

SEPTEMBER 28, 2009

Newton Gravity Running Shoe Review

"Nature and nature's laws lay hid in night;

God said, "Let Newton be," and all was light."

- Alexander Pope's epitaph for Sir Isaac Newton, 1727

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There's a biomechanical theory that describes the act of walking – and by extension, running – as nothing more than a controlled fall.

The physics go something like this: your body's center of mass sits at a point near your pelvic area, and your natural base of support is like a small circle drawn around both feet. In standing, the center of mass hovers directly above the base of support, which is a position of stability. But as soon as you shift your weight forward, the center of mass leaves the base of support, and your balance is disrupted by a downward-directed force; you're essentially tipping over forward. The act of taking a step not only initiates walking, but – more importantly, from a safety standpoint – prevents you from falling on your face.

As for the force that creates this instability and pushes you forward? That would be gravity, as first described by Isaac Newton.



It's no accident that Boulder, Colorado-based [Newton Running Company](#) took the father of modern science as its namesake; in the same revolutionary manner that Sir Isaac changed the way we see the physical universe, the shoe company's intention is to change all the rules you thought you knew about normal running motion.

By business standards, Newton is a completely radical company: they're barely three years old, and were founded by a couple of guys with no manufacturing experience who decided to enter the industry with the most expensive shoes on the market. And they introduced themselves by telling all of us that we run wrong. It's a wonder they lasted three *weeks*, let alone three years. For that reason alone, you

figure the product must be something pretty distinctive.



The Newton Gravity

The company's [co-founders](#) aren't complete neophytes when it comes to running, however: CEO Jerry Lee is an avid marathoner, and Chief Technological Officer Danny Abshire is an experienced ultrarunner, with repeat Leadville 100 finishes under his belt. And their passionate belief that conventional running mechanics were flawed is gaining more and more widespread acceptance with each passing day, and has captured the attention of some of the biggest names in endurance sports.

Newton's [team of professional athletes](#) includes the best triathletes in the world: Craig Alexander (known for his blazing run splits), Michellie Jones, Heather Fuhr, Paula Newby-Fraser, and Natascha Badmann among them – that's five Ironman World Champions, if you somehow needed a reminder. You won't find a more impressive roster of athletes anywhere. The company also supports several young marathoners and triathletes who subscribe to the idea that the mechanics supported by Newton shoes not only increase your running efficiency, but improve your overall speed as well. (Curiously, given Abshire's ultra background, Newton hasn't really targeted the trail running community yet; more on that a bit later.)





Helloooo ... Newton! Sir Isaac goes along for the ride.

The [Gravity](#) is Newton's top of the line neutral performance trainer, with a price tag steep enough to do a double-take. So what makes these shoes so special? That's where Newtonian physics come into play again. Specifically, Newton Running builds shoes specifically for midfoot running, encouraging you to "fall forward" with each step, and mimicking the mechanics of barefoot running as closely as possible.

(Admin note: the Newton website has a wealth of video content discussing everything from proper midfoot running form to shoe technology and construction and social responsibility. I'll probably embed one or two of them in a future post, but if you want to have a look around for yourself sometime, [click here](#).)

The underside of the Gravity makes it awkward to do a traditional heel strike while running. Rubber "actuator" lugs extend almost a half-inch from the base of the forefoot, and the bulk of the heel area is purposely minimized. The lugs are designed to act as the primary cushion on impact, and then as a lever to propel the body into the next stride. Once you're accustomed to the different feel, you find yourself landing naturally on the actuators in the forefoot, as you would if running barefoot.

(The familiarization period is no trivial matter: if you're used to running in traditional footwear, Newtons will require some significant adaptation. Newton [clearly cautions runners](#) to adjust to the shoes in small doses, and to expect some muscle soreness after the first few runs. In my case, having run so many barefoot miles already, I had no problem with the adjustment – perhaps another testimony to the Gravity's effectiveness at mimicking barefoot running.)





Close-up view of the actuators

The actuators also promote increased speed with their patented [Action/Reaction technology](#). Remember Isaac Newton's third law of motion, where every force has an equal and opposite counterforce? That's the principle behind this Action/Reaction idea. The technology is designed to absorb and then return your own energy back to you with each stride.

When your midfoot lands on the ground, shock absorption comes as the actuator lugs are pressed into hollow chambers in the shoe's midsole via an elastic membrane. Then as your forefoot levers inside the shoe, the lugs release their stored energy to help propel you forward. The materials involved with this process are supposedly much more effective than typical air cushions, gel, or foam models; the [science page](#) on Newton Running's website claims that they've spent over 12 years researching and developing their technology, with 9 US patents. From personal experience, the net effect is a feeling like you're rolling smoothly from one stride into the next.



Pretty good forefoot flexibility, too

It's tough to quantify the tangible impact of Newton's speed-enhancing features; by all accounts, Craig Alexander and Natascha Badmann were pretty darn speedy even before they started using Newtons. I can attest, however, that if you're a comfortable midfoot striker, these shoes make it easy to run fast.

I've [previously documented](#) my frustration with the slowness of this whole barefoot running experiment: slow accommodations to rough

surfaces, slow progression of mileage, and above all, a VERY slow average running speed. My response to that has been to really crank up the intensity for several runs in my Newtons over the last several weeks. I've done short interval workouts and longer tempo runs, and been very impressed with their performance.



Very airy - and very red! -mesh upper

Overall weight of the shoe is a mere 9.4 oz – a number that's closer to racing flats than everyday trainers. The uppers are very comfortable, consisting primarily of an extremely open mesh pattern that is perfect for cooling in warm climates, but terrible for keeping debris out if you happen to mix a few trails in with your asphalt. (Newton has developed another model, the [Sir Isaac](#), with a closed mesh upper and a bit more traction for running on dirt. It's still classified as a road trainer, but it appears that Newton is making slow strides towards creating a true trail running shoe. If all goes according to plan, I'll review the Sir Isaac this winter.)

Finally, there's the matter of price. The Gravity [retails for \\$175](#) from the Newton website, and I found very little variation in my brief Google shopping search. That's a significant jump above most high-end running shoes – and if you're just looking for a comfortable high-mileage trainer without making a serious effort to adjust your running form, you're completely wasting your money with these.

Part of the cost of admission, then, is making a commitment to practice midfoot running – and the high price tag makes you take that commitment seriously. These shoes would also be a great option for any of the following:

- Those who've struggled with injuries and want to learn a more efficient running pattern, but aren't ready to jump completely into the wild uncharted waters of barefoot running.
- Practiced midfoot runners who want a lightweight, comfortable shoe for fast workout days or racing. (Newton does make a

race-specific shoe that is one ounce lighter, but the Gravity is a better multi-purpose shoe for training and racing.)

- Triathletes who want to run like Craig Alexander (OK, I made that one up ...)
- Barefoot runners who want some basic shoe protection for super-long runs or easy recovery days while maintaining most of their customary biomechanics.

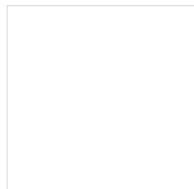
Historically, revolutionary ideas take time to be accepted; nobody's really certain whether today's incontrovertible evidence will hold up to some new scientific approach much further down the road. That's how it's going to be for Newton Running shoes for a while: a core group of believers, a vocal group of skeptics, and a whole lot of time for the rest of us to decide what seems to make the most sense.

Count me in on the side of the believers.

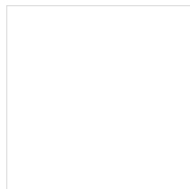


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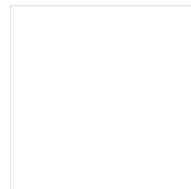
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