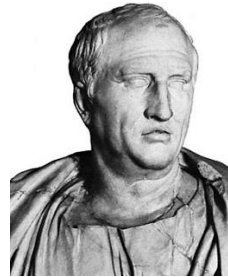


2017 Ohio Association of Track and Cross Country Coaches Clinic

Running Myths, Misconceptions, & Misinformation

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How do we know what we know?



"Any man can make mistakes, but only an idiot persists in his error."

Marcus Tullius Cicero

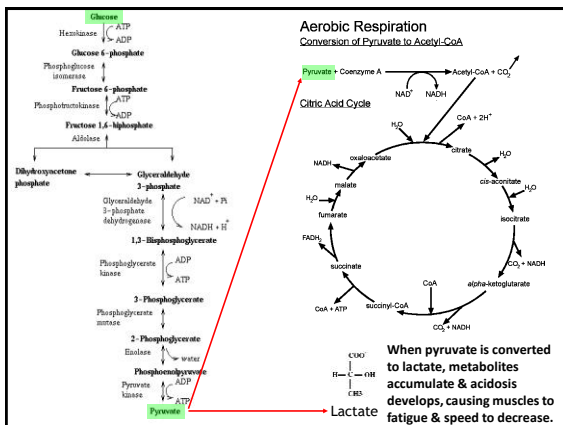
Myth: Running is bad for your knees.

Running is *not* bad for your knees!

Misconception: Runners race faster by training faster.

Runners don't do workouts to practice running faster. They do workouts to improve the physiological characteristics that will enable them to run faster in the future. That's why aerobic running makes you faster — because of the many physiological characteristics it enhances.

Rather than run faster, make workouts more difficult by increasing duration of each rep, increasing number of rep, or decreasing time of recovery intervals.



Myth: Lungs limit running performance.

Lung capacity is primarily influenced by body size, with bigger people having larger lung capacities. The best runners in the world are quite small people, with characteristically small lungs. There is no relationship between lung capacity and how fast someone runs a mile.

While many runners take deeper breaths in an attempt to get in more oxygen, the blood is already nearly maximally saturated with oxygen, even while running a race.

Myth: Lactic acid causes fatigue, muscle burning, and muscle soreness.

Lactic Acid

First discovered in 1780 in sour milk.

Produced in metabolic pathway glycolysis.

In the 1920s, Nobel Prize winners A.V. Hill and Otto Meyerhof discovered that lactic acid is produced during fatiguing muscle contractions in the absence of oxygen.

At physiological pH, lactic acid exists as lactate.

Lactate DOES NOT Cause Fatigue!

There has never been any experimental evidence proving a cause-and-effect relationship between lactate and fatigue. While lactate increases during intense exercise, so do other metabolites, including K^+ , H^+ , ADP, & P_i , all of which have been implicated in fatigue. Because of lactate's concomitant increase with these other metabolites and the simple method of measuring its concentration, blood lactate is used by scientists only as an indirect measure of acidosis.

Lactate DOES NOT Cause Muscle Burning!

No physiologist has ever burnt himself when taking a blood sample containing a high blood lactate concentration. The exact cause of the sensation of muscle burning is unknown, but it may be related to acidosis and increase in muscle temperature that accompanies intense exercise.

Lactate DOES NOT Cause Muscle Soreness!

Muscle and blood lactate return to pre-exercise levels within 30 to 60 minutes after exercise, so lactate is long gone by the time soreness develops. Muscle soreness is the result of microscopic tears in the muscle fibers, causing an initial mechanical injury (likely related to the contractile proteins—actin and myosin—pulling apart), and a delayed biochemical injury, which usually brings about the perception of soreness.

Lactate is a Runner's Friend

Lactate production maintains cells' redox potential ($NAD^+/NADH$)

supports continued ATP regeneration from glycolysis

Used as fuel by heart

Used by liver to make new glucose (gluconeogenesis)

Converted back into glycogen by a reversal of glycolysis
new glucose & glycogen used as fuels by muscles so high-intensity exercise can continue

Lactic acid & \downarrow pH have been shown to \uparrow in vitro muscle force production.

Lactate is not even associated w/acidosis, as H^+ production has been shown to come from other sources.

Misinformation: Strength training will make better distance runners.

There is little evidence that strength training improves distance running performance. Distance running is primarily limited by the delivery and use of oxygen. There are no studies showing that strength training increases supply of oxygen to and use by muscles, which is largely dictated by cardiac output, amount of RBCs & hemoglobin in blood, and muscles' capillary and mitochondrial densities.

However, when done to increase power, strength training can improve running economy.

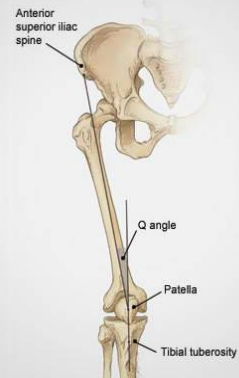
Strength training is not *necessary* unless

- 1) Runner has either already maximized his/her run training by increasing both mileage & intensity.
- 2) Runner cannot handle physical stress of running more miles.
- 3) Runner has reached his/her genetic limit for adaptation to his/her running training.
- 4) Runner is very weak and/or has muscle strength imbalance that needs to be addressed to avoid injury.

Misinformation: Girls have greater risk of injury than boys.

Girls have a greater risk of injury than boys only if menstrual cycle is dysfunctional or absent, or if girl has wide hips.

- Girls have lower bone mineral density than boys.
- Most important determinant of bone mineral density in girls is circulating concentration of estrogen.
- Girls's wider hips create more pronounced angle between pelvis & knee (quadriceps-angle or Q-angle), as femur occurs at more oblique angle compared to boy's femur.



Myth: Stretching Prevents Injuries, Reduces Soreness, & Improves Performance

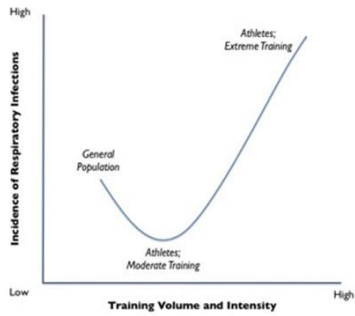
- Stretching only helps prevent injuries for explosive or ballistic movements by increasing compliance of tendons & improve their ability to absorb energy.
- Stretching only helps prevent muscle injuries (sprains & strains), but not bone or joint injuries.
- Stretching doesn't improve running performance.
- Stretching has minimal or no effect on post-workout muscle soreness.
- Major benefit to stretching is increased flexibility.
 - More effective when done apart from workout.
 - Dynamic stretching better than static stretching.

Misinformation: Runners need to eat carbs before races.

No need to carbo load for any race under 2 hours long. Runners have enough stored glycogen for 2+ hours of running.

Given that glucose is muscles' preferred fuel, runners should consume adequate carbs every day (> 50% daily calories) to optimize training.

Misconception: Don't run if you're sick.



Symptoms above neck,
ok to run.



Symptoms below neck,
not ok to run.

**Myth: You have to run a lot
to be a good runner.**

**I lied.
This one is true.**