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The Truth on Fitness:
Should Women Run?

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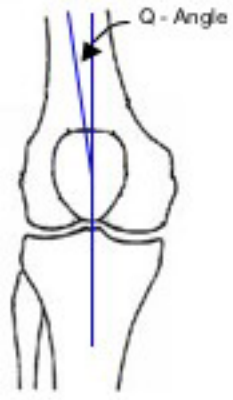
Should women run? This is the question that was recently posed on a popular internet sports conditioning forum. Citing a review article published in the journal Sports Medicine, and a vague reference to women's structural anatomy, the commentator questioned whether women should run.

More specifically, the author of the post indicated that women should not engage in frequent long distance runs, arguing in favor of short duration, high intensity intervals. He also, to his credit, advocated taking a "thoughtful and cautious" approach to planning cardiovascular exercise. To be sure, there is ample scientific evidence in support of high intensity interval training, and nothing is more important than being thoughtful in planning exercise routines. But these concepts were very clearly couched in the premise that women's bodies put them at much greater risk of overuse injuries. He didn't state that men and women should limit or avoid running. Instead, he implied that women were better off not running. So, we repeat the question; should women run?

As with any other issue, the answer to this question depends largely upon one's perspective, and one's training goals. But let's begin with a statistic from the aforementioned review article, that 20% to 30% of male army recruits sustained monthly debilitating injuries, while their female counterparts were injured at a rate of 40% to 60% per month. Thus, the rate of injuries among women in this group was twice that of men.

It has been suggested, that the reason women are injured more frequently is because they have larger Q-angles than men. The quadriceps angle (Q-angle), as pictured at right, is formed by a vertical line bisecting the patella (knee cap), and a diagonal line from the center of the patella to the pelvis. Normal Q-angles for women are approximately 16 degrees, while those of men are 11 degrees (Horton and Hall, 1989). This difference is obviously attributable to a woman's wider pelvis.



According to Rauh, et al. (2007), the Q-angle represents the direction of pull of the knee extensor muscles. As the angle increases, the muscles pull in a more lateral direction, increasing the potential for alignment abnormalities between the patella and the underlying surface of the femur. But how, if at all, does this relate to running injuries in women?

Does a large Q-angle, for example, cause negative changes in joint or limb alignment, which might increase injury risks during running? No, say Heiderscheit, Hamill, and Caldwell (2000), whose study examined the effects of Q-angle on joint and limb motion. Subjects partitioned into either high (≥ 15°) or low (≤ 15°) Q-angle groups demonstrated no difference in joint or limb motion, during running, as determined by three-dimensional motion analysis techniques.

What then is the relationship between Q-angle and running injuries? That, frankly, is somewhat difficult to say. There are many factors which may contribute to overuse injuries, such as flexibility, muscular strength, ground reaction forces, and potentially, Q-angle. Although the total number of studies examining these are too numerous to mention here, one in particular (Hreljac, 2004) suggests that the most influential factor is peak impact force at heel strike. The author suggests that repeated exposure to these forces may lead to overuse injuries, if the tissues and structures in the leg do not have adequate time to recover between events.

Will higher Q-angles in women lead to more frequent impact-related overuse injuries? Not according to Messier and colleagues (2008). In their study examining injury mechanisms in runners, they determined that Q-angle had no relationship with, or influence over, joint compression, or the associated risks of injuries. Thus, women were no more likely to suffer overuse injuries than men, if comparisons were made upon Q-angle.

One limitation to this study may be that the Q-angles measured fell within a normal range. Rauh and colleagues, on the other hand, did reveal a higher risk of injury among high school cross-country runners whose Q-angles exceeded 20 degrees. Curiously though, the authors noted that the shin was the most frequent site of injury in the girl runners, which again, according to Messier et al., is unrelated to Q-angle. Knee problems did arise, but these were attributed more to the left-right difference in Q-angle, rather than the absolute angles themselves.

Given that the Q-angle issue seems to be somewhat of an anomaly in women runners — since the average Q-angle in women is 16 degrees — what then explains the two-fold difference in injury rates as noted in the study by Jones et al.?

For one, the subjects in the study were army recruits entering twelve weeks of basic training. This highly intensive program of physical activity is focused and demanding. The authors also go on to more clearly define total exercise as a combination of frequency, duration, and intensity. They do suggest that duration, in either distance or time, has the most profound impact on runners, but it is the combination of elements that has the ultimate effect. Quite possibly, the recovery issues explained by Hreljac manifest themselves here.

In evaluating the possible contributing factors of injuries, the authors cited older age, smoking, flexibility, and interestingly, previously low running mileage. This last factor is intriguing. Does previous activity, and thus overall physical condition, have anything to do with the apparent frequency of injury in army recruits, especially when little time is given to recover? Or, are the higher injury rates in female recruits really just a gender issue?

Extrapolating from a previous study (Koplan, et al, 1982) that followed nearly 1200 men and women runners over a twelve-month period, Jones and colleagues discovered that per 1000km, runners who covered more weekly miles were less prone to injury than those who ran fewer weekly miles. There were no differences between men and women who ran more than 10 miles per week. In other words, runners who were more physically fit were less exposed to risks, regardless of their gender.

Coincidentally, in a follow up study on female army recruits, Bell and Associates (2000) remarked that the key factor in training injuries was physical fitness, and that "women enter training less physically fit, relative to their own fitness potential, as well as to men."

The truth is, running delivers outstanding benefits, from reduced incidence of smoking, to improved cardiovascular health, weight loss, and even uplifted emotions. In the end, it is difficult to argue that women have physical characteristics that make them more susceptible to running injuries. The real issue resides in one's physical readiness to run. As the web commentator suggested, if a woman is running without incident, then there is no reason to stop her from continuing. Likewise, there is no reason to discourage a woman from entering a running program, provided that the stresses are commensurate with her level of readiness.
Reason would dictate that if one is deconditioned, possesses physical abnormalities, such as exceedingly high Q-angles or some other form of dysfunction, that we would take an extremely cautious approach to weight bearing exercise. Otherwise, effective planning and management of frequency, duration, and intensity will improve fitness while limiting the potential for overuse.

Lastly, we stand to have a more positive impact on those with whom we work, if we're open to the possibilities of what they can achieve, rather than restricted by the assumptions of what they can't.

For more information on running and treadmill design please refer to "The Science Behind CYBEX Treadmills" at **www.cybexinstitute.com/Research.**

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