PERFECT YOUR RUNNING FORM

THE BENEFITS OF GAIT ANALYSIS

A GUIDE TO STAYING INJURY-FREE AND RUNNING STRONG

DR. PADEN WOLFE

INTRODUCTION

The Hidden Struggles of Running with Poor Form

For many runners, hitting the pavement, trails, or treadmill is an escape—a way to clear the mind, push physical limits, and enjoy the freedom of movement. But what happens when **running doesn't feel as good as it should?**

Maybe you've felt it before...

- **Nagging discomfort in your knees, hips, or lower back** that never seems to go away.
- **Tightness in your calves or hamstrings** that keeps slowing you down.
- **Feeling like you're working twice as hard** as other runners but not seeing improvements.
- **Injuries that keep creeping up** no matter how much you stretch or rest.

Many runners unknowingly fight against their own bodies, forcing themselves to run with inefficient mechanics—and that takes a toll over time.

You might be running harder than necessary because your stride isn't optimized. You might be compensating for weaknesses without even realizing it. Or maybe you've already tried making adjustments, but you're not sure if you're doing it right.

The truth is, **how you run matters.**

The good news? You don't have to guess your way through it. Small changes to your form, mechanics, and movement patterns can lead to faster, more efficient, and pain-free running.

This guide will walk you through exactly what you need to know to perfect your running form, reduce stress on your body, and make running feel better than ever.

ABOUT MILE HIGH PHYSICAL THERAPY

Mile High Physical Therapy: Helping You Run Better, Faster, and Pain-Free

Located in the heart of Denver, CO, **Mile High Physical Therapy** is dedicated to helping runners of all levels improve performance, prevent injuries, and optimize movement mechanics—without unnecessary surgeries or medications.

We understand how frustrating it is to deal with nagging pain, inefficient running mechanics, or recurring injuries. Whether you're training for a race or simply want to run more efficiently, the way your body moves plays a huge role in performance and injury prevention.

That's why we take a comprehensive approach, combining cutting-edge techniques, technology , and personalized running assessments to address the root cause of inefficiencies—**so you can run stronger, longer, and pain-free.**

MILE HIGH BALANCE CENTERS PHYSICAL THERAPY

www.milehighphysicaltherapy.com

ABOUT DR. PADEN WOLFE

Meet Dr. Paden Wolfe: 30+ Years of Experience in Biomechanics & Running Performance

With a career spanning over three decades, Dr. Paden Wolfe, MSPT, DPT, has helped thousands of runners and athletes improve their form, efficiency, and performance while avoiding injuries.

His expert understanding of biomechanics, human movement, and sports science allows him to develop customized solutions for each runner.

His approach often includes:

- **Video running gait analysis** to identify inefficient movement patterns
- **Biomechanical assessments** to pinpoint weaknesses affecting speed and endurance
- **Manual therapy & hands-on techniques** to enhance flexibility and mobility
- **Dry needling** for targeted muscle relaxation and recovery
- **Custom training programs** to strengthen key muscle groups for optimal running mechanics

If you've been struggling with persistent aches, inefficient running mechanics, or want to enhance your performance, Dr. Wolfe's evidence-based approach can help you move more efficiently and run at your best. **Take the next step toward stronger, smarter, and pain-free running.**

WHY RUNNING FORM MATTERS

Running is one of the most natural and effective forms of exercise, but poor running mechanics can lead to inefficiencies, discomfort, and even injury.

Whether you're an elite competitor or someone who simply enjoys weekend jogs, perfecting your running form can make all the difference.

With the right adjustments, you can:

- ✓ **Run faster** and more efficiently
- ✓ **Reduce unnecessary stres**s on your body
- ✓ Enjoy a smoother, more **comfortable stride**
- ✓ **Prevent injuries** and **keep running** for years to come

This guide will walk you through key factors that impact your running mechanics and show you how a professional gait analysis can help you become a stronger, more efficient runner.

IMPROVING MECHANICS FOR EFFICIENCY (REVISED TO INCLUDE A BRIEF MENTION OF GAIT ANALYSIS)

Every runner has a unique stride, but not all strides are efficient. Small inefficiencies in running mechanics may not seem significant at first, but over time, they can contribute to fatigue, slower speeds, and even injuries.

When form isn't optimized, muscles work harder than necessary, leading to wasted energy and decreased performance. Minor adjustments to foot placement, cadence, posture, arm, and leg movement can make a significant impact on running efficiency.

Key Areas to Focus On

Foot Strike

Your foot strike determines how efficiently your body absorbs impact and propels you forward. Excessive heel-striking, where the foot lands too far in front of the body, creates a braking force that slows momentum and increases strain on the knees, hips and lower back.

A more efficient foot strike occurs when the foot lands closer to the body's center of mass, helping to absorb impact and improve forward propulsion.

Cadence

Cadence refers to the number of steps taken per minute. A slower cadence with longer strides often leads to overstriding and inefficient movement, while a higher cadence with shorter, quicker steps promotes better efficiency.

Studies suggest that 170-180 steps per minute is the ideal range for most runners to minimize braking forces and improve stride mechanics.

Arm Swing

Arms contribute to balance, rhythm, and forward propulsion. Proper arm movement should be controlled and aligned with forward motion, rather than crossing over the body or creating excess movement that wastes energy.

Making Small Changes for Big Results

Refining these mechanics can help improve efficiency, reduce fatigue, and enhance performance. For runners looking to make targeted improvements, a running gait analysis can provide a clear, objective breakdown of movement patterns, helping identify small adjustments that can lead to significant gains.

REDUCING STRESS ON YOUR BODY

Running puts repeated stress on the joints, muscles, and ligaments. When mechanics aren't optimized, this stress is distributed unevenly, leading to excess strain and an increased risk of injury.

Common issues caused by improper mechanics include:

- Knee pain from excessive impact forces.
- Shin splints due to improper foot strike or running form.
- Hip tightness caused by poor posture and weak stabilizing muscles.
- Achilles tendon issues from excessive strain on the lower leg.

How to Reduce Strain and Prevent Injuries

Making small adjustments to posture, stride length, and foot placement can help the body absorb and distribute impact more effectively.

- **Posture** – Maintaining an upright but relaxed posture with a slight forward lean from the ankles can improve alignment and reduce excess load on the hips, knees and low back.

- **Stride Length** – Shorter, quicker strides reduce impact forces and minimize stress on joints.
- **Foot Placement** – A balanced landing under the body's center of mass improves efficiency and reduces unnecessary strain.

Understanding Your Unique Running Mechanics

Every runner's body is different, and small inefficiencies may not always be noticeable. A running gait analysis can identify hidden movement patterns contributing to excessive strain, helping runners make personalized adjustments to improve performance and reduce the risk of injury.

HOW TO RUN CORRECTLY FOR BETTER PERFORMANCE

Running isn't just about endurance—it's about movement efficiency. The more efficiently you move, the less energy you waste, allowing you to run longer, faster, and with less fatigue.

Many runners focus on training volume—running more miles, increasing speed, and pushing harder workouts—but if mechanics are flawed, training harder won't necessarily make you a better runner. Instead, it may reinforce poor habits and lead to plateaus or injuries.
Optimizing running form means learning how to move with the least amount of resistance, allowing for smoother, more effortless strides.

Fundamentals of Proper Running Technique

1. Stay Tall

Posture plays a critical role in running efficiency. A slight forward lean from the ankles—not from the waist—helps maintain momentum and keeps the body in alignment.

- Keep the chest open and shoulders relaxed to avoid unnecessary tension.
- The head should remain neutral, aligned with the spine, rather than jutting forward or tilting downward.
- Good posture improves breathing efficiency, as a collapsed chest restricts lung expansion.

2. Engage Your Core

A strong core acts as the foundation for proper running mechanics. It stabilizes the spine and pelvis, reducing unnecessary movement and improving stride efficiency.

- A weak core can lead to excessive side-to-side movement or over-rotation of the torso, which wastes energy.
- Strengthening the deep core muscles, hip stabilizers, and lower back helps maintain balance and improve running economy.
- Engaging the core while running prevents lower back pain and posture breakdown over long distances.

3. Land Under Your Center of Mass

One of the most common mistakes runners make is overstriding, where the foot lands too far in front of the body.

- Overstriding increases braking forces, slowing forward momentum and putting excess stress on the knees and hips.
- Instead, aim to land with the foot directly under the body's center of mass, allowing for a smoother transition into the next stride.
- Focusing on a higher cadence (shorter, quicker steps) can help prevent overstriding and improve overall efficiency.

COMMON FORM ERRORS THAT LEAD TO INEFFICIENCY

Many runners are unaware of subtle inefficiencies in their form because they aren't easy to feel while running.

Some of the most common errors include:

- **Slouching or hunching forward** due to fatigue or poor posture.
- **Tension in the shoulders or arms** that wastes energy.
- **Over-rotating the torso**, leading to excessive side-to-side movement.
- **Landing with a heavy heel-strike**, which creates unnecessary impact forces.

Since running is a repetitive motion, small form errors—repeated thousands of times per run—can add up to lost efficiency and increased risk of injury.

The Importance of Body Awareness

Many runners don't realize they're making these mistakes until they see themselves on video. Visual feedback is often the key to making meaningful improvements, as small inefficiencies that go unnoticed can become obvious when analyzed frame by frame.

Fine-tuning running technique isn't about forcing a different way of moving, but rather making small adjustments that help the body run more efficiently, improving both performance and longevity.

FEELING STRONGER AND MORE COMFORTABLE WHILE RUNNING

Running should feel natural and efficient, but for many runners, it often feels like a struggle—whether it's nagging discomfort, constant fatigue, or the sense that running is harder than it should be.

When running feels uncomfortable or overly taxing, it's often a sign that mechanics aren't optimized. Small inefficiencies in movement—such as tight hip flexors, improper foot strike, or weak glutes—can force the body to compensate, leading to increased effort, strain, and even pain.

Common Factors That Make Running More Difficult

1. Tight Hip Flexors and Restricted Mobility

The hips play a critical role in running mechanics. If hip flexors are tight or mobility is limited, stride length can become shortened and inefficient.

- Tight hip flexors restrict natural movement, making each step feel more forced.

- Limited mobility can cause compensations in the lower back or knees, leading to discomfort over time.
- Stretching and mobility work can improve stride mechanics, allowing for smoother, more efficient movement.

2. Improper Foot Strike and Ground Contact

How your foot meets the ground directly impacts energy transfer, efficiency, and impact forces.

- Overstriding and heavy heel-striking increase braking forces, making each step feel more jarring.
- Landing too far forward can lead to unnecessary muscle strain and reduce running efficiency.
- Focusing on a midfoot or balanced foot strike can improve shock absorption and energy return, making running feel lighter and more fluid.

3. Weak Glutes and Core Instability

The glutes and core provide essential stability while running. If they are weak, other muscles compensate, leading to inefficient movement patterns and fatigue.

- Weak glutes can cause excessive hip drop, which reduces stride efficiency.
- Poor core engagement can lead to over-rotation of the torso, wasting energy.
- Strengthening these areas can improve stability, balance, and overall running mechanics.

MAKING RUNNING FEEL EASIER AND MORE ENJOYABLE

Running should not feel like a constant battle against fatigue and discomfort. Small adjustments to mechanics, mobility, and strength training can make a significant difference in how running feels:

- Improving hip mobility allows for a smoother, more efficient stride.
- Correcting foot strike and stride length reduces impact forces and conserves energy.
- Strengthening the core and glutes improves stability and endurance.

By optimizing movement patterns, running becomes less about effort and more about rhythm, allowing for greater endurance, better speed, and more overall enjoyment.

The goal isn't just to run more—it's to run better, stronger, and with ease.

ENJOYING YOUR TIME ON THE TREADMILL, PAVEMENT, AND TRAILS

Running should be something you look forward to—not something that feels like a chore or causes discomfort. Whether you're training for a race, running for fitness, or simply using it as a way to clear your mind, your running mechanics play a huge role in how enjoyable your runs feel.

For many runners, frustration comes from fatigue, discomfort, or recurring injuries that make each run feel harder than it should. But with better efficiency, improved form, and a few small adjustments, running can feel effortless, rewarding, and even exhilarating.

How Running Mechanics Impact Your Experience

- **Better Form = Less Fatigue** – When the body moves efficiently, less energy is wasted, meaning you can run longer and stronger without feeling drained.
- **Injury Prevention = More Consistency** – Avoiding common running injuries means you can train regularly without interruptions, leading to faster improvements and greater enjoyment.
- **Confidence in Your Stride = A More Positive Experience** – Knowing that you're running with proper mechanics and reduced risk of injury allows you to focus on the enjoyment of the run itself, rather than worrying about aches or inefficiencies.

RUNNING SHOULD FEEL GOOD—NOT LIKE A STRUGGLE

Many runners assume that discomfort is just part of the sport, but running should feel fluid and natural. Small refinements in stride mechanics, posture, and movement patterns can transform the way you feel while running, making it something you genuinely look forward to.

Investing in your running technique now means you can keep doing what you love for years to come—without the setbacks of injuries, fatigue, or inefficient movement.

By making running smoother, more comfortable, and less taxing on the body, you can focus on what truly matters: enjoying the journey—whether on the treadmill, pavement, or trails.

HOW GAIT ANALYSIS CAN TAKE YOUR RUNNING TO THE NEXT LEVEL

A professional running gait analysis is more than just evaluating your stride—it's a comprehensive breakdown of how your entire body moves while you run. Even small inefficiencies in mechanics can create extra work, increase injury risk, and limit performance, making it harder to run at your full potential.

By analyzing stride length, foot strike, joint movement, and muscular engagement, a gait analysis provides valuable insights that allow for precise adjustments, helping you run more efficiently, comfortably, and injury-free.

What a Running Gait Analysis Evaluates

At Mile High Physical Therapy, Dr. Paden Wolfe utilizes high-tech video analysis to assess key movement patterns, providing an in-depth evaluation of:

- Stride length and foot strike – Identifying whether you're overstriding, heel-striking, or landing efficiently under your center of mass.
- Hip, knee, and ankle mechanics – Assessing how well these joints move together to support a fluid and balanced stride.
- Muscle imbalances or weaknesses – Detecting areas of instability or strength deficits that may contribute to inefficiencies or injuries.
- Overall body alignment and efficiency – Ensuring proper posture, core engagement, and symmetry throughout your running motion.

Who Can Benefit from a Gait Analysis?

Many runners assume that gait analysis is only for elite athletes, but any runner—regardless of experience level—can benefit.

- Beginner runners looking to start off with proper mechanics and avoid common mistakes.
- Experienced runners who want to refine their form and improve efficiency.
- Injury-prone runners seeking to identify movement patterns that contribute to recurring pain.
- Competitive runners aiming to optimize their stride for better speed and endurance.

Understanding how your body moves while running gives you the ability to make targeted improvements, leading to smoother, faster, and more efficient running—without unnecessary strain.

MEET DR. PADEN WOLFE & THE WOLFE FAMILY – RUNNING IS IN THEIR BLOOD

When it comes to running expertise, **Dr. Paden Wolfe and his family live and breathe the sport.**

🏆 **Dr. Paden Wolfe and his wife, Dr. Debbie Maass, have been running since junior high school** and have dedicated their careers to helping runners move better and perform at their best.

🏆 **Dr. Debbie Maass ran at Colorado State University, earning two All-American awards** in the indoor mile and was inducted into the CSU Hall of Fame in 2024.

🏆 **Their son, Parker Wolfe, is one of the fastest distance runners in University of North Carolina history**—an NCAA Champion in the outdoor 5K and Bronze medalist at the 2024 Olympic Trials.

🏆 **Their daughters, Baylor and Kinley Wolfe, are D1 college runners** at the University of Kentucky and the University of North Carolina.

🏆 **Dr. Paden Wolfe himself began competing in the Senior Games in 2020** and has worked with high school, collegiate, and elite runners for over 20 years.

🏆 **Family mile times:**

- Parker Wolfe: 3:54 (Olympic Trials Bronze Medalist, NCAA 5K Champion)
- Debbie Maass: 4:46 (CSU Hall of Fame Inductee)
- Kinley Wolfe: 4:51 (UNC)
- Baylor Wolfe: 5:05 (UK)
- Paden Wolfe: “Late bloomer” 5:27

The Wolfe family understands running at every level—from youth racing to Olympic competition. When you work with Dr. Paden Wolfe, you’re learning from someone with a lifetime of experience.

NEXT STEPS: BOOK A PROFESSIONAL RUNNING GAIT ANALYSIS

If you're serious about improving your running form, feeling better while running, and reducing your risk of injury, a professional running gait analysis is your next step.

At **Mile High Physical Therapy**, we offer:

- Video running gait analysis
- Muscle strength & flexibility assessment
- Body alignment evaluation
- Personalized recommendations to improve running efficiency
- Custom Home Movement Program (HMP) to address imbalances

Whether you're a competitive runner or just getting started, optimizing your mechanics will help you reach your full potential.

Book your Running Gait Analysis Today

Conclusion and Next Steps

Perfecting your running form isn't just about running faster—it's about running better, staying injury-free, and enjoying every run. With the right mechanics and strength, you can improve efficiency, reduce strain, and run stronger. Start making these adjustments today, and if you need guidance, we're here to help.

Let's work together to help you **run efficiently, move pain-free, and keep doing what you love.**

Don't let inefficient form or recurring pain keep you from doing what you love. Whether you want to train harder, run farther, or simply move without discomfort, we're here to help. Book your running gait analysis today and take the next step toward better, pain-free running!

BOOK A RUNNING ANALYSIS TODAY!

https://www.milehighphysicaltherapy.com/request-a-running-analysis-appointment/

We're here to support you beyond this guide. Visit our website or reach out directly for expert tips, movement assessments, and personalized care. Let's get you running efficiently—without discomfort holding you back!

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