



Cadence Ladder 80 – 100 rpm

Flat Road Cadence Drills

Created by Jennifer Sage, ICA Master Instructor

Training Type: Skill development, awareness

Working HR Zones: Zone 3-4

Total Class Length: 60 minutes

Profile Objective and Intensity:

The objective of this ride is to ride through a range of cadences on a flat road, helping students become aware of where their preference lies, where they become challenged, and how to smooth out their pedal stroke in order to widen their cadence comfort zone. This profile is limited to the most optimal and most recommended cadences (outdoors and indoors) for the widest number of people, which is about 80-100rpm. Sure, there are always exceptions; there are skilled cyclists who can pedal faster than 100rpm for extended periods with a high power output, but it is not the norm. And just because your student can pedal at 120rpm or more, doesn't mean they are doing it correctly! If they are bouncing, they must work on their technique and most likely, they need to add resistance.

This is not an easy profile – higher cadences tend to challenge the cardiovascular system more than higher resistance workouts. So for some, their heart rates may be high. From a technique standpoint, for some students, anything over 90 or even 85rpm is challenging if they haven't learned to pedal effectively. That is, unless they rely on the flywheel to turn the pedals for them; in that case, they may be spinning their legs well over 100rpm and think it's easy.

While this is an excellent profile in the early stages of a periodized program, you can refer to it any time of the year, especially when you have a fairly new group (new class, new program, new students) whom you want to introduce to cadence drills.

For cyclists, higher cadences are more desirable and thankfully, are very trainable with focused effort, paying attention to technique, and of course, a very good bike fit. One cannot pedal very fast unless the body is set-up correctly on the bike. Good pedaling technique is essential to improve economy. When your economy improves and you become more efficient, you will be able to translate that “cost savings” into a higher resistance (gear), thus increasing your power output. Outdoors that will mean you can ride faster for the same perceived exertion. Indoors it means you can add more resistance to a given cadence, or increase your cadence against a given resistance, without spiking the heart rate. All of this translates to greater fitness and greater power output (and hence, calories burned).

Music and measuring cadence

This is a simple ascending ladder from 80-100rpm. I use the beat of the music to define the rpm, and I tend to use longer songs, giving my students time to ingrain that cadence into their minds and legs. I tend to use more introspective songs without many lyrics (electronic, ambient, downtempo), but you can choose any songs you prefer, from any genre, as long as you gradually increase the bpm/rpm from 80-100rpm. Keep in mind that many mainstream songs are shorter

than the ones I've suggested, so you may have more songs with even more gradual bpm increases.

If you don't use the beat of the music to set the cadence, and you have cadence meters, you can certainly use those. If you don't have cadence meters, a third option is to use a metronome, but be wary of using it too much – it can get quite annoying. Only put it up to the mic at the beginning of each song when you raise your cadence, and then perhaps again for a few seconds halfway through to make sure people are on target.

Pedaling technique tips for higher cadences

Pedal stroke technique is a great thing to work on during cadence ladders like this. I do that somewhat in this profile, but it's not a primary focus. However, I do talk about some technique pointers you can give your students who do have trouble pedaling quickly. Many people will have a pronounced up and down movement of the shoulders that is in rhythm with their feet moving downward. It's pretty obvious that the shoulders can't move up and down that fast; this represents a major limitation for some people who find they cannot pedal quickly. The bobbing shoulders in this case is not a result of the jerky leg movement, it's the other way around. The bobbing shoulders limits the movement of the legs. These students need to be taught to disconnect their shoulder movement from the legs. Once they do, they will find they can pedal more quickly. This does not mean isolating or freezing the upper body – in fact it is the opposite. You don't engage any more muscles to quiet the upper body, you relax them. There is a subtle rhythm of the upper body but it is not dependent on the leg pedaling action. Does that make sense?

Practice doing this on your own so you can demonstrate in class how to remedy it. Notice how when the shoulders move downward every time each leg moves downward, once you get into faster cadences, it's not possible to continue smoothly. Think about it this way; if the shoulders move downward with each leg, then a 60rpm cadences means the shoulders are bobbing 120 times (doable), and a 70rpm cadence means the shoulder are bobbing 140 times a minute. It's easy to see why they cannot continue this at 80, or especially 90rpm!

The goal: decouple the up and down movement of the shoulders from the pedaling motion. Let the rhythm of the legs allow the upper body to move subtly, but not enough to tie it directly to each pedal stroke.

Stay Tuned for Cadence Drills #2

This Cadence Ladder 80-100rpm is Cadence Drills #1. I will provide another audio Master Class that will build on the skills developed during this ride. It is called *Accelerations* and is perfect to do within a week or two of doing this Cadence Ladder. It will begin at 80rpm and venture into 110-115 rpm in short intervals, using various cadence drills known in the cycling world as “spin-ups” and “accelerations”.

A Cadence Ladder – 80-100rpm

Warm-up: Mystery Case, Alex Cortiz 78bpm 5:46

Explain the goal of the training session. Raise the HR to Zone 2 by the end of the song.

Today we are going to do a cadence ladder on a flat road. We will start around 80-ish rpm and move to about 100rpm. Nothing too fast, but the goal is to get you to pay close attention to how each leg speed feels, and to search for ways to be even smoother, more efficient as you pedal. If you are an outdoor cyclist, this is an excellent way for you to expand your cadence choices – to think “outside of the box”. As you might know, the term “spinning” as it relates to cyclists generally refers to pedaling more quickly at a lower gear. So in a way, this is the “real” cyclists version of “spinning”!

If you don't ride outside and wonder why this might be important, when you have the skills to pedal more quickly in a more efficient manner, over time you will be able to add more resistance to that. That translates to a greater power output, which translates to burning more calories! So it's great for everyone!

A lot of what we will do will be seated, although I will get you out of the saddle for 30-60 seconds at each cadence level. That may spike your heart rate a bit, but you will focus on the speed and smoothness. When we get much above 90-ish rpm, it becomes too challenging for most people to stand effectively – too many people resort to bad form such as leaning on their hands. I won't want that, so when we get into those higher cadences around 90+rpm, I'll be watching your form carefully. I might ask you to sit down or slow down your legs – much better to have good form than to take any risks. You always have the freedom to take short saddle breaks and slow your legs down when you stand. Do this if you cannot stand with good form or without going completely breathless.

Ready to “spin” your legs?

The Dream, Aris Kokou 82bpm 6:18

(The beat takes about a minute to get going)

This first song is a nice mild flat road cadence of 82rpm. Grab that beat, and acknowledge how good it feels. This is a nice rhythm, not too stressful. Now add enough resistance to feel the road underneath you. Over the next 5 minutes we'll just add little bits of resistance at a time. Pay attention to your breathing – you want to be in control of your breath at all times.

(After a minute)

Legs feel good, they feel warm. Add a tiny bit more resistance,

(After 2 minutes).

Feeling good – we are being very gradual here with resistance. Let's add a tiny bit more. In the next minute, I want your HR to rise into low Zone 3. Moderate.

(After 1 minute)

We are going to stand up. You will probably have to add a bit more resistance, but before you do, look at where your resistance dial is right now. I want you to hold that cadence when you stand. It will raise your HR, but that's OK, just don't let it get to breathless – not just yet.

Stand up for 30-40 seconds, paying close attention to your students' form. Personally, I believe that even on a "flat road" when you stand, the hands should move to the sides for stability and support, because this is how it is done on a real road bike. (That means no Spinning® HP #2 when standing). Right before they sit back down, tell them this:

You're about to sit back down, but when you do, do not let the leg speed change at all. Now sit back down and take your resistance back right to where it was. If your HR went a little high, use your breathing to bring it back down to a moderate level. We'll get more challenged as we go along.

The Words, Disco Volante, 85rpm 7:41

As soon as the beat starts, have them grab onto it.

This song is 85 rpm, only 3rpm faster than the last. Don't touch your resistance knob and just pick up the slightly faster rhythm. Settle into it, see if you can notice that subtle difference

(Be quiet for about 2-3 minutes to let them focus)

You may notice that we started at the same resistance as we ended the last one. We are going to do that for each song and see how your heart responds, but at some point we will have to start turning the resistance down a little bit – otherwise, you can imagine that if we keep raising the cadence against this resistance, you will reach the point of not being able to continue.

Only you know when it's time to turn it down – but I challenge you to be very very subtle about reducing it. Our overall intensity should be in mid to high Zone 3, "moderate" to "somewhat hard". When we stand, it will go higher.

Ready to stand up at this cadence? Before you do, first look at where your resistance knob is right now, because when you sit back down, you'll immediately go here. Once you stand, add a little bit of resistance, and ask yourself "what can I do to be smoother? What can I do to be more fluid?"

Stand up for 30-45 seconds, paying close attention to their form.

Good, now sit back down, go back to where you were, stay on that beat.

Towards the end of the song:

As we proceed through these cadences, ask yourself where you like it the most. Why do you like it? Because you're good at it – you are more efficient there. Remember our goal, to expand that range in which we are efficient – to become better at a wider range of cadences. This comes with practice.

La Bonne Etoile, Tikal 88bpm 8:32

Another subtle increase. We're going from 85 to 88rpm.

You might have had a hard time noticing the difference between 82 and 85, or between 85 and 88, but there's a big difference between 82 and 88rpm, right? Shows us how much we can improve on our awareness.

This is a thoughtful song. Give them a lot of time to focus. Start at the same resistance, then coach them to reduce it a little if needed to maintain that same intensity. Halfway through, stand up again, for up to 1 minute. Once their form starts to fall apart, have them sit back down. It does no good to stay standing if they are flopping all over or resorting to mashing the pedals. HR may spike towards threshold during the standing segment.

Just before the next song, tell them this:

We are about to enter the 90's! This is where the challenge will begin for some of you. Those who ride a lot outside might find this easier.

Exposure (Aes Dana Remix), Aural Planet, 90bpm 6:28

This song takes a little over a minute to pick up the beat. You can decide to use the first minute to stand at a slower cadence for a saddle break. But once the beat gets going, it's a great rhythm to pedal to.

Listen for the new rhythm, pick up the legs just that tiny bit. Settle into it. I'm going to let you alone for the next 3 minutes, so you can focus. Breathe into your pedal stroke. Relax all the other muscle groups that aren't involved in turning those pedals, so your legs have everything they need to be efficient! For the next few minutes, I want you to concentrate on the upward part of the pedal stroke; place your attention on the knees moving upward towards the center third of the handlebars. Don't try to pull up harder, simply place your attention on that part of the pedal stroke.

4 minutes into it:

Nice work – how's that feel? When you focus on that upward part, you might feel a little burning in the hip flexors – simply because you're not used to using them. It's so very subtle...

We will stand up in this song too, but you know the drill, form comes first. If you cannot stand and keep a smooth round pedal stroke, then either sit down and focus on the faster cadence in the saddle, or if you still want to take that saddle break, you can stay standing but slow your legs down until you sit back down. Remember to look at your resistance knob before you stand so you can come right back there when you sit.

Once again, stand up for 30-60 seconds depending on the skill of your group. HR will rise, let them appreciate and enjoy the challenge. When you sit back down, encourage them to not let the legs slow at all, and to back their resistance right to where it was. Riders who have gone into anaerobic ranges may be tempted to slow the legs way down, but don't let them – part of this process is to learn to recover while the legs are spinning.

Days Go By, Dirty Vegas 127bpm 5:01

Intermission! Yes, you get a little break from the more focused cadence work. Let's stand up here on a hill, stay standing for a minute, then sit down and ride however you want for the next 4 minutes. Keep in mind that we have 2 more songs at 94 and 98rpm – you will want all of your attention focused on that faster leg speed so don't wear yourself out in this song.

(Let them go during this song. You can climb seated or standing, or you can use it as a bit of a recovery before heading into the faster leg work. This depends on your group.)

Arab Star, Warp Technique 94bpm 10:42

(This song takes 2 minutes for the beat to pick up. You can ask them to try to find 94rpm on their own, or if desired, extend your break).

This song is 94bpm. You can't hear the beat yet, but I want you to pick up your legs and see if you can guess where 94 rpm is. First find the cadence, then dial in a resistance/gear that is either the same or perhaps a little less than you had on the 90rpm song before this last climbing song.

(Once the beat picks up...)

There it is, how did you do? Were you close? This is fairly fast – if you have trouble with this, you aren't alone. That is, except for those people who tend to let the flywheel turn their pedals for them. That's not you though, right? I've taught you all to never rely on the flywheel!

Because you do have some resistance on there, this is most likely not a low heart rate, unless you are a very efficient and elite cyclist. You should be working here! Stay in high Zone 3, low Zone 4, at the very least, try to stay below your threshold.

If you do have trouble with this faster rhythm, let me give you a few tips to make it easier. Relax your upper body. If you tend to bob your shoulders with every pedal stroke, you can't do that at higher leg speeds, you've got to quiet your upper body. That does not mean FREEZE it! Don't engage any more muscles to keep it from moving, rather you want to quiet down any bobbing up and down of the shoulders that is in time with each foot you press downward. Breathe and relax into the shoulders. When you take away that bobbing that is timed to the movement of the feet, you will be able to move your feet more quickly.*

* This is a good time to demonstrate this for your students. You may have to get off the bike to work individually with students who ride like this. I will place my hands on their shoulders as they ride to emphasize where they need to quiet it down.

This is a long song, allowing for you to focus on different parts of the pedal stroke as desired.

Work on the top, the bottom, and the upstroke.

Another tip is to focus on the upstroke for a minute or two, like we did a few songs ago. That should help you spin the legs a little faster.

(After a minute) Now focus on the bottom part of the pedal stroke, simply feeling the heels pull back and upwards towards your butt.

(After a minute) Now focus on the top part of the pedal stroke, as your toes push forward and over the top.

You can try standing for 10-15 seconds once or twice in the song at the faster leg speed. If they cannot do it without resorting to leaning on the handlebars, let them take a short saddle break with slower legs.

Sakarya, Banco de Gaia 98 bpm 5:39

In this song the beat picks up right away – try to grab it from one song to the next.

OK everyone, this is the final one, this one is 98bpm. First try it with the same resistance you had for the last one, and see if you can't manage the intensity, keeping your breathing under your control. If your breathing picks up too much, if you become anaerobic, then back it down just a little bit.

For some of you this 100-ish rpm is very challenging. If you are bouncing in the saddle, and/or your HR goes way too high, then I want you to do it in intervals. Hold it for 1 minute and focus... Then take a 30-second break without touching the dial, but slow the legs down. This is optional, but it's a great way to allow yourself to do it with as much good technique as possible if you are having challenges.

Coach them through this song with 1-min at 98rpm, and 30-seconds break with slower legs throughout the song for those who need it. Your cyclists and/or more skilled riders can hold the 98rpm the entire song as long as they can do it without bouncing. It is up to you if you want to try a very short standing segment, towards the end of the song – 10-15 seconds. This is very fast so do not try to stand much longer than that because it is just not possible for many students.

Tight Flair, Tara Putra 82bpm 8:36

Cool down. Try to grab this 82rpm beat as you cool down, learning to recover while the legs are still spinning. Turn the resistance way down. Some of your students who had difficulty with the higher cadences (and might have gone anaerobic for longer periods) may need to pedal slower in the cool down to bring their HR down. You also may want to get them out of the saddle at the beginning of this song for a short slower cadence saddle break.

Excellent job everyone. Welcome to the most appropriate cadences for riding a real bike outside. I hope that has shown you the challenges of riding at a real cadence with a real road resistance. Always remember, the smoother you are, the more skill you acquire, the more efficient you will be. What that means is that your HR won't be as high for a given cadence/resistance combination. When that happens, you have become more fit! And it also means you can usually start to add a little more resistance, increasing your power output.

Lead them through a cool down and stretch.

A Cadence Ladder 80-100rpm

Quick Profile

Created by Jennifer Sage, ICA Master Instructor

Training Type: Skill development, awareness

Working HR Zones: Zone 3-4

Total Class Length: 60 minutes

Warm-up – 6-8 minutes

Announce the purpose of the class, to introduce them to the most recommended and appropriate cadences for riding outside, as well as inside when they aren't on a hill.

Have at least 6-8 songs gradually increasing from about 80rpm to about 100rpm, in 2-4 rpm increments. On the first song, resistance load until they feel a perceived exertion of moderate to somewhat hard. Most of the class will be there, with some increases to threshold (perhaps short periods above) when they stand at the higher cadences.

When they stand, keep it 30-60 seconds, and watch carefully for form, especially as it gets faster. No leaning on the handlebars, no resorting to mashing the pedals. When in the high 90's, you may allow them to slow the legs down for a saddle break when they stand.

It is an option to take an "intermission" about 2/3 of the way through, just before going into the mid 90's for rpm, with a song that is 5 minutes or less at a climbing cadence. This gives them a mental and physical break.

Cool-down/Stretch 8 minutes

A Cadence Ladder Playlist

Song title, Artist, Album, bpm, length

Mystery Case, Alex Cortiz, Mood Food 78bpm 5:46

Amazon, iTunes

The Dream, Aris Kokou, Drum 'n Bass Area, Volume 2 82bpm 6:18

iTunes

The Words, Disco Volante, Mashed Mellow Groove 85rpm 7:41

iTunes

La Bonne Etoile, Tikal, Carnaval 88bpm 8:32

eMusic

Exposure (Aes Dana Remix), Aes Dana, Memory Shell, 90bpm 6:28

eMusic

Days Go By, Dirty Vegas 127bpm 5:01

There are many versions of this song on every download source

Arab Star, Warp Technique, Make Animals Happy 94bpm 10:42

Amazon

Sakarya, Banco de Gaia, Arabian Travels: A Six Degree Collection 98 bpm 5:39

eMusic

Tight Flair, Tara Putra, Hidden Sense 82bpm 8:36

Free Download at EktoPlazm <http://www.ektoplazm.com/free-music/tara-putra-hidden-sense>

Some alternative rock, pop, and indie songs from 80-100pbm

Awake, Seventh Day Slumber, Finally Awake 100bpm 3:43
 Drumming Song, Florence + The Machine, Lungs, 100bpm, 3:44
 Kryptonite, 3 Doors Dow, 99bpm, 3:58
 It's All Over Now, The Rolling Stones, Forty Licks 99bpm, 3:28
 Eminence Front, The Who, Greatest Hits 98bpm, 5:43
 Superstition (Todd Terje Edit), Stevie Wonder 98bpm, 8:57
 Love is my Religion, Ziggy Marley 97bpm, 3:43
 Hey Soul Sister, Train, Hey Soul Sister, 97bpm, 3:36
 Sweet Home Alabama, Lynyrd Skynyrd 97bpm 5:00
 She's on Fire, Train, Drops of Jupiter 96bpm, 3:49
 Sledgehammer Remix, Peter Gabriel 96bpm 6:39
 The Love Cats, The Cure 96bpm, 3:39
 Love the One You're With, Steven Stills 95bpm 3:40
 Temple of Love, Enigma, Temple of Love, 95bpm 4:40
 Dances of Resistance, Babylon Circus, Dances of Resistance 95bpm, 3:53
 I Love Rock n Roll, Joan Jett, 94bpm, 2:54
 Why Can't We Be Friends, War, Best Of, 92bpm, 3:47
 You Can't Always Get What You Want, Rolling Stones, Forty Licks 92bpm, 7:29
 Let There be Rock, AC/DC 91bpm, 5:00
 iRobot, Alan parsons Project, D*R*T*Y Edits Vol 1, 90bpm, 8:33
 Bang Bang (feat Adam Levine), K'naan, Troubadour 90bpm, 3:07
 Yellow Moon, Neville Brothers, Live on Planet Earth 89bpm, 4:57
 Are You Happy Now, Michelle Branch, Hotel Paper 89bpm 3:49
 How do You Love, Collective Soul, Youth 89bpm, 4:20
 The Boys of Summer, Don Henley, 88bpm, 4:48
 Bring Me to Life, Thousand Foot Krutch, Welcome to the Masquerade 88bpm 3:36
 Stranger in a Strange Land, 30 Seconds to Mars, This is War, 87bpm, 6:53
 Primary, The Cure, Staring at the Sea, 87bpm, 3:36
 Say Hello, Little Spitfire, Say Hello 86bpm, 3:58
 Make it Take it, Amanda Blank, 86bpm, 2:26
 Dreaming Against Me, Seven Mary Three, Day 'n Night Driving 86bpm, 3:05
 Running Down a Dream, Tom Petty, Full Moon Fever, 85bpm 4:25
 Leave the Memories Alone, Fuel, Angels and Devils, 85bpm, 3:58
 The Outsider (Apocalypse Mix), A Perfect Circle, aMotion (Bonus Remix CD) 85bpm, 5:28
 Sunday, Heather Headley, 85bpm, 3:27
 The Last Time, Rolling Stones, Forty Licks, 84bpm, 3:42
 American woman, Lenny Kravitz, Austin Powers 2 84 bpm, 4:20
 Lose Yourself, Havannah Drive, 84bpm, 3:23
 Silent Screams, Eowyn 83bpm, 3:45
 Wild in the Streets, Bon Jovi, Slippery When Wet, 82bpm, 3:54
 Kings and Queens, 30 Seconds to mars, This is War, 82bpm
 Teen Angst, Cracker, Greatest Hits Redux, 81bpm, 4:05

Please see the ICA Audio Master Class *Cause and Effect* for some other suggestions of faster bpm mainstream songs.