Velobike

Training Nuggets

PREFACE

This article is for those new to track cyclists who want to grasp training basics and 'starting point principles' of track sprinting. The article resulted from a series of weekly training 'nuggets' I shared with the Track Sprinting Facebook group as conversational starters. It seemed a great idea to collate and share them, with a view to encouraging others in the sport.

The inspiration for writing the Training Nuggets was an article by Sean Eadie, Olympic bronze medalist and World champion. You can read it here.

Track sprinting Training Nuggets pays tribute to my coach - Zac Williams; ex-NZ sprint team member, and the Wellington Sprint Squad team here in Wellington, New Zealand. I am also grateful to a handful of Track Sprinting Facebook members, including; Lee Povey, Lee Evans, Paul Jackson, BJ Olsen, and Nathan McLachlan, each of whom unreservedly shared knowledge when I wanted to 'know stuff'. Thank you!

May this article encourage those new to sprinting and inspire you to go faster. Welcome to the vortex!

- David Bernard

INDIVIDUAL SPRINT EVENT OVERVIEW

Race Description: The Individual sprint is a classic track cycling event comprising two parts: the Flying 200 qualifying event and knock out styles match sprint tournament.

The Flying 200 phase consists of a solo, flying start 200m time trial by each rider. The resulting 200-metre times determine the seeding for the two-person sprint races.

Upon completion of the flying 200, the top seed (fastest) rider is (usually) matched up for the match sprint with the lowest (slowest) seeded rider, the second seed with the second lowest seeded and so on. This provides the racing pairings for the actual match sprint tournament.

The matched sprint races are 750 meters long (on a 250mm Olympic styled track). Each pair of riders covers three track laps, jockeying for advantage and position until the final sprint, where the first rider across the lines wins. The 'best of three races' winner of each pair determines who will go forward to the next round and who will be knocked out.

For more information on the rules of the individual sprint, visit the UCI technical resources here:

- *UCI 'What is the Sprint'* - *Youtube*
- *UCI Race Regulations* - *PDF*

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THE NUGGETS

1. As track sprinters, we train differently than nearly all other cyclists. Sprinting performance is based upon power developed for much shorter efforts usually from 10 - 80 seconds. Therefore, much of a track sprinter's training should focus on developing his or her rate of acceleration, maximum speed, and ability to hold that speed.

2. In terms of developing rate of acceleration, this means you will include training that accelerates from a stop (for standing start in time trial events), accelerates from a slow roll (for match sprint events), accelerates out of corners - standing and seated (for preventing riders from overtaking you out of the corner on last laps) and rolling 'power jump' accelerations - where you get out of the saddle and accelerate hard from different velocities for the final sprint. Weight training will affect your rate of acceleration as well.

3. Speed endurance training is also needed to maintain your speed to the finish line. Still, it is helpful to remember that it takes more time and effort to develop one's acceleration and top speed than it does to add speed endurance for sprinting events distances.

4. In short, your on-the-bike training should include volumes of seated and standing accelerations from various speeds, distances, and gears to develop the range of acceleration modes required for racing. It will also include training to high cadences and sustained pace (tempo) training to develop speed endurance.

5. There is a strong correlation between the training for track sprinting and track and field 100m, 200 and 400-metre training. Both forms of sprinting use a lot of gym and a range of short-distance, acceleration-based training. They are different realms, but both are training to a) increase acceleration, b) increase top speed, and c) maintain the top speed possible for race distance. We do not train like endurance athletes, and there is a 'school of thought' that endurance training can be detrimental to track sprint performance. As an analogy, Usain Bolt did not run 5 and 10-km road races or marathons when training for his peak 100m and 200m performances!

6. Almost all good track cycling sprinters train in the gym. It is exceedingly rare to find a top national, international or world champion sprinter - even at Masters levels - who does not train in the gym as part of their overall training. While lifting weights may not be required to be a good track sprinter, the evidence indicates that all the great modern track sprinters (and endurance track cyclist) include a significant amount of weight training in their programs.

7. Whether (or not) to include weights in your training will depend on your training background, strengths & weaknesses, goals, and time available to train. Plenty of good sprinters do not train with weights, though only a few, and they most likely compensate with resistance work on the bicycle or stationary trainer. In contrast, some very good club elite and masters sprinters spend the winter in the gym and kick back into stationary trainer / bike training as the season nears. There is no silver bullet, as Eddie Dawkins once told me.

8. Weight training provides a worthwhile foundation for track sprinters to develop greater strength, power, acceleration and top speed. Weight training also helps strengthen your tendons and ligaments and helps prevent injuries when the racing season comes around - but know that weight training won't make you faster on its own. Also, there is good science advocating strength training for older cyclists.

9. Generally, gym training is secondary to on-the-bike / stationary erg training to develop the cycling-specific musculature, neural responses, energy systems, and RFD (Rate of Force Development) required to be a decent sprinter. The rule of specificity applies!

10. Some of us live near a velodrome. Some are covered in snow over winter, or it's dark by the time work is over. However, most of us have a garage and can afford an Stationary trainer and Velobike fixed gear adapter. Physiologically, an stationary trainer setup is next best to be on a track bike on the velodrome, and you can swap out chainrings and sprockets for different training sessions. Some track sprinters train on long, deserted roads on their track bikes over winter, during lunch breaks, whilst others combine road bike and, ergo, training with a weekend outdoor track session. Indoor tracks are best of all.

11. Velodrome, Stationary trainer and on-the-bike training is essential to develop the proper pedal stroke coordination and timing (sometimes called activation/deactivation kinetics), which allows down stroke musculature to unload and reload into upstrokes repeatedly at high cadences. This is important; the more powerful and faster you become.

12. You must balance gym training with the on-bike and/or stationary trainer work across your training week. Targeting, say, two gym sessions and three on-bike and/or stationary sessions per week, your body only has so much capacity for muscular work. You must flip intelligently between the two modes to ensure you train effectively and receive the expected outcomes. This is where the benefit of a track sprint cycling coach kicks in. Above all, you must remember that you are training to be a faster sprint cyclist, not a power lifter. And you must strive for good form, avoid injury and enjoy yourself for the most part to maintain your motivation.

13. Whereas the main muscle groups worked in the gym are similar to sprint cycling, if the right exercises are chosen, the limbs operate through different ranges of motion and speeds.

For example, the time taken to complete a full single leg press - around 2.5 seconds - vastly differs from the 400 ms for the leg musculature to complete one pedal stroke at 140 rpm cadence. It gets even more interesting, as it takes around 4-5 times longer for the leg musculature to deactivate after the downward stroke than the time to reactivate on the upstroke. The need to overcome this muscular characteristic is one of the reasons why over speed cadence training is so necessary.

14. In praise of coaches: A truly good coach knows considerably more about training than you or I do, especially if they have worked with several successful sprinters long enough to learn what works and what does not. With a good understanding of human nature and, ideally, with good communication qualities, a coach can be of immense value to you. What are your strengths and weaknesses, and where are your limitations? Should you pursue a 'top down' training approach (where the season training starts with a lot of mileage training and progresses to faster training as the season approaches) or a 'bottom up' training approach (where the season training is mostly short distance training throughout the season? Which is best for you and why? A local coach is best, but an email / Zoom coach can be - and is for me - hugely valuable to guide my sprint-specific training cycles. My coach (Zac Williams) was in the NZ sprint squad and is an excellent communicator. My training plan optimises my available time and personal potential. I regard this as essential at my age, and worth every penny.

15. An excellent approach to weight and on-the-bike and/or stationary training is periodisation. Periodisation typically comprises a series of 'blocks' or 'phases". Different coaches will call blocks by different names. Still, they probably take a similar form to Rest and Recovery, Preparation, Strength, Adaption, Speed Endurance, Speed, Taper and Event phases. Once again, an experienced coach is of immense value in planning effective training programs.

16. It is usual for sprint training practice to undertake some strength, acceleration, power, and easy riding during a training mesocycle (usually two to four weeks). However, they will be 'polarised' to the particular periodisation phase one is in and the proximity to major races. Charlie Francis popularised this training method for track and field sprinters, and it is widely used across track and field and velodrome sprinting to the highest levels in sport.

17. Periodically vary your training program in the gym: One of the keys to continued progress in both gym and bike work is to vary the exercise type. This is straight out of the Powerlifters and Track and Field handbooks and helps prevent progress stagnation and exercise boredom. For example, following a period of, say, five weeks of squatting, follow it with three weeks of, say, box squats. After three weeks of, say, thirty-second seated accelerations, swap them out with, say, 13-second standing accelerations. It will all depend on the phase and the rest of the program. But the principle applies.

18. One should lift with a near-maximal intent on each rep across your sets in the gym. This helps increase neural drive, motor unit recruitment and rate of force development (RFD), and the all-important Type II (fast twitch) muscle fibre development. We strive for this as a sprinter in the gym and on the bike. Related to this, one school of thought for optimal Type II muscle development is that your training reps should not be undertaken to failure. That is to say, you should leave a rep or two 'in the bank' with each set. Repping to failure is usually reserved for bodybuilding and not strength building. Even powerlifters do not lift to exhaustion, saving their PBs for competitions. The problem with training to failure is that residual fatigue per set increases "exponentially' as one gets close to failure, while training stimulus does not. So, if the training session involves a single set, it can be a good idea to take the set to failure. However, for a sprinter seeking strength, the exercise sets usually involve multiple sets, providing a more significant overall workload and greater super-compensation for sprinting purposes.

19. The emphasis on exercise type, volumes and intensities will vary according to which training phase one is in. For example, there is likely to be greater work undertaken in the gym during a strength phase than in a pre-race phase. And, as the spring and pre-race phase approaches, you might move from a typical three days a week in the gym to two days - with more time spent at the track or on the stationary trainer. One more example: as you move from a strength phase to a speed-endurance phase, your volumes of sets and reps in a gym will decrease significantly as you balance out your physical, mental and neural efforts to focus more specifically on going fast on the bike.

20. Combining your gym work with on-bike, stationary trainer and track work will inhibit your rate of growing stronger in the gym and cap your gym PBs. But that's OK. After all, your goal is to be a faster track cyclist, not to lift more weight in a powerlifting competition. You can and will grow stronger in the gym. Only it will be at a slower rate than if you were only doing weights. Remember that gym boasting rights are less valuable to track cyclists. Flying 200 times are the gas!

21. Primary gym leg exercises across a training week typically combine Single Leg Presses and/or Squats (front and/or back) and/or Bulgarian split squats. These might typically be combined with dead lifts or trap bar lifts, Romanian dead lifts, leg curls (seated or Nordic) for the back and posterior chain and accessory lifts for the core. Squat jumps, single-leg press thrusts and clean pulls might be added closer to race season, which help transition the gym training stimulus from a strength focus to more powerful and faster movements.

22. Secondary leg exercises in the gym across a training week could include step-ups, lunges, hip-flexor raises, hip thrusts, or bent-over rowing.

23. Primary exercises on-bike, stationary trainer or on the track across a training week will vary between sets of 13 and 60-second reps. Whether these are undertaken on an stationary trainer in the garage or on the track will depend on the time of year, the weather, and proximity to a velodrome.

24. Know the value of seated accelerations as you learn how to apply maximum torque and power through the pedals. Always train your seated acceleration reps in a full racing tuck to help ensure your race-specific muscles are trained at race-specific angles. Keeping in racing tuck across your seated acceleration reps helps you to hold form when it matters under pressure in a race.

25. Also, know the value of standing accelerations on your bike or stationary trainer as used for standing starts (obviously) and stepping a touch more speed out of a corner to hold off an opponent on your tail in the last lap or so of a match sprint or Keirin.

26. The times (or distances) of your on-bike, stationary trainer and track training will vary between 13 and 60 seconds to target your alactic and anaerobic energy systems. They may also vary between seated and standing accelerations. Again, they will vary between smaller gear accelerations (say, about 5 - 10 gear inches below your target event racing gear) and big gear accelerations (say, about 10 - 15 gear inches above your target event racing gear). Each variation will depend on your strengths and weaknesses, your periodisation phase, and the balance within your overall program.

27. The total volume of work you can achieve and sustain in the gym will likely grow each year you train. I think of it as a bit like 'alcohol tolerance'. After a continued period of weeks (or months/ years), constant training produces a lesser effect, or increasing training volumes are necessary to produce the same effect. You will be able to tolerate more workload each year, which is a helpful variable to stimulate additional adaptation. Additional workloads required to stimulate strength adaptations must be balanced by using varying exercises to avoid physical and mental stagnation and the need to recover and adapt sufficiently.

28. When starting track sprinting, you will think you are exerting energy maximally and probably are for your initial anaerobic fitness level. However, if you are new to the sport (or come from an endurance background), you can further develop your alactic energy system and ability to exert effort. Putting the hammer down as a sprinter is something else! A sprinter's alactic energy system must be trained and developed together with your mindset, focus, and neural capacity to allow you to 'dig deeper'. Speaking from experience, when I first started sprint training, I would finish a flying 150m rep and be ready to start another within 3 or 4 minutes. My experienced sprinter training partners took at least fifteen-minute breaks between efforts to recover fully - and needed it. I felt ready to do another rep quickly because I hadn't yet developed my alactic / anaerobic energy system. A typical session of flying 100s might be, say, 5 x 100m efforts, but they are h.a.r.d. out, digging deep into the alactic energy system, and with, say 15 min rest periods.

29. Training frequency. A rule of thumb might be 2-3 gym sessions a week and 2 possibly 3 on-bike, stationary trainer or on the track sessions a week during the off-season period, moving towards 2 x gym sessions and 3 possibly 4 on-bike, stationary trainer or on the track sessions a week going into your pre-season phase. Professionals will gravitate towards multiple double sessions a day several times a week, but this article is written for non-professionals!

30. Some senior (non-professional) Masters sprinters keep the gym work going over the winter but take a break from riding, then pick it up again in the spring when the snows have melted from the track. It does depend on a range of factors, including your available spare time and your level of competitiveness. Some outstanding track sprinters spend a few months in the gym over the winter before returning on the stationary trainer.

31. Big gear sessions: You would normally undertake big gear sessions only once, twice a week in your off-season or strength phase and not continue into your racing season. In many ways, big gear sessions are the 'ultimate 'bike-specific gym sessions.' If your in-season flying 200m racing gear was 105 gear inches, you might start your big-gear strength session on around 125 - 135 gear inches. And you would do only 4 or 5 reps per session of, say, 30-second reps, with, say, 10 minutes between reps. At 65 years, I do a winter block of 60 seconds x 5 reps seated on 58 tooth chainring x 11 tooth Velobike sprocket (58 x 11). But this is interwoven with speed accelerations on a small gear, 30-second standing on 58t x 11t, and other acceleration variations.

    There is no silver bullet. However, intelligently mixing and matching these elements of big gear, small gear accelerations, standing strength endurance and such like - in with intelligent gym work - contributes greatly to solid grounding for the spring pre-season, applied track work.