Injury Prevention for Runners

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PART 1
Welcome!
Welcome to the Injury Prevention for Runners program! This program is designed to be your personal MBA on injury prevention, how to train smarter, and finally stay healthy.

I’ve pulled the very best information from the very best sources to highlight only the most effective, actionable coaching advice that really works. This program has been produced and tested over two years, using research and information from:

- Injury prevention yoga workshops
- Nearly every running book on the market
- Interviews with the best runners, coaches, scientists, physical therapists, and authors in the world
- The USA Track & Field Coaching Education Curriculum
- My 15+ years of competitive running experience (including my injury-free training since 2009)

As you can see, I didn’t just cobble together this program from a few books or my own personal experiences. No, I went deeper. I bought the best prevention books available, attended clinics on healing ITBS, and spoke with the brightest minds the sport of running has to offer.

My goal is to provide you with the best education possible on injury prevention and treatment. But more than that, you’ll get specific action steps to help you implement this program into your current training.

But before we get into the really good stuff, I want to be clear on what this program really is: it’s a comprehensive system that details how runners can stay healthy while still running a lot, with prevention and treatment advice that you can implement in your training starting today.
If you’ve been a reader of Strength Running for a while, you know that I love actionable coaching advice. Training tips and wisdom that you can implement now are much better than general theories that sound good on paper, but then leave you wondering what the hell you’re supposed to do next.

Here, you’re going to get actionable strategies that you can use today. The more you implement, the healthier you’ll be with fewer overuse injuries. I’ve interviewed physical therapists, coaches, and even attended workshops on how to use yoga to heal injuries (I’m a little neurotic about injury prevention).

Researching and creating this program and these strategies took years and thousands of dollars. I collected tens of thousands of data points and I’m confident that this program will get you results.

But with all that, I also want to be clear that this program is not a panacea. Even if you use all these prevention tactics, adopt my running philosophy, and follow every piece of advice, you could still get hurt.

That’s because as humans, we’re incredibly good at pushing ourselves out of our own comfort zones. We can hammer our bodies every day even when we should be resting. As we chase faster times and performance targets, it’s easy for us to over-reach. And some of us are more susceptible to overuse injuries because of our specific anatomy, lifestyle, and biomechanics.

For these reasons, overuse injuries may still occur.

Most runners will get hurt this year - and those who do often battle several injuries. It always seems that after you fix one nagging pain, another one crops up. However, this program can help dramatically reduce that risk. You might still get a few aches and pains when you do a little too much, too soon, but your risk of serious injury will be much lower.
The career-ending injuries like regular ITBS, a ruptured Achilles tendon, or chronic stress fractures should be nonexistent if you follow this program.

Our goal is smart injury prevention - and it’s going to take some work.

The real “secret sauce” to running success is consistency over time. Just like with your training, you also have to be consistent with your prevention efforts. If you skip strength routines and never bother to implement any variety into your running, then you’re not putting in the work.

I love it when runners take action, and since you invested in this program, I’m expecting you to work harder than other people. When you do, you’ll reap the rewards.

* * *

I want to tell you a quick story about consistency. There’s one runner in my 1-on-1 coaching program who hasn’t had an injury worth any mention for over two years. She’s dropped her half marathon time from 1:51 during our first month together to 1:38, plus she ran 3:29 at the Boston Marathon.

So what’s her secret? Simple: consistent training. She’s able to run consistently because she has a great coach (I’m shameless), runs smart workouts, and does an hour or more every day of strength, core and flexibility exercises. Of course, I’m not saying you need to do all that. But I’m illuminating the need for consistency with your prevention work if you want to stay healthy.

Before I mention a few tools and resources that you might find helpful as you go through the routines in this program, I want to mention one thing: focus on the process, not the outcome.

What do I mean by that? Well, there are some runners who only think about the outcome, like “Fix my ITBS so I can qualify for Boston” but they never approach that goal through any systematic way. I’m going to provide you that process, that systematic way of staying healthy. It’s your job to focus on the process - the results and outcomes will come as a natural product of being process-oriented.
I want to mention that all of the strength, core, and mobility routines in this program can be done almost anywhere (there’s only one Gym Workout, and it’s optional). Most require no equipment. This is obviously by design so this program is easily implemented without any additional costs.

However, some exercises are best performed with a few simple pieces of exercise equipment that you can buy almost anywhere.

**Medicine Ball:** start with 4-8 pounds if you’ve never done any strength work. The med ball is a versatile strength tool that can be used for the upper body, lower body, and core.

**Thera-Band:** this elastic tubing is helpful when strengthening the hips and is used in my ITB Rehab Routine. There are several new variations of that routine in this program, with more exercises, so get a medium strength band (or a multi-pack of low, medium, and high resistance).

**Foam Roller** (or **The Stick**): Perfect for self-massage, a foam roller is great for the larger muscle groups while the Stick is better for the hamstrings and calf muscles.

**Compression Socks:** Not absolutely necessary, but I’ve found them helpful after difficult workouts. The research indicates they can be effective at alleviating minor muscle soreness when used after your run.
Why Do Runners Get Hurt?

The million dollar question! Why do runners get hurt?

First, let’s separate the two kinds of injuries that runners can sustain: traumatic vs. overuse.

A traumatic injury is what happens if you trip over a curb and sprain your ankle. Or fall on a rock and bang your knee. Traumatic injuries are the result of one specific instance of acute stress.

Overuse injuries are what this program helps you with: repetitive stress injuries that we’re most familiar with like IT Band Syndrome, Achilles Tendinopathy, Plantar Fasciitis, and others. They are the result of cumulative stress inflicted over days, weeks, and months of running.

Most repetitive stress injuries are the result of running too much mileage, too quickly, too soon. Nearly all injuries happen because runners don’t structure their training to avoid the “3 Too’s” (more than simply strength exercises, this program will help you structure your training properly to avoid this problem in the future).

But we can dive deeper and explore each component of the “3 Too’s” to further understand why we get hurt – and what we can do about it.
1. Too Much

Most runners increase their mileage too quickly before their body has time to adapt to the workload. Running is stressful! Each step sends impact forces equivalent to 2-3 times your body weight through your legs. If you don’t allow enough time for your leg musculature to adapt, you won’t recover quickly enough and you’ll be sidelined with an injury.

Later in the program I’ll show you the right way to increase your mileage so you’re always doing the correct amount.

2. Too Quickly

I want to be blunt: you’re probably running too fast. Many injury-prone runners do their running at a hard effort every day. Rather than structuring their training correctly (I’ll show you how to do this soon), every run is a challenge.

Runners say things like:

“I want to make sure I’m working hard.”

“Running fast makes it feel like I’m getting in better shape.”

“I’m trying to work on my speed so I can get to a 9 minute mile pace.”

The reality of good training is that the majority of your mileage needs to according to the 3 C’s of easy running: comfortable, controlled, and conversational.

Too many runners are stuck in the grey zone of training, which is where their training runs are fast enough to be considered a tempo.

By running too fast, you’re putting even more stress on your muscles, bones, ligaments, and tendons. Rather than some runs being strategic recovery runs, your body never gets to actively recover.
3. Too Soon

If hard training is one side of the running coin, then rest and recovery is the other side. Instead of listening to our bodies and allowing it time to recover and adapt, we push onwards. To the next long run! To the next interval workout!

But without prioritizing sleep and allowing for sufficient recovery, every runner is doomed to get injured. Running is an enormous stress and if you do more than what your body is accustomed to, an injury is inevitable.

Recovery is so important that it’s one of the longest and most details sections in this program.

Now, this is a very general way of looking at why injuries happen (even though in 90% of cases, it’s an accurate framework). There are other big reasons why runners get hurt that complement the “3 Too’s.”

New runners are particularly susceptible to overuse injuries because their bodies have yet to adapt to the stress of running. Every run can be a challenge and even a slow pace feels difficult. Until beginners reach a point where their body has adapted to running, injuries are more common than in experienced runners.

Knowing the difference between soreness, pain, fatigue, and achiness is a learned skill that beginners often don’t have, especially if they have no previous background in sports. Understanding what warrants a day off and what can be run through is a difficult decision and new runners often run through the early warning signs of an injury. Later I’ll show you how to make this decision.

Another cause of injury is a history with injuries. Ironic (and frustrating) isn’t it? If you previously experienced a running injury, you’re more likely to experience it again!

Most runners take the same steps to heal from an injury: take time off, ice the painful area, take some anti-inflammatories, and see how it feels in a week. Sound familiar?

The problem with this approach is that it doesn’t get to the root cause of the injury, which is almost always an imbalance or weakness that’s exacerbated by the “3 Too’s”.

Injury Prevention for Runners
And there we have the major reason why most runners get hurt: **running too much, too quickly, too soon exacerbates underlying imbalances and weaknesses, resulting in overuse injuries.**

Preventing injuries must then take a more well-rounded, comprehensive approach than simply running less, adding strength exercises, or never doing any fast workouts (there’s a sure way to never get any faster!).

This program not only helps you structure well-rounded training to avoid the “3 Too’s”, but provides the tools to correct muscle imbalances and weaknesses.

When combined, this approach is dramatically more effective at preventing injuries than any other available.
Frameworks vs. Random Tips: The SR Running Philosophy

Before you can dive into the specific prevention and treatment strategies I have for you (don’t worry, I have a lot!) you must understand the running and coaching philosophy that guides them.

My philosophy prioritizes the important elements of running so you can get the results you’re looking for without freaking out about every little detail. This is my “system” of training – a running approach that develops the fundamentals while prioritizing injury prevention. To do this, it focuses on “training pillars.”

These pillars maintain baseline fitness with far fewer injuries. This “baseline fitness” is key to being a good runner – it means you can jump down to a short 5k race or up to a marathon relatively quickly without an overly dramatic change in training (those dramatic changes - like bumps in mileage or workout intensity - are usually what cause injuries).

The main training pillars in the Strength Running Training Philosophy include aerobic development, injury prevention, and variety – all three make specific training easier to accomplish when the time is right.

Obviously this program focuses on injury prevention, but you’ll see elements of all three woven into my prevention strategies and coaching advice. That’s why I want to go over all three so we’re all on the same page.

Aerobic development is the top training pillar for obvious reasons: without endurance, you can’t do much of anything. As Jim Butler, my former college cross country coach likes to answer (in response to what will fix any running problem), “MILEAGE!”
Over the long haul, endurance is built by a variety of training tactics:

- High mileage (your weekly running volume)
- Long runs
- Density of running (the number of runs you do per week)
- Aerobic workouts (tempos, progressions, marathon/half marathon pace runs, etc.)

Weaving these elements throughout a training plan using a sound progression is key. Do too much and you could get hurt. Do too little and you won’t get the training stimulus you’re looking for.

Injury prevention is critical for consistency and long-term development so it’s a close second in my philosophy. If you can’t run, how are you supposed to improve?

The basics include a good dynamic warm-up, core workout, and runner-specific strength exercises. That’s not all though – the overall training approach helps you stay healthy by avoiding the “3 Too’s” that we discussed earlier.

We’re going to explore all of this (and a lot more) in detail throughout this program, so stay tuned.

Finally, the SR philosophy centers heavily on variety to move along the adaptation process (i.e., to get you in better shape!) and prevent injuries:

1. Rotating 2-3 pairs of shoes to vary the stress on your feet and lower legs
2. Using 4 or more different paced workouts every week to boost your fitness
3. Running a variety of surfaces and terrains to change how your body is stressed
4. Training for different races throughout the year to work on different “types” of fitness
Of course, all of these principles are related: variety can prevent injuries. Injury prevention improves consistency so you can build more endurance. A higher aerobic fitness means you can do a wider range of workouts.

As elite coach Brad Hudson would say, “Everything matters.”

That’s the underlying training philosophy that guides how these training strategies fit into an overall running plan. No doubt you’re interested in staying healthy – that’s why you’re here. My coaching philosophy demands injury prevention.

But why is it so important?

I’m so passionate about healthy, consistent running that I recorded a private video for you.

Click the Image to Watch the Private Video
Now that you understand more about this program, my coaching and injury philosophy, let’s get started on a major injury risk: modern life.
Running Healthy vs. Modern Living

Living in the modern age has its comforts: fast transportation, accessible food, and machines and technology that do most of our hard work. These luxuries have freed up our time to devote to hobbies (like running and racing for fun!) and leisure.

But, with all the convenience of modern life, we’re slowly becoming a more sedentary, overweight, and inactive population. In fact, most people in the United States are either overweight or obese.

Since you’re committed to running, this probably isn’t you. You’re out there running and trying to become a better, healthier runner.

Even so, there are certain aspects of living in today’s world that must be considered when designing prevention and training programs. Even if you’re fit and healthy, modern life isn’t helping your running.

The Perils of Sitting
Here’s the sad truth: the majority of us spend most of the day sitting down. And long periods of sitting are inherently bad for us, resulting in:

- reduced HDL cholesterol (the “good” cholesterol)
- higher risk of diabetes, obesity, certain cancers, and heart disease
★ higher risk of dying

★ Think of prolonged sitting this way: it’s like smoking cigarettes. Even if you run every day and eat a great diet, you’re still a cigarette smoker. No amount of running or clean eating will undo that.

It’s beyond the scope of this coaching program to tackle lifestyle factors that affect general health. But there’s a real problem with sitting when it comes to day-to-day running performance: sitting wreaks havoc on your flexibility and general posture.

Sitting results in many types of postural and muscular changes that not only deteriorate your running economy (or efficiency), but can predispose you to running injuries. If you run after work (i.e., after sitting for about eight hours), then you’re especially at risk.

Just think: prolonged sitting...

★ reduces the flexibility of the hip flexors and hamstrings
★ creates a forward tilt of the pelvis
★ reduces blood flow to the legs, hampering the recovery process
★ weakens the glutes and hip muscles, reducing the stability of the pelvis while running

These immediate results from a day of sitting make you ill-equipped to handle an afternoon or evening run.

Now, many of the prevention strategies later in this guide are aimed at counteracting the imbalances, weaknesses, and inflexibilities that are caused by our sedentary lifestyles.

But before we get into those, I want to encourage you to vary how you spend your day. Of course you can still sit down (it would be crazy for me to suggest you don’t!), but it’s best to alternate between sitting, standing, walking, and even kneeling.
There are a combination of strategies that you can do throughout the day to help your body retain more flexibility and reduce the damaging effects of sitting down for long periods of time.

Ideally, you would alternate between:

- A standing desk
- A normal office chair
- An exercise ball
- An ergonomic kneeling chair

It’s also helpful to take frequent walk breaks and use your lunch hour actively instead of for more sitting. You can go for a longer walk, a short run, or a yoga class or lifting session if you have a gym membership nearby.

If you work an office job, it’s also helpful to do things the hard way: use the printer on the other side of the office, get up and walk over to a colleague instead of calling, stand up while you’re on the phone, go for a walk with a colleague instead of sitting down for a 1-on-1 meeting, and avoid using a chair whenever you don’t have to.

While you’re sitting, use the cue to bring your belly button to your spine (we’ll talk more about this cue later in the Running Form lesson) to activate your deep abdominal muscles and improve your posture. Do this several times per hour while sitting and even while standing to promote a neutral, efficient posture.

**Beware: Life Creates Imbalances**

Poor posture while sitting isn’t the only problem with modern life. Think about all the other actions you take throughout the day that contribute to muscle imbalances: driving a car (pushing the gas and brake pedals with your right foot and shifting with your right hand), carrying a shoulder bag on the same side of your body, crossing your right leg over your left (or vice versa), or always running on the same side of the road.
These activities don’t promote symmetrical muscular development. In fact, how we hold our bodies throughout the day can affect our soft tissue structure. Crane your neck at a computer for nine hours a day? Your body will naturally hold itself that way after learning that position over weeks, months, and even years of poor posture.

Finally, take a moment to evaluate your choice of non-running shoes. Do you wear high heels? Or constrictive, narrow dress shoes? Do you stuff your feet into inflexible, stiff shoes every day when you’re not running?

Modern foot wear is horrendous from an injury prevention perspective (particularly for those who are susceptible to plantar fasciitis). Runners love debating the minor benefits of neutral or stability running shoes but give barely a thought to the shoes that they spend most of their day wearing.

Ideally, shoes that allow your foot to comfortably rest in a neutral position are your best choice. Avoid shoes with a significant heel or those that constrict your toes. Pointy stiletto high heels are every coach’s worst nightmare. Just say no!

Alternative options for more dressy occasions like work include flats, driving loafers, and boat shoes.

Remember that what you do when you’re not running can contribute to your health just as much as running an appropriate mileage level or interval speed. Be kind to your feet when you’re at work.

Later in this program you’ll see strength and flexibility routines that have been developed specifically to counteract the effects of sitting and muscular imbalances. They’re increasingly common problems and we need to make sure you’re strong, loose, and ready to run!
Part 1 Action Steps

Each section of this program will include Action Steps that help you implement the material into your training. I want to make sure you’re actively incorporating the lessons into your running program rather than consuming the information.

This section tackles a big picture topic – lifestyle factors that affect injuries – as it comes before running-specific changes to your training.

**Step 1**: For one day, be aware of how much time you spend sitting down. You don’t have to keep a running stopwatch of how much time you spend on your butt (although I did – and it was eye-opening) but it’s helpful as most of us under-estimate.

**Step 2**: The next day try to reduce this time by 1-3 hours. If you work a sedentary job and spend your evenings watching TV or on the computer, aim to sit for no more than 5-6 hours total (the national average is over 9 hours per day!).

**Step 3**: Evaluate your casual shoes for rigid, high-heeled, constrictive models that could be contributing to foot and lower leg weaknesses. I won’t ask you to buy a new closet of shoes, but:

1. Wear high-heeled or constrictive shoes for one less workday per week
2. Never wear shoes in your home
3. Opt for more flexible, lower-profile shoes when you’re at more casual events
4. The next time you need new shoes, buy a lower-profile, more flexible option

Many runners look for a “magic pill” that will help them run healthy in the long-term. I’m fond of saying that there are no magic workouts, secret training strategies, or hidden coaching tactics.
Instead, we’re improving your foundation so you can live a lifestyle conducive to running injury-free.
PART 2
Design Better Training to Prevent Injuries
Now that we’ve covered the major lifestyle factors that contribute to injuries in runners – like sitting for prolonged time periods and wearing constrictive shoes – it’s time to focus on your training.

And from a high level, the best way to prevent injuries is to design effective training. When your program is appropriate for you and follows best practices of sound training design, you’ll get hurt far less than someone who has no plan at all.

The Strength Running injury prevention system provides a framework for prevention that includes six principles to help you stay healthy. This section of the program highlights the first two:

- Patience
- Variety

Each is critical to the injury prevention puzzle and we’ll cover how to best apply each principle to your training.

Of course, you could skip one (or maybe more) and stay healthy. But it’s much more effective to improve all of them for the best results.

Just like Part 1, at the end of this section of the program you’ll have several Action Steps that show you the exact strategies to implement. No more asking, “Gee, this info is great but what do I do now?”

And it’s critical to follow through: without applying this coaching advice you won’t benefit!

These first two prevention principles focus on Training Design – or how you actually structure your running program to promote healthy running.

Injury prevention is about more than doing a few strength exercises or taking an ice bath after hard workouts. Here you’ll learn how to approach mileage and race scheduling.
Before you work on yourself, you have to first work on your program.

Onward!
Patient Training = Smart Training

Have you ever noticed that most car accidents happen because people are impatient?

If you’re speeding, following too closely, driving recklessly and passing illegally, or otherwise rushing to get where you’re going, your risk of getting in an accident is significantly higher than if you took your time.

This analogy is perfect for runners. People who are impatient succumb to the Three Too’s: too far, too fast, too soon. To put this in perspective, I want to share two personal stories about how impatience can lead to injuries:

Click the image to watch a private video
If you’re not rushing to get in shape, you’ll never have to aggressively increase your long runs, total mileage, or the intensity of your workouts too dramatically (and you’ll avoid the same blunders I made).

Distance running is a long-term project. Any success - and certainly injury prevention - takes consistent training free of wild swings in mileage or workout intensity. Your workouts should have a gradual, progressive pattern.

Elite coach Greg McMillan tells his runners that it takes 2-3 years of consistent training to even see their potential (this is on top of eight years of high school and college running). Patience is critical; modest increases in training over a long period of time help you stay healthy and ultimately reach your goals. There are no shortcuts.

So you can understand when I get frustrated when I hear questions like:

★ Can I PR by 15 minutes in the 10k in a month?
★ I’ve been running 10 miles a week - can I run a marathon in 12 weeks?
★ Can you help me recover from ITBS so I can run a half marathon in a month?
★ I ran a marathon in September but it sucked, so I’m running another one in six weeks.

These runners are being impatient - and their injury risk is through the roof! Sometimes we search for the easy answer. But there are no secrets to preventing injuries or getting faster.

You have to have patience and put in the hard work (which sometimes means you need to do less to stay healthy). That means being realistic about what your body can accomplish in the near future, being consistent with your strength work every day, always doing a warm-up, and running consistently without wild swings in mileage.

I have to admit: this is the LEAST sexy topic in this entire program. But it might just be the most important. If there is a secret that I’ve learned after years of healthy running
(since early 2009) it's this: **consistency** with mileage, workouts, and prevention efforts is just as important as the hard work itself.

After I ran 2:39 at the 2011 Philadelphia Marathon my friend Greg Strosaker (a sub-3 hour marathoner himself) told me:

Everything you’ve done since the 2008 NYC Marathon has prepared you for this day – it wasn’t one good training season, or a few key workouts, it was the full body of work and the physiological gains you developed in patiently executing it.

I like to joke that the new! sexy! easy! training tips out there are “training porn” and the real valuable coaching wisdom isn’t catchy enough to resonate with runners.

But I know you’re different. You recognize that hard work, consistency, and patience are what really differentiate healthy, successful runners from those who are always struggling.

**The Patience Protocol**

To help you implement more patience in your running and avoid the “Three Too’s”, follow the *Patience Protocol*.

It has three rules:

1. **Know your baseline mileage.** This is the level that you’re comfortable at but not struggling with. Every runner has a "baseline mileage" that they’re comfortable running but it’s different for each person.

   Look over the last 4-6 months of your training. What's your "mileage baseline" where you feel comfortable? This is your starting point. Most of your training cycles should start slightly under your baseline mileage. Then add about 5-10% more mileage every other week.

   If you’re looking at a marathon or half marathon soon, but can’t increase your
mileage and long run according to this rule in time, then you’re not ready to run that race. Pick one further in the future.

A detailed example of what a “baseline mileage” would look like is what I like to call “The Goldilock’s Principle” – it’s mileage that’s just right. You’ll want to eventually have some long runs and weeks of mileage that are ultimately pushing this boundary higher, but here’s how it looks in graph form:

![The Goldilocks Principle Graph](image)

2. Use “Adaptation Weeks.” You should repeat a week of mileage, long runs, and workouts for most weeks in your training plan. This allows your body to absorb the training, get stronger, and adapt to the higher workload. It also helps limits your risk of injury.

Remember the Stress-Adaptation Principle of Running (a less detailed version of the Goldilocks Principle graph):
After a tough workout, you experience a certain level of fatigue and muscle damage. You’re actually in worse shape after the workout!

But when you rest and allow yourself to recover from that workout, you adapt to it, supercompensate, and get stronger. An Adaptation Week allows this recovery.

Remember that using Adaptation Weeks is a general guideline. You’ll see it at work in my training plans, but keep in mind it’s not an absolute. You don’t have to repeat everything every single week.

3. **When in Doubt, Sit it Out.** If you’re not sure whether a workout is too difficult, a race is too soon from your last one, or a particular long run increase is too aggressive, then it probably is!

Every change to your training is a new stress: an extra interval at the track, mile on your long run, or 5% bump in weekly mileage. If you’re increasing all of these things, be cautious and reduce any workout where you feel you’re pushing yourself too far or fast.
There are no "magic workouts" or "perfect mileage levels" that will bring glory and PR's if you run "X" number of intervals or miles per week. Increase your volume gradually and be more cautious when you’re above your mileage baseline. Also be careful when you’re increasing more than one training stress.

A good training plan uses these principles to guide mileage, workout progressions, and long runs in a smarter way. If you follow a plan that’s appropriate for you and stay patient, you’ll never succumb to the “Three Too’s!”
After years of helping runners design better training, I’ve noticed a very consistent trend among the majority of people: their training is boring!

They run the same races and train in the same shoes, on the same routes, doing the same workouts month after month (and often year after year). It’s no wonder so many runners are stuck in a rut or always dealing with chronic injuries.

See, they’re called repetitive stress injuries for a reason: they’re caused by repeating the same stress over and over again. We can’t change the fact that as runners, we’re going to be running over and over again most days of the week.

But variety in how we train is crucial. It forms one of the training pillars that influence my race plans. Each week typically has at least four paces and over 50 different exercises to help prevent injuries and help runners get faster.

More importantly, when I plan long-term I suggest runners focus on different types of races. Have you ever met the “two marathons a year” person who only runs marathons and seems to have one speed (slow)?

They rarely see improvement and always seem to be in a rut with consistent overuse injuries. When I got my USA Track & Field coaching certification, training variety was discussed in the course as a way to actually reduce repetitive stress injuries!

But having a lot of variety in your training doesn’t mean that you get to run random distances and workouts. Every schedule should follow a logical progression and the weekly workouts should be similar from week to week. The overall structure should be fairly rigid. Without this structure, your fitness won’t progress.

Here’s a general outline of how progression works:
The real variety comes in the details:

- Terrain - hilly, flat, uneven trail, cinder path, dirt road, snow, asphalt, grass, etc.
- Running many different paces every week from very easy jogging to sprinting
- Including a wide variety of flexibility and strength exercises
- Rotating several different types of shoes (and maybe doing some barefoot work)

Elite coach Brad Hudson calls these “little wrinkles” that are purposefully built into any good training program. They help you stay mentally focused and reduce the repetitive nature of running so you’re not constantly subjecting your legs to the same type of running (read: you’ll reduce your injury rate!).

After you’ve incorporated these “micro-variations” into your plan, you can focus on macro-variations:
★ Race selection - 5k, half marathon, ultra, 10k trail race, marathon, triathlon
★ Overall training approach: high volume vs. low volume, weight sessions vs. none, cross-training vs. none, high intensity vs. low intensity

Choosing to race only marathons severely limits the type of training that you can do. You’re stuck doing marathon workouts in a typically high volume training plan. You can only vary the details.

Can you see how this might increase your chance of a running injury if you train for 2-3 marathons every year? You’re doing almost the same workouts, mileage, and overall training year after year.

Changing macro-elements of your training is just as important as altering the micro-elements (like shoe choice and terrain) for injury prevention.

Variety is the spice of life - and it’s the spice of running. You’ll see this in almost all top runners’ schedules: their races vary significantly - and therefore their training approach.

This topic of injury prevention is a little “softer” than others like running form and runner-specific strength exercises that we’ll get to later. But after helping thousands of runners train smarter (including myself), I don’t think any runner can reach their potential if they don’t have a varied program.

Change can be hard. But smart changes and variety are critical for injury prevention. You’ll see many of these principles in your training plan, but some variations are up to you (like shoe and terrain choice)!
Part 2 Action Steps

Alright, time for your homework.

This week tackles very big picture training themes like patience and macro-variations, as well as very small training adjustments like shoe choice, running surface, and weekly running paces.

Some of your action steps will be ideas to keep in mind for later use. And some will be changes you can incorporate immediately.

**Step 1**: Take a few minutes and think about two specific instances in your running when you were wildly impatient. Here are a few examples:

* Maybe you increased your mileage way too quickly
* Or you had a sharp pain but tried to run through it
* Or you tried running too many fast workouts in one week

Now think about your future running as objectively as possible: will you be able to see yourself making the same mistakes again? Always learn from your past mistakes and exercise patience before it’s too late.

Write down 2-3 examples of mistakes that you could make in the future, but resolve not to. When you’re faced with a decision later on, you can refer back to your examples and encourage yourself to stay patient.

**Step 2**: Implement two micro-variations into your training on a regular basis that you aren’t doing right now, like:

* Once a week run a hillier route instead of always sticking to flat terrain
* Run trails instead of only on sidewalks or the roads (if you don’t have a trail near you, explore a large network of fields that are typically near high schools)
★ Order a new pair of shoes and rotate two different models throughout the week
★ Run at least three different paces throughout the week to stress your body in a variety of ways

**Step 3:** Think long-term and implement one macro-variation into your training. Maybe you train specifically for a 5k (much faster workouts!) if you’ve been focused on the marathon for a long time.

Or if you’ve always stuck to short road races, commit to your first marathon, sprint triathlon, or ultramarathon.

Smarter training doesn’t always mean harder training. Instead, strategic decisions like the ones discussed in this section help you run healthy by avoiding the “3 Too’s” and introducing more variety.
PART 3

Recover Like a Pro And Run More Efficiently
The Injury Prevention for Runners program provides a framework for prevention that highlights six principles of staying healthy. We’ve already covered Patience and Variety.

Part 3 of the program highlights:

- Recovery Techniques
- Efficient Running Form

Each is critical to the injury prevention puzzle and we’ll cover how to best apply each principle to your training.

You’ll notice that the first several principles focused on Training Design – or how you actually structure your running program that promotes healthy running. You’ve seen how to approach mileage, race scheduling, the value of patience, and soon we’ll cover recovery techniques.

As we get into the topics of running form, we’re diving into the more detailed aspects of training: the specific form changes to make to reduce your injury potential and become a more efficient, economical runner.

Later, I’ll cover the exact exercises that promote health, counterbalance the ill effects of all the sitting we do, and strengthen the particular muscles that running neglects.

Ready? Let’s do this.
How to Master the Art and Science of Recovery

Recovery is as much art as it is science. After this lesson you’ll have the resources to recover from acute soreness or injury (what I call the Injury Red Alert Mode phase of recovery) plus use more long-term recovery strategies to prevent injuries and feel great on a day to day basis.

Let’s first tackle recovery from a more general perspective. Recovery is about more than reacting to soreness and injury. It’s best to take a more proactive approach and minimize the damaging effects on a day to day basis.

The Post-Run Routine
A post-run routine ensures you’re optimizing your recovery from a fueling, nutrition, strength, and dynamic flexibility perspective.

After every run - particularly a difficult workout - follow a standardized protocol for boosting recovery:

1. Within 10 minutes of the end of your run, refuel with simple carbohydrates and a source of protein. A glass of chocolate milk works great. A peanut butter sandwich is another option.

2. Within a half hour, rehydrate with 12-32 ounces of water depending on how much fluid you’ve lost.

3. As soon as possible after the run, complete your post-run strength routine.

4. Within an hour, eat a full, balanced meal that includes complex carbohydrates, a good source of protein, and 1-3 servings of vegetables.
5. Extra Credit: take a 90 minute nap later in the day to jumpstart the muscle regeneration process.

6. Before bed, 5-10 minutes of light foam rolling will help you loosen up and feel better in the morning.

If you’re doing this after every run then you’re refueling, preventing tightness from turning into trigger points, and developing the strength necessary to build your structural fitness.

But something can still go wrong. You can still push too hard and find yourself too sore, in actual pain, or injured.

**Red Alert Recovery**

If you do, then you’re in the Red Alert mode of recovery. This phase is similar to the common RICE (Rest, Ice, Compression, Elevation) treatments that many doctors prescribe. It applies to those who are dealing with significant soreness (that prevents proper range of motion or running without pain) or who just sustained an injury.

Let’s go through each component of RICE so you know how to implement each element of recovery.

**REST** (i.e., not running): This reduces the stress your legs experience and lets tissues repair themselves without additional damage occurring.

Some runners may need just a day or two off from running to reduce soreness enough to be able to run. Others who have a minor injury may need more time.

One of the most difficult questions to answer is, “When can I start running again?” Here are three rules to follow:

1. You must have a zero-tolerance policy for pain. Never run through sharp, stabbing, intense pain - that means you’re doing more damage.
2. If you need to alter your running stride - or in other words, limp - then you shouldn’t be running. You need normal range of motion.

3. You can usually run through dull or achy pain that feels more like soreness, tightness, or stiffness.

#1 and #2 indicate that there’s a problem. Pain is your brain’s way of telling you that you’re doing additional damage to your muscles and connective tissues - never run through it.

If neither #1 nor #2 is true (you can run within your normal range of motion with no sharp pain) then you can run.

**ICE:** There’s actually conflicting evidence that icing actually works to reduce muscle soreness, but most runners believe it does. In fact, some of its efficacy might be the placebo effect. Regardless, I’m a believer in its ability to reduce inflammation and delayed-onset muscle soreness (DOMS). One way that ice can help treat an injury is that it helps clear the injured area of waste products and speeds the recovery process.

But icing every day will reduce your body’s ability to fight inflammation naturally. After all, a little bit of soreness is a good thing! It activates the adaptation process and forces us to get stronger, faster, and more resilient.

So use ice strategically - only when you need to (like in the Red Alert stage of recovery), when you think you pushed too hard during a speed workout, or when your long run was a little too long. When you’re nursing an injury, it’s best to ice aggressively: 2-3 times per day with at least 20 minutes in between each icing session is ideal.

Filling a bathtub with cold water and dumping a big salad bowl full of ice in there is my preferred method. If you just need to ice a specific muscle, freezing water in a paper cup and using that as an ice massager is another good option.
**Compression** is another way to speed the recovery process. Most runners use compression socks to get the desired compression for their feet and lower legs. However, wrapping your quadriceps and hamstring is possible as well, though more difficult without the help from a physical therapist.

There are compression wraps available for the thigh to use for ITBS or a muscle strain. The research is less clear on these types of compression garments as most studies look at socks. But the same principles apply and if you can, a compression sleeve for the thigh is a good idea.

Compression is most useful during the treatment phase of an injury or after a difficult workout. When you do a long run or a fast workout on the track, you do a lot of damage to your muscles. Wearing compression socks can help you recover by increasing blood flow in your lower legs when you’re sitting around after that workout.

Compression socks improve blood flow while at rest (like when you’re sitting down at work after a morning workout), which will help move byproducts from exercise from your lower legs. If you need extra recovery, I’ve found that sleeping in the compression socks helps as well – as long as your significant other doesn’t think that’s too weird…

So how do you find the best compression socks? The most effective are graduated, meaning they’re tighter at the foot and ankle and gradually get looser closer to the knee. Always buy graduated compression socks.

Some brands list the amount of compression (in mmHg - or millimeter of Mercury) and you should try to find a pair that falls between 15-25 mmHg if possible to enhance blood flow. Any tighter and they may restrict blood flow. And if they’re too loose they won’t provide enough stimulus.

**Elevation** is the final strategy during this window of acute, Red Alert recovery. It’s another way to control swelling (like ice) and is best implemented when the injured or sore area is elevated above the heart.
This strategy prevents blood to pool around the affected tissue. When a normal position is resumed and elevation is stopped, fresh blood rushes to the area. This is very similar to contrast baths where you alternate cold and hot water to promote blood flow.

The action is similar to wringing out a sponge: blood that contains byproducts of the recovery process is flushed out and fresh blood is introduced to the injured area.

Elevation can help alleviate some soreness and reduce swelling but it’s not as effective as taking an ice bath. In any recovery protocol, I consider elevation to be “nice to do” but not mandatory.

Those are the RICE components of this more passive phase of recovery. You should always adhere to RICE as soon as acute soreness strikes or when you think you’re injured.

But instead of being reactive to soreness and injuries, let’s instead be proactive and limit them from happening in the first place.

**Lifestyle Factors that Affect Recovery**

So far in this program, I’ve spent a good amount of time on lifestyle. It’s critical to injury prevention because what you do the other 23 hours of the day is just as important as the hour you’re training.

Let’s look at the two most important lifestyle factors that help you recover from your workouts, feel great on a day to day basis, and stay healthy in the long-term.

**Are you sleeping enough?**

It doesn’t matter how much strength work you do or how thorough your dynamic warm-up is - if you’re not sleeping enough, you’ll prolong your recovery or continue to get hurt. You have to get enough sleep, especially during periods of higher mileage training or when your workouts are more intense than usual.
During the sleep cycle, your body repairs itself, adapts to the running you’ve been doing, and rejuvenates its muscles for your next workout. In fact, running really just breaks you down! Sleep is when you absorb the training, get faster, and heal properly.

I can’t tell you how much to sleep, but most people need 8 hours. Some need slightly less, but I’d wager that most runners should be getting at least 8 hours, if not more. Figure out what works best for you and stick with it.

If possible, use naps strategically to help your body recover. After races, long runs, or tough workouts are when they’re most valuable.

Naps are most effective from a tissue repair perspective when you’re able to sleep for about 90 minutes. This is about the length of one sleep cycle and includes slow-wave Delta sleep that most promotes bodily repair.

To get the best sleep possible, follow these best practices:

★ Use blackout curtains and turn off any electronics in your bedroom that emit light
★ Temperature greatly affects sleep quality; most people prefer a room temperature of 66-68 while sleeping
★ If you live on a noisy street or in an apartment, use ear plugs or a sound machine for white noise
★ Limit your caffeine to the morning hours so you’re not overly caffeinated in the evening
★ Turn off the television, laptop, and avoid your smart phone during the 1-2 hours before bed. The “blue light” from these devices interferes with your body’s circadian rhythm

★ Read fiction before bed – this helps your mind escape the grind of daily life and your to-do list

To illuminate the importance of sleeping, Ryan Hall, the fastest American marathoner of all time, calls his daily nap a "business meeting” because he considers it a part of his training. Since he’s a professional runner and is paid to perform, napping is part of his job.

Wouldn’t that be nice for us, too?

Eat Right to Feel Right
No discussion of recovery is complete without a focus on diet. No matter how you identify yourself - Caveman, Vegetarian, Omnivore, etc. - a good diet can be hugely beneficial to your recovery and performance.

Put a focus on real food like fresh vegetables, fruit, high-quality meat, fish, nuts, and whole grains (don’t go crazy with whole grains, though).

I have a very simple philosophy when it comes to the ideal runner’s diet and it aligns almost perfectly with Michael Pollan’s famous quote from In Defense of Food: An Eater’s Manifesto: eat food, mostly plants, not too much. Keep it simple and don’t worry so much about your food choices. As long as you’re eating real food like the ones I mentioned, you’ll be fine.

There’s no hard evidence that suggests injured runners can heal faster with any type of supplements. If you live in the modern world and eat a balanced diet, you’re most likely not deficient in any nutrients. If your recovery seems to slow down or you’re not healing at the rate that you think you should, call your doctor. She may be able to pinpoint any deficiencies.
Providing meal plans or super specific diet advice isn’t part of this program (I’m not a nutritionist) but regardless of the type of diet you choose, whole, real food is critical.

Now you have a toolbox of recovery techniques at your disposal for use after each run, when you’re sore after a tough workout, or when a minor injury occurs.

In a later section I’ll be providing information on specific recovery tactics like using a foam roller and kinesiotape, so read on.
Running Form - do you run right?

Runners love talking about the best form changes to make to stay healthy and be more efficient. You’ll hear people tout the benefits of forefoot vs. midfoot striking and leaning forward vs. keeping a straight back. Who do you listen to?

I want to dispel some of the misconceptions that float around the internet once and for all. There are certainly best practices to follow when trying to run efficiently, but I want to be clear that running form is variable! You don’t have to label yourself a forefoot, midfoot, or heel striker. You can be all three depending on your shoes (or lack thereof), the terrain, and your speed.

Many runners try to change their form for one reason or another when it’s not even necessary. If you’re running well and you don’t have frequent injuries, there’s no need to alter what’s already working. Doing so could create issues where they didn’t exist before.

This is worth repeating: If you’re running well and you don’t have frequent injuries, there’s no need to alter what’s already working.

There are, however, a few key ways to upgrade your form if you’re experiencing consistent injuries.

Increase your cadence. Prevent over-striding by increasing your step-rate (the number of steps you take per minute - or your cadence) by 5-10% from your baseline step rate. This usually solves most cases of over-striding.

The majority of poor form habits are solved with this one tweak to your stride. Don’t over-complicate things - increase your cadence to at least 170, but ideally closer to 180, and you’ll realize almost all of the benefits of more efficient running form.
To calculate your cadence, simply count the number of foot strikes on one leg during 60 seconds of running. Then double that number to account for both legs (as a runner, I’m assuming you have two legs) and that’s your cadence!

Many runners ask how to increase their cadence, saying that it “feels weird” when they try to do it. Well, of course it does! It’s different than what your body is used to.

But if your stride rate is significantly under 170, this is a skill you need to focus on improving. It will feel a little awkward at first, but a quicker step rate is critical as it’s easier on your joints, muscles, tendons, and ligaments and is a much more efficient way to run.

**Avoid aggressive heel-striking.** You’ll recognize this in other runners when they run with an extended leg in front of them, nearly locked knee, and toes pointing toward the sky when their foot contacts the ground. This is bad news!

The good news is that improving your cadence will dramatically reduce aggressive heel striking. Just keep in mind that not all heel striking is created equal. Some heel striking isn’t necessarily bad, but the heel smashing variety can certainly do some damage.

If you ever watch 2009 New York City Marathoner winner (and Olympic bronze medalist in the marathon) Meb Keflezighi run, he has a heel strike. And he’s a professional at the highest level of the sport! But his heel strike is what many call a “proprioceptive heel strike” which just means his heel comes down first, but his weight doesn’t come down until his foot is flat on the ground.

Essentially, Meb uses his heel to “feel” the ground and then his weight is distributed mostly on his midfoot. There’s nothing wrong with this style of running and it works for him (I’m also a mild heel striker and haven’t been hurt since 2009).

**Land underneath your body.** While increasing your cadence should resolve the problem of “reaching out” in front of your body with your foot, this strategy also deserves mention. If you don’t land underneath your body, you’re over-striding and
likely slamming your heel on the ground. See how the three problems are all connected?

Imagine that you’re “putting your foot down” underneath your hips. That simple cue will help you reduce over-striding and have a more neutral foot position.

**Have a symmetrical arm swing.** This part of your running form is more difficult to change because your arm carriage is in response to what your legs are doing underneath you. But let me outline the basics so you can see how you compare and make a few tweaks if necessary.

First, your arms shouldn’t cross over your midline. Pretend there’s an invisible line that runs down the middle or center of your body - your arms shouldn’t cross over this line.

You should also carry them with about a 90 degree angle at the elbow, though this is variable between runners. Use a front to back arm swing (not side to side) and pump your elbows, not your fists, for more momentum. Cup your hands loosely and don’t clench them - stay relaxed.

**But...what about foot strike?!** You might have noticed I’ve barely talked about whether you should have a midfoot, forefoot, or heel strike while running. That’s because it doesn’t really matter! It’s much more productive to focus on the other principles in this section.

The most important aspect of foot strike to remember is to avoid the extremes of a heavy heel strike or a pronounced forefoot strike. Both put unnecessary stress on your feet and legs.

This video analysis outlines my running form – both the good and the bad – so you can learn more about efficient form.
Running Cues

It’s easy to say “land underneath your body” or “don’t over-stride” but how exactly do you make these changes in your stride? You do that with running cues.

Cues are simple ways to think about form change that elicit positive changes without you over-thinking things.

Run tall. You might have heard the advice to lean forward while running to let gravity help propel you forward. This is garbage! Runners need to maintain an erect, tall back for ideal posture while running.

The problem is that when you actively try to lean forward, you typically lean forward from the waist or hips. This causes all sorts of problems and puts your entire body out of alignment.

Instead, maintain an erect, tall back and lean from your ankles. This is a more subtle way to put your entire body in a slight forward lean. It’s usually difficult to do if you’re thinking about it, so instead pretend that there’s a string coming out of the top of your head and it’s pulling your head up toward the sky.
Maintain that erect form and the slight lean almost always takes care of itself.

**Push the Wall.** Pretend there’s a wall directly in front of your face when you’re out running. It prevents your feet from extending too far in front of your body and ensures your stride doesn’t get too long.

This cue accomplishes two vital goals: it reduces over-striding (and the extra impact forces that go along with it) and it encourages a more compact running form. With less flailing around, you’ll conserve energy and have a more efficient stride.

**Relax.** No discussion of form is complete without encouraging you to relax! You can’t run smoothly, comfortably, or fast if you’re tense. Even if you’re doing a fast workout or are late in the stages of a long run experiencing massive amounts of fatigue, stay relaxed.

You might have seen elite runners who look relaxed and comfortable sprinting toward the finish at a marathon. Believe me, they’re not comfortable but they’re actively working on staying as relaxed as possible.

They’re holding no tension in their upper body, face, or legs. They’re relaxed.

**Pull Your Belly Button To Your Spine.** While running, it’s important to have a stable, stiff torso that keeps the pelvis in alignment. To activate the deep abdominal muscles that maintain an erect posture and help you run tall, try pulling your belly button toward your spine during your next run.

This cue forces you to contract those deep ab muscles and maintain more stability during the running stride. The strength workouts in this program also make this cue easier to execute.

**Spread those knees!** Don’t worry - this is a family-friendly program. While running, pretend there’s a golf ball between your knees that forces them a few centimeters further away from one another.
This simple action reduces the abnormal rotation of the thigh that causes many injuries and is common among injury-prone runners.

If you choose to make any changes to your running form (and remember, if you’re not chronically injured, there’s no reason to fix something that isn’t broken), always make those changes gradually over a few weeks. Start with one update and cautiously test it before making another change.

It takes your body time to adapt to any new stress - typically longer than you think.

**Posture Matters.** It turns out that your mom was right all those years. Having correct posture throughout the day - even when you’re not running - is immensely important.

That’s because soft tissue (like muscles) remember the position that it’s held in. If you’re constantly slouching at your computer or on the couch your muscles will adapt to that position and it will become the natural way your body carries itself.

It’s helpful to perform a “body check” a few times a day to remind yourself of how you’re carrying your body. Keep your back tall, don’t crane your neck forward, keep your shoulders level and don’t round your shoulders. And when you’re sitting, always maintain a neutral position.

I discuss the importance of posture in the *Healthy Running and Modern Living* section. In addition, see the OSHA (Occupational Safety and Health Administration) [recommendations](#) on ergonomic sitting.
Part 3 Action Steps

The term “recovery” is very unspecific. It helps to break it down and focus on the actionable ways you can build more recovery into your training program so you can reduce unneeded soreness, bounce back from hard workouts quickly, and reduce your personal injury rate.

Here’s your action plan:

**Step 1.** Follow every run with a Post-Run Routine that includes refueling, strength/core work, and rehydrating.

**Step 2.** Acute soreness or the beginning of an injury should be aggressively treated with:

1. **Rest** - Don’t run if your form is affected and there’s sharp/stabbing pain.
2. **Ice** - An ice bath or cup can be used to reduce swelling and promote healing.
3. **Compression** - Compression socks can increase healing blood flow.
4. **Elevation** - Not as effective as ice, but another strategy available to you.
5. **Sleep** - This is when the body repairs itself! Get 8-9 hours and nap if possible.
6. **Diet** - Meet your nutrition needs with a balanced diet. Supplements aren’t entirely necessary.

Next up is your running form. Follow these steps:

**Step 3.** On your next run, count your cadence. If you’re below 170 steps per minute, work on increasing your cadence by about 10%.
You can do this for several minutes a few times during your run. Follow this pattern for a few weeks and soon the higher cadence will feel more natural.

**Step 4.** Practice one running cue per week on each run. Work on a cue for a few minutes per run for an entire week – it takes time to develop it into a habit.

Remember, you don’t need to change your running form if you don’t have consistent injuries. **If it ain’t broke, don’t fix it!**
PART 4
Get Stronger and Become a Better Athlete
In the last three sections, we’ve covered a lot of material:

- Lifestyle factors that promote injuries – like prolonged sitting and constrictive shoes – and what to do instead
- Advanced recovery techniques and post-run routines
- The value of patience and variety throughout your training
- How to run more efficiently and what cues to use to reinforce sound running form

Let’s now go over two of the most powerful, specific ways to prevent injuries and maximize your running performance. These are the final two principles in the injury prevention framework that are part of my coaching philosophy.

The program lessons in this section are:

1. Dynamic Flexibility
2. Running-Specific Strength Workouts

Each is critical to the injury prevention puzzle and we’ll cover how to best apply each principle to your training.

The world of running has seen a dramatic transformation in the last ten years. Coaches no longer recommend static stretching. Runners are expected to do more than “just” run.

Workouts develop a variety of skills other than simply aerobic or anaerobic fitness. Indeed, good runners are **athletic**.

If you’ve ever seen a runner topple over while standing on one leg trying to put on a shoe, you’ve witnessed an uncoordinated runner with very little balance. That’s a shame and one of the top goals of this program is to make you more athletic.
So what does athletic specifically mean? It means having the balance, coordination, and proprioception to handle a variety of training stresses.

Ask yourself: can you...

★ Complete a series of strength and mobility exercises without feeling awkward?
★ Sprint at maximum effort while maintaining control (and without flailing around)?
★ Run technical trails without falling on your face (I admit, I’m good for 2-3 falls a year…)?
★ But when you do fall, can you do it gracefully and pop back up to continue your run?
★ Stand on one leg for a minute without falling?

Athletic runners have basic movement skills of well-rounded athletes. They can do a lunge with a twist while maintaining good posture. They’re not clumsy when they sprint.

We’ve previously discussed training variety and that’s one powerful way to build your athleticism. Different types of workouts, terrain, shoes, core and strength work, and races help you become a more well-rounded athlete.

The functional skills of strength, balance, range of motion, coordination, and proprioception not only help you prevent injuries, but they can make you faster, more powerful, and efficient. Agile runners who can sprint, move well in all three planes of motion, and complete a variety of strength exercises will simply be faster runners.

As a Strength Running reader, you know that this topic is one that is near and dear to me. I’ve personally witnessed the power of these training strategies and I’ve used them successfully with thousands of other runners like you to help them improve their training.
Today I want to dive into the topics of dynamic flexibility and strength in more detail. Your success as a runner depends not just on your aerobic capacity, but also on your muscle strength, mechanics, and coordination.

Let’s get to it.
Dynamic Flexibility: Static Stretching is OUT

Do you warm up before you go running? If you’re like the majority of runners, you either don’t at all or you spend a few minutes with a couple static stretches.

For years, it was common practice for recreational runners, competitive collegiate teams, and even elite athletes to complete no warm-up.

When I was in high school and for part of my college career, all I did was static stretching before a run or workout. Now it’s known that this is the worst way to prepare and can not only reduce performance but actually increase your injury risk.

In fact, the CDC (Centers for Disease Control) reviewed hundreds of studies on the topic and concluded that static stretching wasn’t significantly associated with a reduction in injuries. Stretching as a form of prevention isn’t based on science.

Additionally, several studies have shown that static stretching reduces the distance that can be run in a 30 minute time trial. While this type of stretching has been shown to reduce strength and power, now we’re seeing that it can compromise your running performance!

So, we’re going to skip static stretching.

Gone are the days that you just head out the door without preparing your body. Now all of your runs will be preceded by a warm-up routine that accomplishes several critical things:

★ Improves circulation and blood flow to your legs
★ Opens capillaries in extremities like the feet
★ Lubricates joints
★ Warms the muscles (what a “warm-up” is supposed to do anyway!)
★ Improves range of motion
★ Prepares the body for faster running
★ Allows you to run more economically (i.e., efficiently)
★ Increases coordination, strength, and prevents injuries

Every single run should include a warm-up routine before you start. They’re comprehensive so there’s no need to memorize a dozen different sequences of exercises – just a few will cover all your needs.

These routines will help you prevent injuries. Just think: if you can’t do a lunge with a twist, how can you hop from one leg to the other while your torso twists slightly for 26.2 miles (that’s what happens during a marathon!)?

Indeed, they form the foundation of coordination, strength, and mobility that allow you to be a more athletic runner. And athletic runners get hurt far less than those people who “only run.”

You might be asking yourself, “What exactly is a warm-up routine?” Good question! It’s simply a series of dynamic stretches that mimic the way your body moves during running. They’re controlled, repetitive movements that are often slightly exaggerated.

I’ve designed these routines to not only be comprehensive, but to be completed almost anywhere. Runners can do them in parking lots, cramped hotel rooms, or in their living room before leaving for a run.

Once you implement these routines into your training, you’ll feel “off” if you skip them. You won’t feel right - many runners describe the feeling as clumsy, clunky, or a little uncoordinated.
Sabre Warm-up

The Sabre Warm-up prepares your body to run by gradually increasing your heart rate and muscle temperature. It’s ideal before races and more demanding workouts. Perform 1 set of this routine which takes about 10 minutes. [Watch the video here].

Click the image above to watch the Sabre Warm-up
Quickie Warm-up
The Quickie Warm-up is a shorter warm-up routine that includes the most important exercises to complete when you’re pressed for time. Perform one set of this routine which takes about five minutes. Watch the video here.

Click the image above to watch the Sabre Warm-up

The main goal with dynamic warm-ups is to simply complete the routines. It’s incredibly tempting to skip this part of your training, but a mere 5-10 minutes of preparation before a run can help you run more comfortably, at a faster pace, with fewer injuries.
Strength Work for Runners

Runners should do a lot more than "just" running. In addition to a dynamic stretching warm-up routine, strength work should be a regular part of every runner's training. But don’t be intimidated by strength exercises - you can be a total beginner or have no access to a gym and still be successful.

Most of the best exercises for runners require only your body weight and no equipment. I’m going to cover everything here so you can choose the routines that best fit your life, injury profile, and resources.

Soon after starting a consistent strength program, you’ll reduce your chance of injury, improve your running efficiency, and strengthen your entire body - creating a more powerful stride and ultimately running faster.

Runners need runner-specific strength work that focuses on the specific imbalances and weaknesses that are most common to us. Let's face it: running is a one-dimensional sport. For the most part, we just run straight ahead and vary our speed.

That creates physiological changes in our bodies that need to be corrected - like weaknesses moving side to side or rotationally. Since we never practice these movements while running, our ability to do them (and our overall athleticism) erodes over time.

That's why the majority of the routines that I recommend - and those unique to Injury Prevention for Runners - focus on multiple planes of motion and the posterior chain (the muscles in the back of your body like the hamstrings, glutes, and lower back). They increase our ability to move differently and help reduce the chance of injury.

Anyone can do a “core workout” or blast their abs with crunches and planks. But injury prevention requires a more well-rounded view of strength.

Like I mentioned, you don’t need to be in the gym throwing around 50lb dumbbells. Leave that to the body-builders. Nor do you need to be doing hamstring curls or tricep presses. Instead, focus on "routines" that you can do after every run.
This program uses a variety of body-weight, core, and gym routines that focus on different aspects of strength. Most of them are named after medieval weapons because they’re basic, effective, and, well, just sound very awesome.

In addition to private videos on YouTube, you have also received PDF copies of each routine with an image of the exercise and a text description of how to perform each movement. It’s important to provide written, video, and audio descriptions for every type of learner, so use what you’re most comfortable with to learn these routines.

**The ITB Rehab Routine**

Not just for those with ITBS, this series of exercises builds hip and glute strength (among other muscle groups) – the two major muscles that contribute to injuries in runners. And these are the muscles that are weakened by long periods of sedentary behavior. [Watch the video here](#).
The Standard Core Routine
You might remember this routine – it’s public on Strength Running and is the “bread and butter” core workout for runners. It focuses on postural and general core strength by targeting almost every muscle in the core area: hamstrings, hips, glutes, abdominals, obliques, and the lower back.

Most runners experience significant struggles with this routine. As you go through your training, build to three sets of one minute and you’ll be stronger than the vast majority of other runners. Watch the video here.
The Stiletto Routine
Since many injuries are caused by weak glutes – and we weaken our glutes by sitting for such long periods of time – this routine specifically targets the glute muscles. Building strength in these neglected muscles helps you control your stride from higher in the muscle chain. Watch the video here.
The Claymore Strength Workout

Claymore is a general strength workout that’s less runner-specific and more like many of the workouts you’ll see in strength magazines. It requires virtually no equipment (just a place to do pull ups and dips) and is one of the more challenging routines here.

Exercises that aren’t runner-specific are still very valuable to runners: they help you develop overall athleticism, can prevent “full body fatigue” in the late stages of a half marathon or marathon, and help you lose any unwanted weight. Watch the video here.
The Pike Gym Workout
The only routine in this program that requires gym equipment, this is for runners with access to a gym and have a desire to maintain a serious level of strength that goes beyond what's necessary for injury-free running. The focus is on compound, multi-joint lifts that train movements, not muscles. Watch the video here.
The Ballista Routine

This is the “athlete’s workout” with a focus on multiple planes of motion and 360° fitness. The exercises here have you moving sideways and rotationally – exactly the motions that you don’t perform while running.

This routine includes both strength exercises and dynamic stretches to help you learn movements that are different from those you experience while running or in everyday life. Watch the video here.
The Chakram Routine

This routine focuses on balance, proprioception (the knowledge of where your body is in space), and lower leg strength. Done barefoot, it’s a more “Zen” workout as it requires more focus and mindfulness than the other routines. [Watch the video here.]

These routines are done after your run to help you become a well-rounded athlete and develop the specific strength you need to stay healthy. If you constantly feel "niggles" (or "almost-injuries"), these will definitely help you feel better on a day-to-day basis.

You'll see that there are no bicep curls, calf raises, or tricep extensions to be done in the gym. Those are muscle-specific exercises that are best reserved for body-builders. Instead, we're focusing on function and movements that are more runner-specific.

Like the saying goes, "Train movements, not muscles."
How to Schedule Strength Work

The routines here should follow each of your runs. Harder routines (like the ITB Rehab Routine or Claymore Strength Workout) should come after the harder workouts or long run. This helps make your easy days easier and your hard days harder.

And the opposite is true for the easier post-run routines like Chakram or Ballista – these are best used on easier days.

If you’re going to the gym, 1-2 sessions per week is beneficial for most runners. A good rule of thumb is that you want more gym sessions in the earlier, base phase of training. But when your volume and intensity builds, you may need to prioritize your key running workouts. If that happens because you’re too fatigued to run your workouts and lift at the gym, cut the number of weight sessions to one or none.

If you’re used to doing regular gym workouts and then cut back on those sessions during peak training, remember that it becomes much more important to do the bodyweight routines instead. Never skip all your strength work!

These routines are the **top way to stay healthy and prevent injuries**. If you implement just one lesson from this program, make it this one! Always do regular strength work. Period.

I know I sound like a broken record sometimes, but when you’re injury-free, I know you’ll ultimately race faster. Consistency has a funny way of helping your race times!
Part 4 Action Steps

Now is when you take what you’ve learned and apply it to your own running so you can stay healthy. Some training changes are easy, some are more difficult. This week your action steps are relatively easy; you won’t need to think back on past mistakes or plan seasons of racing.

Dynamic Flexibility

Step 1. You have to warm up before every run and especially before workouts and races.

Focus on consistency, even if it’s the 5-minute Quickie Routine.

No fluff here – just perform the warm-up routine before your run!

Strength Work for Runners

This type of ancillary works builds runner-specific strength and makes your injury risk plummet. If you’re skipping strength work, your risk of injury is going to be significantly higher.

Here are your action steps:

Step 2: Alternate strength workouts from this program after every run.

* Focus on the routines that fit your weaknesses
  - Chronic ITBS sufferers should focus on the ITB Rehab Routine and Stiletto Routines more often as they focus on the hips and glutes.
  - Achilles tendinopathy sufferers should do the Chakram Routine barefoot 2-3 times per week to build foot and lower leg strength.
Remember, consistency over time is what’s truly important. You won’t see results in a week; you may just be sore and feel awkward doing the exercises (that’s normal!).

But after a few months of consistent strength work and dynamic stretching, you’ll feel stronger and more efficient, and likely have no injuries.
PART 5

Q&A with Coach
A huge benefit to this program is that you get to learn from the first members of the program. This happens in a few critical ways.

The Expert Interviews include questions from other runners so you’re able to learn from the issues that other runners just like you are facing.

It’s like being back in high school while other students are asking questions about the lessons. You may not have the same exact question, but it’s helpful in the learning process.

In addition to the interview series, I collected questions about running, injuries, and the training process. Using these questions, I’ve amassed an enormous Question and Answer bank for you.

It includes questions about the recovery process, pacing, injury treatment modalities, how to get started with running after a layoff, and more.

These are common questions but often stump runners. Remember to adapt the answer slightly to your particular situation or needs. We’re all different, but often our struggles are so similar that the solution is about the same.

Let’s get started.
Q&A with Coach

The Q&A with Coach answer bank includes answers to your toughest questions about running, workouts, recovery, and injuries.

Use this FAQ to inform your decisions about your training and learn more about how to stay healthy in the long-term.

Enjoy!

After a long layoff from running, my distance runs are a lot slower. Should I try to run my old pace? How can I get back to my normal pace per mile?

For right now, don’t worry about your pace. Your body isn’t ready to handle your normal (faster) pace because of two reasons:

1. You’re in worse aerobic shape so you run slower

2. Your muscles, tendons, and ligaments are weaker from no running. So running fast could leave you injured!

Just keep the effort level of your runs at easy or moderate. Just remember the three C’s of easy running: controlled, comfortable, and conversational. With a good training plan that includes faster workouts when you’re ready, long runs, easy runs, and strides you’ll be back to your old self soon.

After I took six months off because of ITBS in 2008-2009, I was running nearly two minutes per mile slower than I used to! But after a few months I was doing comparable workouts and feeling great. Stay patient, run smart, and soon you’ll be back to your old self.
Do running shoes prevent injuries? What type of shoe should I buy?

This is a difficult question! The short answer is that no, running shoes don’t prevent injuries. What works for you might be terrible for another runner.

But, a poor fitting shoe may cause a running injury. Make sure that a shoe feels good not only when you try it on but when you run in it. Any good running store will allow you to run for a minute or two before deciding on a pair of shoes.

Since choosing a running shoe is very personal, there’s no “one size fits all” type of shoe. But most people don’t need a bulky motion control shoe and can use a neutral shoe instead. And rotating 2-3 (or more) different shoes helps stress your legs and feet in various ways: different heel height, arch support, flexibility, firmness, and weight affect your legs differently.
This is another way to help prevent injuries by reducing the repetitive nature of your training.

Keep in mind it’s only one small part of an overall injury prevention plan. Just make sure you find a shoe that you are most comfortable in and use that for the majority of your training. You can alternate other pairs when you can, like minimalist running shoes, for shorter runs or workouts.

Aside from finding a comfortable shoe that fits, remember that running shoes that claim to control “overpronation” don’t do a very good job. In fact, stability or motion control shoes have been shown not to control it much at all! Besides, if you can stabilize your leg yourself, there’s no need for more control.

For reviews of my favorite neutral and minimalist running shoes, see SR’s Running Shoe Reviews page here: [http://strengthrunning.com/running-shoe-reviews/](http://strengthrunning.com/running-shoe-reviews/)

**What about minimalist running shoes - should I run in them?**

Minimalist running shoes like Vibram Five Fingers, Merrell Trail Glove, or the Nike Free have a set of characteristics that define the minimalist category:

- Low-profile (closer to the ground)
- Low heel-toe drop (the difference in height between the heel and the forefoot)
- Less support overall (arch and upper)
- Wider toe box allowing more natural toe splay
- More flexibility in the sole
- Lightweight (typically less than 10 ounces)

As you can see, these types of shoes promote a more natural, barefoot style of running by forcing you to do more of the work. That can be a good thing as it promotes a more efficient running stride and strengthens your feet and lower legs.
But it’s a double-edged sword: it’s also more stressful because you’re doing more work!

If you don’t have any injuries (and don’t have a long history with injuries) and like the shoes you already have, stick with what’s already working for you.

But if the opposite is true, you should considering wearing a pair of minimalist shoes once per week for a very short run to see if they work for you. If they feel comfortable and don’t leave you too sore, then keep wearing them 1-3 times per week for about 10-30% of your total weekly mileage.

**How much time off and recovery do I need after my goal race?**

Great question! And it depends – what distance was your goal race? You’ll need more time to recover from the demands of a marathon than you do a 5k.

Here’s a handy table that shows my estimates:

<table>
<thead>
<tr>
<th>Race Distance</th>
<th>Recovery Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>5k or less</td>
<td>2-5 days</td>
</tr>
<tr>
<td>10k</td>
<td>5-7 days</td>
</tr>
<tr>
<td>Half Marathon</td>
<td>7-10 days</td>
</tr>
<tr>
<td>Marathon</td>
<td>7-14 days</td>
</tr>
</tbody>
</table>

Now here’s a caveat: the recovery times here show how long you’ll need to recover from your goal race. But you may want to take more time off to recover from your entire season of training.

So if you raced a 5k as your goal race, you might be feeling great after only three days. But your body could use some extra time off if you’ve been training hard for many months.
As a general rule, use this table as the minimum number of days to take off after your goal race. You may want more depending on your exact situation.

**Is static stretching bad?**
No, static stretching isn’t “bad” – but it won’t help you prevent injuries. Research has shown that it does nothing to help protect you from overuse injuries and when done before a run, can decrease your efficiency, power, and even increase your risk of an injury.

My simple answer is that you don’t need to stretch. If you dislike it, then skip it. No harm done.

But if you enjoy static stretching, then the best time to do it is after your run and any ancillary work (like strength or mobility exercises). It should be the very last thing you do before you hit the shower.

And as a general rule, don’t stretch a strained or very sore muscle. These muscles are damaged and need to heal – stretching a damaged muscle is never a good idea!

For more on this topic, see the *Recovery* and *Dynamic Stretching* sections. The interview with journalist Alex Hutchinson is also helpful.

**How do I know if I’m injured or just sore or achy? When should I start running more and when should I stop running completely?**
Every runner is different with their tolerance for aches and pains. Some runners can train through a tight calf muscle and then it just goes away – others always seem to get side-lined by minor injuries.

There are two simple rules to know if you’re really injured or just nursing a bad case of DOMS (Delayed Onset Muscle Soreness):
1. If you experience sharp or stabbing pain, that’s a big red flag. It means you’re doing more damage and need to follow the “Red Alert Mode” protocol in the Recovery section.

2. If you have to alter your stride to avoid pain you need to rest and stop running

Refer back to the Recovery principle of injury prevention to see the guidelines for running through aches, pains, and soreness. Just like the two rules above, the guidelines for knowing when to run are almost the same as knowing if you’re injured:

1. Never run through sharp, stabbing, intense pain - that means you’re doing more damage.

2. If you need to alter your running stride - or in other words, limp - then you shouldn’t be running. You need normal range of motion to run.

3. You can usually run through dull or achy pain that feels more like soreness, tightness, or stiffness.

If neither #1 or #2 is true (you can run normally with no sharp pain) then you can keep running and probably aren’t injured.
When I get healthy from an injury, what should I do after the injury? In other words, should my training change because of the injury?

After you’re finally healthy, you should gradually transition back to your normal mileage and workout intensity. Here’s an outline of how much time this will take:

<table>
<thead>
<tr>
<th>After this many weeks off...</th>
<th>Return to normal training within...</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2 weeks</td>
<td>2 weeks</td>
</tr>
<tr>
<td>3-4 weeks</td>
<td>4-6 weeks</td>
</tr>
<tr>
<td>5-8 weeks</td>
<td>8-10 weeks</td>
</tr>
<tr>
<td>More than 8 weeks</td>
<td>12 weeks or more</td>
</tr>
</tbody>
</table>

But once you’re healthy, you should also train differently than how you were running when you got injured. That’s what this entire program is for! Implement the six principles of injury prevention, with a particular focus on the rehab exercises for your specific injury. Now that you’re healthy, those rehab exercises are now prehab exercises for prevention.

When (and how) should I use a foam roller?

A foam roller is a great tool for self-massage. You can use it before or after a run, as much as 1-2 times per day. But just like a strong massage, spending too much time on one particular muscle could make you sore.

So limit the amount of time you spend on any specific muscle to 2-3 minutes. That’s all you need.

How you use a foam roller is the real question. And the real answer is that there’s no “best” way! Simply put the roller on the floor and put your calf, hamstring, quad, glute, or back on the roller. Move back and forth over the muscle using your body weight to change the pressure of the massage.
By manipulating your body position and using your body weight in different ways, you can control the massage to be harder, softer, or more targeted.

If you’re more visual, a video demonstration of the most effective movements can be helpful:

Click the image to watch the private video

Can I run through an injury? Will my injury heal properly if I’m running a little bit?
In most cases, no you can’t run through an injury. See the previous question about knowing the difference between real pain and just soreness. Use those rules to determine if you can run through the injury you’re experiencing.

If your pain is sore and dull and you can run with normal range of motion without altering your stride, then yes you can run! Just be sure to reduce the effort of your runs to make sure they’re easy and comfortable.
Any pain-free running with a normal stride won’t curtail your recovery. In fact, you’ll probably recover faster. Active recovery is always better than passive recovery and the extra blood flow can reduce the time it takes to get back to 100%.

I’m worried about taking time off from running! How much complete rest will erase my base fitness and after how much time off do I need to start from scratch?

Your first priority needs to be healthy, pain-free running. So for now, forget about your base fitness and focus on treating your injury.

Also remember that if you’ve been running consistently for a year or more, it will take six months+ to completely erase your fitness. Your running stride is programmed into your muscle memory and fitness is much more easily gained after a layoff than for someone who’s never run.

In general, it takes about two weeks of no running to start eroding your aerobic fitness (endurance). Depending on how much you were running, it could take 1-6 months (or more!) to get completely out of shape and have to start from scratch.

Your structural fitness (the strength of your muscles, bones, ligaments, and tendons) erodes more quickly than your endurance. That’s why the right strength routines are critical during periods of recovery and during the base-building phase of running.

See the table in a previous question about how many weeks you’ll need to return to normal running after a period of time off.

Should my injury prevention efforts be different now that I’m older than 45?

Your specific treatment steps should be the same as any runner: apply the Red Alert protocol of treatment during the acute injury phase and then use a recovery plan in this program.
The only difference is that older runners don’t recover as quickly so you have to be more conservative with your return to running. In the table used in the previous question, add 1-3 weeks per section.

Since older runners don’t recover as fast as younger athletes, the recovery time in between hard workouts and long runs needs to increase. Instead of two fast workouts and a long run every week, Master’s Runners may find that they need to replace their workout with a rest day.

Weekly mileage should also be reduced by 10-40% depending on your age and ability. Be conservative with your workouts - it’s much easier to take a rest day and stay healthy than push yourself too hard and spend months treating an overuse injury!

Also, refer to the interviews with Alex Hutchinson and Greg Lehman for more on this topic.

Does Kinesiotape (KT) help prevent injuries or increase healing from an injury?
Not really! There’s no scientific evidence that Kinesiotape prevents or effectively treats injuries. In fact, studies have shown that it doesn’t matter how you put the tape on (!) and it does nothing to improve blood flow to the taped area.

However, Kinesiotape may mask pain. The current research is unclear on this and there is conflicting data, but it looks like KT will mask deep tissue pain by stimulating the skin.

So if you have an “A” goal race that can’t be completed without taping, it may be worth it. But remember that masking pain is not the same as being pain-free. There may be consequences to running while masking structural pain caused by an injury. You could do additional damage and lengthen your recovery time.

Bottom line: I don’t use it, I don’t see myself using it in the future, and I will rarely recommend it to the athletes I coach. There are far better treatment modalities.

**Does running surface contribute to injuries? Should I avoid sidewalks or road running?**

There’s no clear answer to this question. Some studies have shown no correlation between running surface and injuries. Yet some coaches will drive their athletes to a training location so they can avoid a half-mile of sidewalk running.

So what should you do?

My view is that each training surface (technical trail, road, treadmill, sidewalk, dirt path, etc.) has benefits and drawbacks. Your training should include a variety of surfaces so you don’t exacerbate the drawbacks of any one surface.

Sidewalks are typically made from concrete and are harder than roads. They’re also predictably flat and offer virtually no variation. You’ll inevitably experience higher impact forces on concrete than any other surface so make sure your form is as good as possible! Aggressive heel-striking will be particularly problematic if you’re always running on the sidewalk.
Studies have also shown that your body will adapt to the surface you’re on and you’ll automatically adjust shock absorption. So on a concrete sidewalk, you’ll land more gently than if you were on soft grass, where you’ll come down harder while looking for stability.

But in general, my recommendation is to limit your total sidewalk running as much as possible. As the Kenyans say, “Hard roads kill fresh legs.”

Road running is another common option. There’s nothing inherently “bad” with road running, though you should do your best to mitigate the drawbacks of being on an asphalt road:

★ Avoid obstacles like potholes, traffic, and curbs.
★ Avoid spending too long running on the same side of the road – the camber (or slope) of the road goes toward the curb to aid drainage and can cause imbalances.

If you have the option, I’d choose road running over sidewalk running. But some roads have a dramatic camber and in that case, I’d choose the sidewalk instead.

In a perfect training environment, most of your running would be on dirt trails and similar softer surfaces that have varying elevation and (not too technical) surfaces. But a combination of every surface available allows your body more variety and prevents more overuse that can lead to injuries.

If you’re feeling particularly sore, a softer surface is a better choice because it will help you recover more quickly because there’s less impact stress. But if you’re running a faster workout, avoid technical trails or the sidewalk. Run on a track, smooth dirt trail, or road with a small camber.
Should I take ant-inflammatory (NSAID’s) like Ibuprofen to speed healing or help with pain?

Here’s the deal with anti-inflammatory medication like Advil or Aspirin: they reduce pain and fight inflammation! If you sprain your ankle, it’s a very good idea to take the recommended dose in the first day to reduce swelling and pain.

But they shouldn’t be used for soreness you experience from running. Yes, they can reduce your soreness, but they won’t help repair damaged tissue. Your muscles need to repair the damage that you do to them after exercise (this is the Adaptation Principle in effect) but NSAID’s won’t speed this process up.

In fact, it may even slow it down. Prolonged use of anti-inflammatories stunts the adaptation process and prevents your body from adjusting to the workload you’re asking of it.

My coaching advice is to take anti-inflammatories immediately after a specific injury or difficult race (like a marathon). But don’t use them for more than a day.

How do I know what my tempo pace is?

Tempo runs have many definitions, which make them a little confusing. Here are the most popular three:

1. A “comfortably hard” pace (based on perceived effort)
2. Your 1-hour race pace (based on performance)
3. 85-90% of your maximum heart rate (based on heart rate)

I prefer the second option based on performance because it’s the simplest solution. Too many runners aren’t good at judging their perceived effort and estimating your maximum heart rate is very difficult. The old “220 minus your age” formula is woefully inaccurate.
Instead, it’s helpful to use your recent best performances to estimate a tempo pace range:

<table>
<thead>
<tr>
<th>Marathon Time</th>
<th>Tempo Pace</th>
<th>Half-Marathon Time</th>
<th>Tempo Pace</th>
</tr>
</thead>
<tbody>
<tr>
<td>3:15</td>
<td>6:45-6:55</td>
<td>1:30</td>
<td>6:30-6:40</td>
</tr>
<tr>
<td>3:30</td>
<td>7:15-7:25</td>
<td>1:40</td>
<td>7:15-7:25</td>
</tr>
<tr>
<td>3:45</td>
<td>7:45-8:00</td>
<td>1:50</td>
<td>7:55-8:10</td>
</tr>
<tr>
<td>4:00</td>
<td>8:15-8:30</td>
<td>1:55</td>
<td>8:15-8:30</td>
</tr>
<tr>
<td>4:15</td>
<td>8:50-9:05</td>
<td>2:00</td>
<td>8:40-8:55</td>
</tr>
<tr>
<td>4:30</td>
<td>9:15-9:30</td>
<td>2:10</td>
<td>9:25-9:40</td>
</tr>
<tr>
<td>4:45</td>
<td>9:45-10:00</td>
<td>2:20</td>
<td>10:10-10:30</td>
</tr>
<tr>
<td>5:00</td>
<td>10:15-10:30</td>
<td>2:30</td>
<td>10:50-11:10</td>
</tr>
</tbody>
</table>

Your tempo pace is affected by a wide variety of factors like how rested you are, stress levels, hydration, temperature, humidity, and fatigue. Because it’s so variable, your paces might be slightly different from workout to workout. This is ok!

Tempo workouts are very much dependent on effort levels, so as long as the effort is in the right range, you shouldn’t be overly concerned with the specific pace.

**Running calculators put my easy run pace at an effort that feels way too slow. Will I put myself at risk for an injury if I run faster if it still feels easy?**

The short answer: no way! If a certain pace feels easy, then it’s easy. But here’s the caveat: that pace has to feel easy for the entire run to truly be considered easy. If I were to start running every run at 5 minute mile pace, that would feel easy...for the first minute.
Make sure you can hold a conversation during your easy runs. If you can do that, you’re not risking an injury. Your long runs should typically be a moderate effort and could venture into “hard effort” territory during the last few miles if you’re fatigued. I recommend that runners run “by feel” on their runs so instead of being married to a particular pace, run what your body is ready for on that particular day.

And always remember the “3 C’s” of easy running: controlled, comfortable, and conversational.

**Should I breathe through my nose or mouth when running?**

I’ve seen this question come up frequently with new and beginning runners. Ideally, your breathing should come naturally and be a sub-conscious activity. Do you think about your breathing when you’re walking to work, going up a flight of stairs, or doing laundry? Probably not. The same is true with running: your breathing rate will automatically change based on your pace and effort level.

There has been no research that shows a particular breathing pattern is optimal for performance, efficiency, or injury prevention. But forcing yourself to breathe through your nose while running hard – or in accordance to a certain ratio of breaths to steps – can negatively affect your running economy. And for those who think nasal breathing is preferred, it’s a physical impossibility to get enough oxygen into your body when your body needs 30 or more liters of air every minute.

As you start to run more you’ll probably stop thinking about your breathing just like you do with most everyday activities. It will be secondary, a subconscious pattern regulated by your effort.