completed.

Balance drills can start with simple things like taking a water bottle out of its cage and replacing it without looking, keeping the bike in a straight line. Every athlete should be able to do this with either right or left hand. Good balance is crucial and the first step to introducing drafting to young triathletes.

Balance drills (like these) should be practiced at every bike practice.

Water Bottle Pickups (WBPU) (these should be done in a controlled area with no traffic and under proper supervision)

- Place water bottle on the ground
- Approach the water bottle straight on
- Reach down to pick up the water bottle
- Keeping the bike straight ride off and replace the water bottle in the cage
- Athletes should be able to complete 3 WBPU in 5 attempts with each hand.

Advanced versions include replacing the water bottle back on the ground, picking up smaller objects like shorter bottles, hockey pucks, pens, coins

[Water Bottle Pickup Video](#)

Coaching Cues

Approach the bottle slowly

Rider leans “forward” (NOT to the side) to pick the bottle up.

“Sternum over stem” - Riders sternum (area of bone in the middle of the rib cage) should be over the

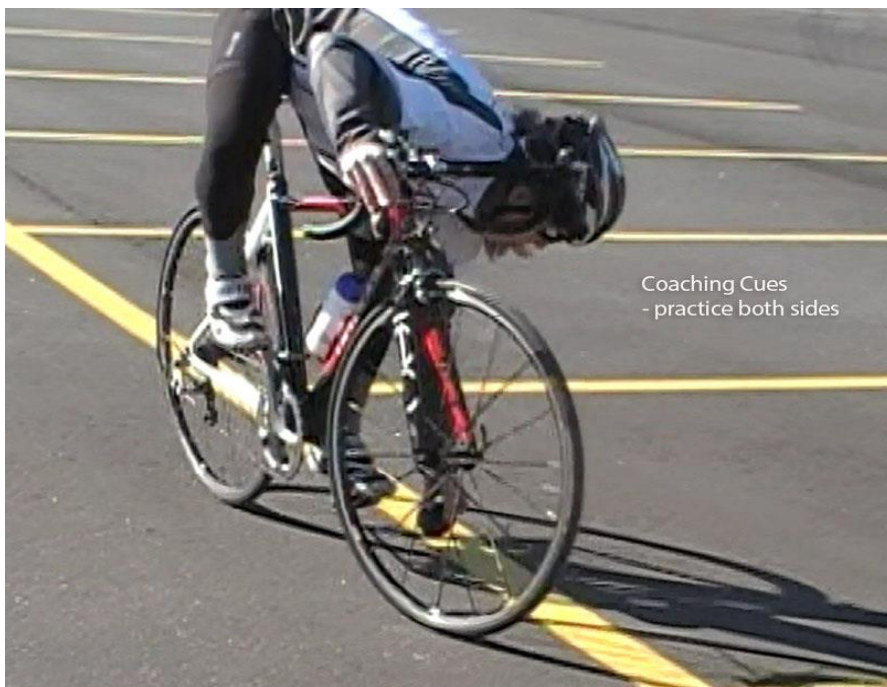
stem of the handle bars

Riders hand should drop down in line with the pedal/crank NOT out front by the front wheel



Coaching Notes

- start with higher items such as a water bottle gradually moving to smaller items
- rider is leaning forward, not across, keeping centre of gravity as close as possible to the centre line of the bike
- opposite hand applies pressure on the brake hood
- bike remains straight



Coaching Cues

- practice both sides



4. Cornering

A cyclist's ability to corner properly is an important aspect in being able to save energy, ride smoothly & effectively. Proper cornering involves many skill sets such as good balance, proper pedal stroke, being able to read the line through corners**, effective weight distribution across the bike, proper pedal position. Racing involves many different types of corners from 180-degree turns, to "S" shaped chicanes.

Slalom and Chicanes- Short slalom corners are great to practice because it helps athletes understand the importance of "steering" the bike with their body, not the handle bars.

NOTE: In setting up a slalom course I recommend using tennis balls that have been cut in half instead of cones/pylons. Smaller pylons can get caught in a crank or wheel when a rider comes to a close. Half tennis balls are great markers and not obstructive.

Set out the course - begin with wider sweeping corners so athletes get the feel of reading the corners and controlling the bike as the skills improve move the markers closer and tighter together.

Cornering 360's - Practicing 180 and 360 degree turns teaches athletes to control weight distribution (not over leaning) as well as pedalling while turning. This drill is done in a parking lot with clearly marked parking spaces.

Athletes begin with 4 parking spaces, in a rectangle shape (i.e. 2 spaces next to each other and 2 more spaces above)

Begin with the athlete having to ride in circles within the confines of the 4 parking spaces, encourage riding in circles not ovals.

Athletes should be able to ride 6-8 circles in both directions (to the left and to the right) without touching the parking space lines, once successful reduce the space to 2 parking spaces side by side, then down to a single parking space.

5. Pace Line Riding

Pace line riding is perhaps the most understood aspect to drafting for young triathletes. Making sure that as coaches you explain to your athletes the purpose of drafting, the benefits and drawbacks, the correct process and mistakes they can make is as important to their development than knowing the skill itself. Drafting as touched upon at the beginning is NOT done to ride faster. Drafting allows a group of riders to maintain a desired speed for longer while saving energy.

Pace line riding skills include:

- Riding comfortably in a group
- The ability to ride in a predictable fashion (ride a straight line)
- Maintain or control speed through gearing and cadence (not hitting the brakes)
- Entering and exiting the pace line effectively
 - 1) The only way to improve pace line riding is to ride in a group consistently. Pace line practice should take place in a large controlled area like a parking lot NOT on open roads.
 - 2) Allow riders to be a distance they are comfortable with (half a bike length) when first introducing pace line riding. Forcing riders into an uncomfortable position only creates a more unsafe environment.
 - 3) Start with having the group ride a circuit without braking, getting to know what cadence and gear to use to maintain a consistent speed.
 - 4) Give everyone a lap at the front, then break off and merge in at the back.

Coaching Cues

Stay in the drops - this requires the athlete to focus on cadence to maintain speed not always hitting the brakes and riding unevenly

When pulling off the front, wave the rider through, break off and stay close enough to the line to move back in without having to sprint to catch up

Be predictable don't race off the front, this is a waste of energy and is not a pace line, if you want to increase the pace do so slowly so you bring everyone with you.

Communicate - talk to each other, about hazards etc., taking the lead, slowing down don't make the other riders guess what you're doing, tell them



6. Riding in 6's

Athletes in a group of 6 across shoulder to shoulder. This drill is done at a VERY slow and comfortable pace. Athletes should be able to ride together anywhere in the line i.e.: ends or middle.

Once the athletes are comfortable riding in a group shoulder to shoulder, the progression is to pass a baton or water bottle down the line. If athlete "A" is the athlete on the far left of the line and athlete "F" is at the far right of the line. Athlete "A" take their water bottle from the cage with their left hand, passes it to their right hand. Athlete "A" hands the water bottle off to athlete "B" who takes it with their left hand passes to their right hand and hands it off to athlete "C"..... Athlete "A" once they have passed the water bottle off must drop behind the group and moves to the far right in time to take the water bottle from athlete "F", athlete "B" follows athlete "A" and so on and so on.

The line must ride in a straight line, so each athlete is moving slightly to the left as the water bottle is being passed down the line. The water bottle pass can go on for an extended period of time. We have done a 10min WBP going from 5-6kph to 16kph with a group of 6 athletes. This was done riding in a large oval in a huge parking lot.

This drill teaches athletes to ride with either hand, stay relaxed, focus on maintaining position in relation to other riders, break out and integrate into a "pace line". It puts a "sense of urgency" on each athlete to be in place before the water bottle reaches the end based on the speed with which other athletes are exchanging

Coaching Cues

Stay relaxed

Watch that each hand is removed from the handle bars to exchange the baton/water bottle

Chin up look where you are riding

Tighten up, stay shoulder to shoulder

Stay as group, don't fall behind or go ahead

Integrate properly, don't be going too fast when re-entering the group



7. Braking

Proper braking is an important part of riding safely. Proper braking includes using both brakes equally at the same time (some info would use percentages like 60% back/40% front, I have found most kids are heavy on the back brake anyway so making it simple as say equal pressure on both brakes does not confuse the athlete). Just using one brake (front, you loss control and if he wheel flips i.e.: turns on you can go over the handle bars, using just the back brake you will slide sideways from the back wheel)

Stopping on the Line - this drill will have athletes stopping with their front tire on a painted line. Done in a controlled area like a parking lot, place two cones or markers about 3 feet (1metre) apart on a solid line (like a parking spot line). Athletes ride up to the line and stop with their front wheel coming to a complete stop on the line.

Coaching Cues

Let athletes choose the speed they want to ride at, don't make them go to fast

Watch for use of both hands squeezing the brakes

Watch for no skidding (too much back brake)

Watch for a complete stop (balance)

If the athlete cannot start pedaling to start right away, they are in to hard a gear, make sure they are in proper gearing

As the athletes learn to stop properly we can begin to add more skills, emergency braking (includes shifting body weight), evasive moves etc. But as with all skills proper execution of the basics is a primary objective.

8. Riding Safety

As coaches and clubs that have athletes that will be riding on roadways we all need to know, understand and practice proper road safety and cautious cycling habits. Coaches should NEVER take any athlete on a roadway without knowing the level of skills that rider possesses and you are confident the athlete will and other around them will be safe. Everyone should know all hand signals and use them.

Unfortunately a large percentage of fatal cycling accidents involving cars and bikes are due to the cyclist's poor decisions. Here are the guidelines we use to assess if a rider is allowed to ride on the road during an organized practice and some of the practices we follow while on the road.

The athlete must:

- 1) Know and demonstrate proper hand signals for stopping, right turn, left turn
- 2) The athlete must know which hand to use while signaling (left hand only)
- 3) Athlete must ride in a predictable manner
- 4) The athlete must be able to complete every single drill mentioned above to the coaches satisfaction.

Group Riding Rules:

- 1) Obey all road signs and traffic laws (no exceptions)
- 2) When riding in a group of 8 or more on a 2 lane road or highway, riders leave a space at least 2 car lengths between groups of 8. This allows cars an escape or area to pull back in safely for oncoming traffic if a car is attempting to pass
- 3) Ride single file, in past years this has been challenged by groups who ride 2 or 3 across in order to "force cars to slow down" I find this practice dangerous and creates a more aggressive atmosphere. If I am in a situation where I am concerned as the coach I will ride behind the group 6-8 inches to the left of the line of athletes.
- 4) Be predictable, don't swerve in and out of parked cars, pick a line and ride straight. If the driver of an automobile can predict your behaviour you are safer (kind of like driving a car)
- 5) Be courteous or IGNORE. Yes there are idiots, your with kids, ignore them or report them, don't engage.

This is level one for athletes entering the draft legal stream of triathlon. Triathlon Ontario will be following up with a Level Two volume and in the future will produce more skill development manuals for youth and Junior based coaching.