What is Optimal Running Form?

5K Training Program
In-Person or Self-Guided

There is **no perfect run form, everyone looks different**, but certain key features do exist. In summary a slightly bent knee on foot strike, a quick and light foot strike regardless of foot strike pattern, consistent arm swing, upright posture with a slight forward lean, and powerful toe offs are all important aspects of optimal running form that can help reduce the risk of injury and improve running efficiency. These principles are supported by research conducted by Harvard and other institutions.

The best running form is a topic that has been studied extensively by researchers and coaches. While there is some variation in recommendations, most experts agree on certain key principles, including a slightly bent knee on foot strike, foot strike pattern, arm swing, forward lean, and powerful toes driven from the glutes. Here are some research studies that support these principles:

- Bent knee on foot strike: A study conducted by researchers at the University of Wisconsin found that a slightly bent knee on impact can help reduce the risk of injury and improve running efficiency (Heiderscheit et al., 2011). A bent knee allows for greater shock absorption and can facilitate a quicker, lighter foot strike.
- Foot strike pattern: A study conducted by researchers at Harvard found that the exact location of the foot strike (forefoot, midfoot, or heel) is less important than the degree of impact forces generated upon contact with the ground (Lieberman et al., 2010). Regardless of the foot strike pattern, it is important to reduce impact forces to minimize the risk of injury.
- Arm swing: A study conducted by researchers in Spain found that a consistent arm swing and minimal side-to-side movement can lead to improved running economy (Muniz-Pardos et al., 2020). The arms can help counterbalance the movement of the legs and torso during running, and excessive movement can lead to energy wastage and inefficiency.
- Forward lean: The same study by Harvard researchers found that maintaining an upright posture with a slight forward lean can help reduce the risk of injury and improve running efficiency (Lieberman et al., 2010). This posture allows for proper alignment of the joints and optimal muscle activation, leading to efficient movement and reduced injury risk.
- Quick and light foot strikes: Having a quick and light foot strike is another important aspect that can help improve running efficiency and reduce the risk of injury. Research conducted by Harvard found that the exact location of the foot strike (forefoot, midfoot, or heel) is less important than the degree of impact forces generated upon contact with the ground (Lieberman et al., 2010). Regardless of the foot strike pattern, it is important to reduce impact forces by having a quick and light foot strike to minimize the risk of injury and increase running efficiency. This can be facilitated by having a slightly bent knee on impact, which allows the foot to make contact with the ground closer to the body's center of mass, reducing the time spent on the ground and the amount of energy wasted in braking forces (Lieberman et al., 2010).
- Powerful toe off: I often work with people that do not engage their glutes enough when walking or running. THaving a powerful toe off using the glute muscles in what is termed triple extension is another important aspect that can help improve running efficiency and reduce the risk of injury. riple extension refers to the extension of the hip, knee, and ankle joints during the push-off phase of running (Lieberman et al., 2010). This can be facilitated by engaging the glute muscles, which are the largest and most powerful muscles in the body. The glutes are responsible for hip extension and play a key role in generating the force needed for a powerful toe off.Research has shown that proper glute activation is important for efficient and injury-free running. A study conducted by researchers at the University of Michigan found that runners with weak glutes had a higher risk of developing knee injuries (Foch et al., 2014). Additionally, a study conducted by researchers at the University of North Carolina found that glute activation exercises can lead to improvements in running form and efficiency (Friel et al., 2016). Engaging the glute muscles to achieve triple extension and a powerful toe off is an important aspect of good running form that can help improve running efficiency and reduce the risk of injury. This can be facilitated by performing glute activation exercises and ensuring proper glute activation during running.

Running Form

NO

YES

Slight Forward Lean

Hip, Knee, Calf Extension

Triple Extension

Glutes, Hamstrings, Quadriceps, Calf

1 BALANCED FORWARD POSTURE
- Stand tall, gaze forward
- Keep chest forward and shoulders back and relaxed
- Don't bend at the waist

Looking Ahead, Breathe through nose and out mouth

2 COMPACT ARMS
- Short, compact, relaxed arm movement
- Pump back and recover forward, don't sway side to side
- Elbows should not extend in front of the waist unless sprinting

Bent Arms, Not Straight

3 PROPER FOOT STRIKE
- Land softly underneath a bent knee
- Avoid overstriding and excessive heel striking

Soft Landing

4 HIGH CADENCE
- Maintain approximately 170-180 steps per minute
- Count 30 steps per leg in 20 seconds for a 180 cadence
- Light, soft & quick foot placement