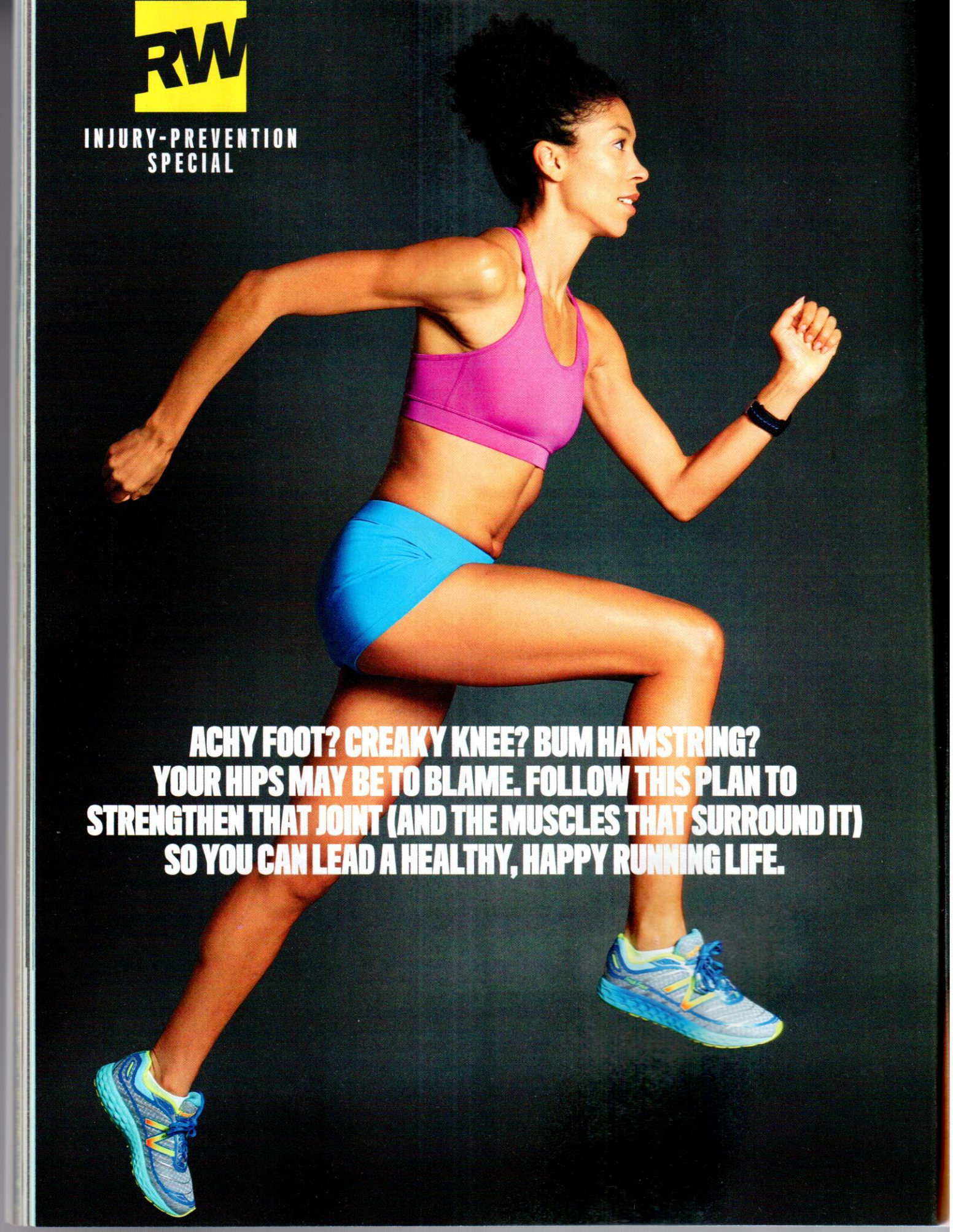
RW
INJURY-PREVENTION SPECIAL
ACHY FOOT? CREAKY KNEE? BUM HAMSTRING?
YOUR HIPS MAY BE TO BLAME. FOLLOW THIS PLAN TO
STRENGTHEN THAT JOINT (AND THE MUSCLES THAT SURROUND IT)
SO YOU CAN LEAD A HEALTHY, HAPPY RUNNING LIFE.

HIP CHECK!

BY CINDY KUZMA

PHOTOGRAPHS BY MITCH MANDEL

INJURED RUNNERS frequently come to see physical therapist Brian Noehren, P.T., Ph.D., with their shoes and orthotics in tow, regaling him with tales of how they've cycled through different brands and models of shoes in an attempt to treat themselves. They're not alone in suspecting their footwear. In a recent survey asking runners to name the biggest injury culprits, "wearing the wrong running shoes" ranked third (behind "not stretching" and "excessive training"). Sometimes footwear does deserve the blame, as in the case of one of Noehren's patients who wore the same pair of shoes for nearly a decade. But far more frequently, the problem isn't the gear. Or even how your foot hits the ground (heel-strikers are not doomed to injury, as once thought). Instead, research is pointing to a different culprit, one that many runners tend to overlook: the hips. Experts believe that detecting and correcting weaknesses and imbalances in the hips could be the key to getting you back on the road, and keeping you there.

Noehren has a unique perspective—besides treating runners as a therapist, he's a scientist who oversees the Bio-Motion lab at the University of Kentucky. In a cavernous room on the Lexington campus, he and his colleagues stick reflective sensors all over runners' bodies before turning them loose on a split-belt treadmill equipped with force plates and motion sensors. The scientists hover over nearby computers, which turn the captured data

into a three-dimensional model and a series of sophisticated charts and graphs displaying factors like hip rotation, knee flexion, and foot eversion.

When Noehren first began comparing the gaits of runners with knee pain to those of healthy runners, he expected to see differences in pronation—the inward roll of your foot while you run. Time and again, he couldn't find a clear pattern. "The hip was where everything was goofy," he says. In a 2013 study published in *Medicine & Science in Sports & Exercise*, his team assessed about 400 healthy women. Fifteen went on to develop runner's knee, and when the researchers looked back, they found those who ended up with the injury ran with greater hip adduction, meaning their hips turned toward the center of their bodies with every stride. If your pelvis drops, your femur will collapse inward, which puts added pressure on your knee, which will eventually create pain.

Other research has linked similar gait patterns to iliotibial-band syndrome, hamstring strains, and potentially even stress fractures. Colleen Brough, D.P.T., M.S., assistant professor of physical therapy at Columbia University, also sees these patterns in runners who show up at the Running Performance Program at NYU's Langone Medical Center with hip-flexor strains and tears, Achilles tendinitis, and calf strains. Essentially, if your hip muscles fail at their main job—to keep your pelvis balanced—adjoining muscles like your hamstrings and hip flexors attempt to pick up the slack and steady you. And since they weren't designed to bear this much force, they often crumble under the pressure.

Experts usually blame a lack of strength training for these issues. Brough and Noehren say hitting the gym is a smart tactic, especially for those who are healthy and want to stay that way. But for injured runners who have poor running mechanics, targeted strength work is simply a starting point. After that, Brough says these runners need to work on learning how to activate hip, glute, and other core muscles that are likely not firing properly. Doing so will enable them to develop healthier running patterns and find long-term relief (see "DIY Gait Retraining," page 68).

Brough stresses that runners shouldn't wait until they get hurt to think about their hip and core muscle health. She believes runners can identify and correct small hip-muscle imbalances on their own before they suffer a full-blown injury (see "Test Yourself," right). Doing so might not only keep you injury-free—it also may boost your speed. Jay Johnson, a Boulder, Colorado–based coach who's had his athletes perform hip-strength and mobility work for years, says those who diligently abide by the program stay resilient enough to handle harder training and wind up turning out better performances as a result. "It's the least sexy part of becoming a better runner," he says. "But when you do a bunch of consistent hip-strength training back to back for weeks, days, months, and years, that's when you get stronger and run faster."

What's Your Risk?

Runners of all shapes, sizes, and speeds—from newbies to Olympic qualifiers—can have weak or inactive hips and glutes, says New York City physical therapist Colleen Brough. Your odds of incurring common injuries originating from weakness in the hip muscles and core tend to be higher if you:

Are female
For reasons experts still don't understand—but possibly due to women's tapered pelvises—female runners often have poor hip strength and lack pelvic stability, which contributes to overuse injuries.

Work at a desk
Sitting in a chair all day can deactivate glutes and tighten hip flexors and hamstrings, throwing your stride off balance.

Have been hurt before
Past injuries—ankle sprains, for example—are linked to inactive glutes, possibly because you've altered your gait to compensate. The resulting dysfunctions can cause a new set of issues.

Plan to increase your speed or mileage soon
Gait errors that don't hurt you if you're happy at 15 miles a week may turn into an injury when you bump it to 30 or start doing more challenging workouts.

Test Yourself

If you struggle with these moves, consider it a mandate to do the exercises on page 66.

The Step-Down Test
Stand in front of a mirror on a block eight inches tall. Step down, letting your heel just touch the ground, then return back up. Do three times on each leg.
YOU FAIL IF Your pelvis slants instead of staying level; your knees drift in.

The Leg-Raise Test
Lie with both legs extended out. Put your hands on your hip bones. Lift one leg up about six inches.
YOU FAIL IF Your pelvis rotates instead of staying level; your back arches.

The Gait Test
Ask a friend to video you running toward him. Bonus: Download a gait-assessment app such as Ubersense (free) or Dartfish Express ($6.99) to slow down the footage. Freeze-frame your form when each leg hits the ground.
YOU FAIL IF Your pelvis slants rather than staying level; your knees drift inward. If you have an issue, these flaws will be glaringly obvious.

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HIPSTER LINGO

A quick anatomy lesson: Weakness or dysfunction in the structures of the hip (indicated here with blue squares) can contribute to a wide range of running injuries (yellow squares), extending up into your lower back and as far down as your feet.

Reed Ferber, Ph.D., gave 284 patients complaining of leg pain a hip-strengthening plan. Within six weeks, 93% were pain-free.

PELVIC BONES
These anchor your core and upper leg muscles and should stay relatively level as you run. Often, though, runners' knees drift inward and the pelvis drops, causing the entire lower leg to rotate out of alignment.

LOWER BACK PAIN
The muscles above your hips get overworked trying to keep your pelvis stable if your glutes aren't up to the task.

HIP FLEXOR STRAIN
These muscles were designed to bend your hip—not to stabilize the pelvis. But when your glutes don't work properly, they often end up picking up the slack to reduce extra motion in your pelvis.

GLUTEUS MAXIMUS
The strong, multilayered butt muscle absorbs impact and generates force that helps propel you forward.

GLUTEUS MEDIUS
This is a primary stabilizing muscle, which is key, given that running is essentially a one-legged balancing act.

ITB SYNDROME
A dropped pelvis and knees that rotate inward tend to strain the iliotibial band, causing pain and irritation.

HAMSTRING STRAINS
Weak or inactive glutes often cause the hamstrings to work double time, leading to overuse injury.

RUNNER'S KNEE
Weakness in the hip abductors and external rotators can alter your biomechanics, causing the knee to turn inward.

ACHILLES TENDINITIS
Weak or inactive glutes can cause you to overuse your calf muscles to propel your body, which can strain your Achilles tendons.

PLANTAR FASCIITIS
If your hips are weak, often calf muscles get over-recruited. Under excess strain, they can pull on the thick tissue that runs along the arches of your feet.

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GET STRONG & HEALTHY
A 4-Phase Action Plan

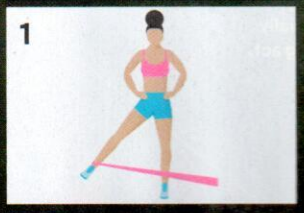
When runners call his Running Injury Clinic, it doesn't matter what ails them—an achy hamstring, knee, or foot—Reed Ferber, Ph.D., associate professor at the University of Calgary, prescribes hip-strengthening exercises (phase 1, below). He instructs them to do the moves every day for four weeks and to call back if they aren't feeling better. "Often, I don't hear back from them; sometimes I do get an e-mail of gratitude," he says. "This routine is based on our research. These exercises should be a part of every runner's injury prevention and rehabilitation protocol."

Ferber's full plan contains four phases. Do each phase for four weeks before moving on. Once you work your way through all the phases, do phase 4 twice a week for maintenance. If you take a break from running or strengthening, start over with phase 1. Do these moves either after you run or hours before you run. Start with a light to medium band. As you gain strength, you can take a half-step away from the band's anchor or try a heavier band. It's okay to start phase 1 and 2 touching a wall. But you should be able to do the exercises freestanding before moving to phase 3.

How Many, How Often?

For best results, do the exercises every day. On your first day of each phase, do 1 set of 10 reps. On your second and third days, do 2 sets of 10 reps. Beginning on the fourth day, do 3 sets of 10 reps.

PHASE 1 (WEEKS 1-4)



HIP ABDUCTOR STRENGTHENER

Secure a resistance band to a stable object. Stand with your left side facing the band's anchor. Place your right ankle in the band. Move your right leg out to your side while keeping your knee straight. Raise your leg out to a count of two, and lower it to a count of two, keeping your movement slow and controlled. Repeat on the other leg.

WATCH OUT FOR Keep your upper body still. If you're leaning, you're cheating.

HIP FLEXOR STRENGTHENER

Secure a resistance band to a stable object. Stand facing away from the band's anchor, with the band around your left ankle. Lift your left leg out while keeping the knee straight. Raise your leg to a count of two, and lower it to a count of two, keeping your movement slow and controlled. Repeat on the other leg.

VIDEO DEMO

Watch this routine at **runnersworld.com/hipcheck**.

PHASE 2 (WEEKS 5-8)

1

GLUTEUS MEDIUS STRENGTHENER

Secure a resistance band to a stable object. Stand facing the band's anchor, with the band around your right ankle. Move your right leg back and slightly out to a 45-degree angle while keeping your knee straight. Extend your leg to a count of two, and lower it to a count of two. Repeat on the other leg.
WATCH OUT FOR If you are moving at the correct angle, you'll feel a burn on the outside of your glute, indicating you're working your gluteus medius.

2

HIP EXTENSOR

Secure a resistance band to a stable object. Stand facing the band's anchor, with the band around your right ankle. Move your right leg back directly behind you while keeping your knee straight. Extend your leg to a count of two, and lower it to a count of two, keeping your movement slow and controlled. Repeat on the other leg.
WATCH OUT FOR You should feel a burn more toward the middle of your glute.

PHASE 3 (WEEKS 9-12)

1

TWO-LEGGED BALANCE

Stand on an unstable surface, such as an Airex Balance pad or a pillow, with both feet. Balance for 30 seconds, and repeat three times. To make it easier, lightly touch a wall to help with balance. To make it harder, close your eyes.

2

STEP-UP

Stand with your left foot on a box. Step up with your right foot and then lower your right foot back down. Move up to a count of two, and lower back down to a count of two. Repeat on the other leg.
WATCH OUT FOR Make sure your front knee stays above your foot and doesn't extend past your toes.

3

LUNGE

Stand with feet staggered, your right foot forward. Squat down so that your left knee is lowered toward, but not touching, the floor. Lower down to a count of two, and rise back up to a count of two. Repeat on the other leg.
WATCH OUT FOR Make sure your front knee doesn't extend past your toes.

4

ONE-LEGGED SQUAT

Balance on your right foot. Bend your right knee and squat down slightly. Move down to a count of two and back up to a count of two. Repeat on the other leg.
WATCH OUT FOR Keep your hips level—don't let one side dip.

PHASE 4 (WEEKS 13-16)

1

ONE-LEGGED BALANCE

Stand on one leg on an unstable surface, such as an Airex Balance pad or a pillow. Balance for 30 seconds, and repeat three times. Then balance on your other foot. To make it easier, lightly touch a wall. To make it harder, close your eyes.

2

SIDE PLANK

Lie on your left side, supporting your weight on your left forearm. Form a straight line with your body so your head, hips, and ankles are aligned. Maintaining that straight line, lift your hips up off the floor and hold for 10 to 30 seconds. Repeat on the other side.

3

BRIDGE

Lie on your back with your knees bent, arms out, and palms down. Draw your belly button in, and lift your hips up by pressing your feet into the ground. Contract your core, your glutes, and then your hamstrings in this position. Hold for three to five seconds.
WATCH OUT FOR Keep your hips level—don't let one side dip—while raised.

DIY Gait Retraining

If you've struggled with injuries, it may not be enough to just strengthen your hips. You may need to re-educate them, says physical therapist Colleen Brough. "Running cues teach the correct muscles when and how to fire," she says. "They also teach overused calves, hamstrings, and hip flexors to quiet down. It's called neuromuscular reeducation—teaching a new firing pattern." As you start phase 2 of Ferber's strength program, do these gait exercises. At some point on your run, pick a pole, tree, or other landmark about 100 yards away and practice one of these drills until you reach that point. Try again a few more times on that run, but don't worry about doing these for the length of an entire run. And be patient: It can take anywhere from three weeks to three months to make the new movement pattern your natural gait.

The Glute Push-Off

WHY By focusing on squeezing your butt and then using it to drive you forward, you're teaching your gluteus maximus to fire at just the right moment, harnessing the strength there to propel you.

HOW Focus on one side at a time. As that side's foot hits the ground, think about relaxing through your stomach, back, and hamstring while squeezing your butt muscles. Once you hit your first landmark, pick another and repeat on the other side.

The Core Cue-Up

WHY Many runners with weak or dysfunctional hip and core muscles overuse their obliques to steady their wobbling pelvis—a job those muscles weren't completely designed to do, and a position that creates tension throughout your trunk and arms. Learning to draw power from your lower abdominals instead keeps your upper body more relaxed and your pelvis strong and stable.

HOW Engage your lower abs by gently drawing your navel up and in. Relax once you reach your landmark. Repeat.

The Forward Lean

WHY Often, runners tend to sit back as they fatigue—a position that can inhibit your gluteus maximus and put extra strain on your hip flexors and hamstrings. This cue reminds you to stay upright, utilizing the strength in your core and glutes properly.

HOW Try this one near the end of a run, when you're tired. Imagine someone is grabbing your shirt from the front and lifting you up by the chest. Tip your body slightly forward from the ankles on up—don't just bend forward at the hips. Relax once you reach your landmark. Repeat.

What's Good Form?

Proper hip alignment is achieved when your pelvis stays in a neutral position (shown here), meaning it doesn't tip too far forward or back, or too far to the left or right. Think of your pelvis as a bowl filled with water. The goal is to keep that bowl steady, so water doesn't spill from the front, back, or either side.

Quick Fixes

Got a minute? That's all it takes to help your hips.

Anytime
Squeeze your glutes and hold that contraction for 10 seconds.

When sitting Don't just plop into your chair—slowly lower, focusing on your butt muscles. Better yet, swap your desk chair for a stability ball or an adjustable or standing desk.

While standing
Reset your posture—breathe deeply to relax your upper abs, engage your lower abs, then lean slightly forward, so you have less weight in your heels and more in the balls of your feet to minimize slouching. Keep your pelvis neutral; don't tilt your hips forward or backward.

On stairs
As you climb or descend stairs, focus on squeezing your glutes rather than letting your quads do all the work.