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Strength training as an ergogenic tool to enhance running economy and elite marathon running performance [Commentary]

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Title: Strength training as an ergogenic tool to enhance running economy and elite marathon running performance.

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To the editor:

The viewpoint by Joyner and colleagues [1] provides an eloquent summary of the physiological characteristics required for elite marathon running. Practically, the training insights of the world's best marathon runner are also useful for applied practitioners in helping to understand the preparation required to reach this level.

Although we appreciate the focus of the training section was intended to be running-related, we feel it is important to highlight the value of strength training as a strategy to enhance running economy (RE) and performance [2]. This is particularly important for highly trained distance runners, who possess similar maximal oxygen uptake values, but display considerable variation in how much oxygen it costs to run at a given speed [3]. Given the small margins of improvement that are possible using conventional running training methods at the elite level, we contend that an appropriately designed and periodized routine of strength training is likely to offer a potent stimulus to the neuromuscular system that enhances RE and marathon performance.

The mechanisms that underpin an improvement in RE following a period of strength training remain to be fully elucidated. It has previously been shown that greater muscular strength endurance confers a fatigue resistant effect resulting in smaller decrements to RE following intensive running [4]. Although further work is required to confirm whether a relationship exists between strength qualities and deteriorations in RE during prolonged running, we speculate that improvements in marathon running performance are possible via this mechanism.

REFERENCES

1. Joyner MJ, Hunter SK, Lucia A, Jones AM. Viewpoint: Physiology and fast marathons. *J Appl Physiol*; doi: 10.1152/jappphysiol.00793.2019 [Epub ahead of print].
2. Blagrove RC, Howatson, G, Hayes, PR. Effects of strength training on the physiological determinants of middle- and long-distance running performance: a systematic review. *Sports Med* 48: 1117-1149, 2018.
3. Conley DL, Krahenbuhl GS. Running economy and distance running performance of highly trained athletes. *Med Sci Sports Exerc* 12: 357–360, 1980.
4. Hayes PR, French DN, Thomas K. The effect of muscular endurance on running economy. *J Strength Cond Res* 25: 2464-2469, 2011.