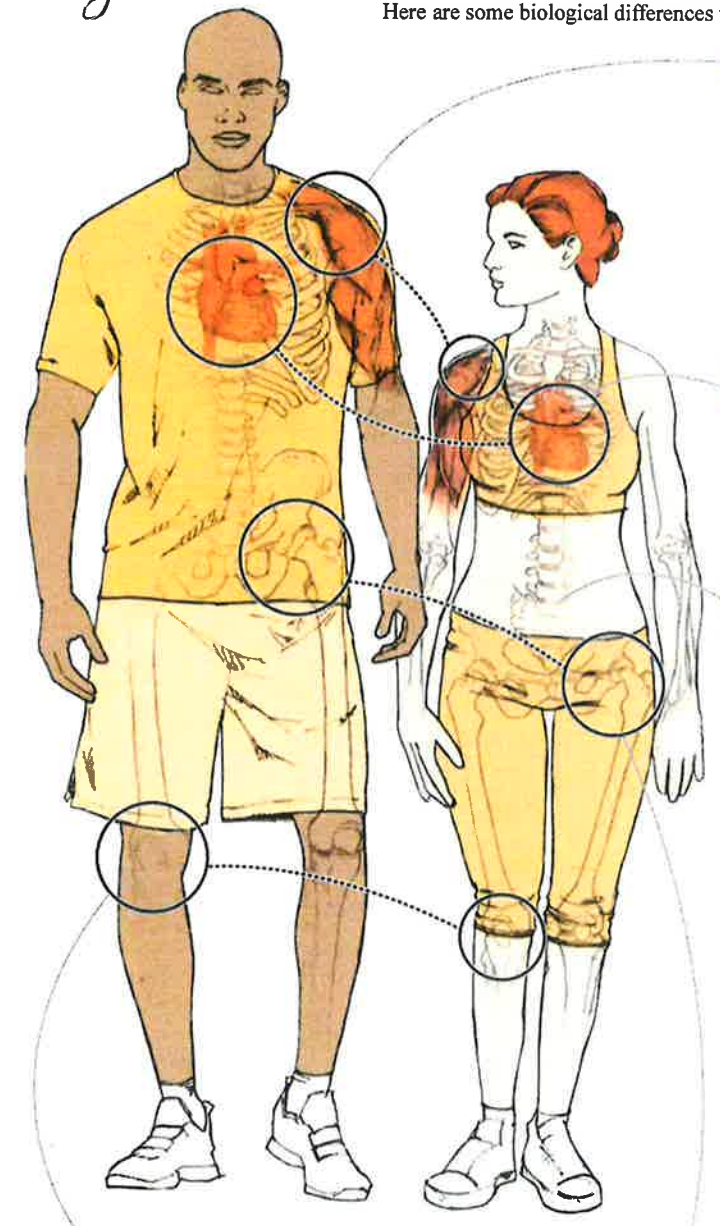


Attachment 1  
 H500 3-6-2020  
 Senator Souza

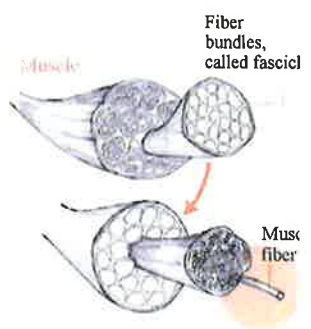
# Fit but unequal

Take two highly trained, Olympic-caliber athletes: one man, one woman.  
 Here are some biological differences that affect their performance:



### Muscle

Testosterone and other hormones give him a greater percentage of lean muscle, particularly in his upper body. Some research indicates that even his individual muscle fibers are larger. Because more muscle means more power, men's top performances in jumping and sprinting sports and especially weightlifting and throwing events greatly exceed women's.

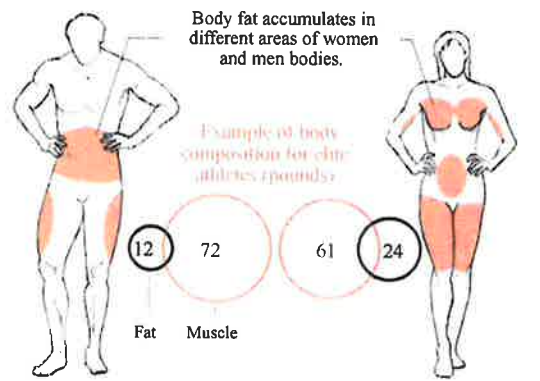


### Heart

The man's heart, because of its larger size, can send more blood per beat to working muscles than hers can. His blood also contains more oxygen-carrying hemoglobin. Altogether, his ability to take in and use oxygen — also called aerobic capacity, or VO2 max — is typically 15 to 25 percent greater than hers. That translates to greater performance in endurance events.

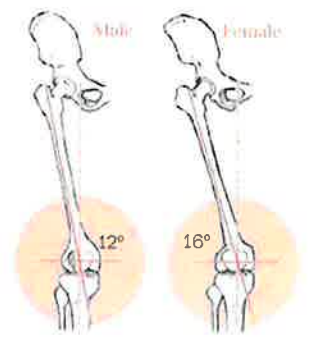
### Fat

Her total body fat is 16% of her weight; his is half that. Her body needs more "essential fat" just to keep all systems running smoothly. Estrogen increases the fat storage. (These are elite athletes. Regular people's healthy body-fat ranges are roughly 20 to 32% for women and 10 to 22% for men.) Her extra fat is vital but doesn't boost performance, so he is stronger, pound for pound.



### Knees

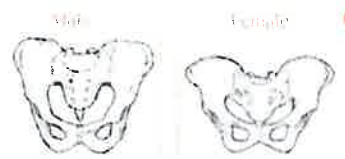
Her wider pelvis means her femurs meet her tibias at a greater angle. The higher this "Q angle," the more stress is put on the knee joints. This is one reason female soccer players, for example, are five to six times as susceptible to knee injuries as male players are. Strength training that targets hamstrings and nearby muscles can reduce the risk.



The Q angle is named for the quadriceps muscle in front of the thigh.

### Flexibility

Thanks to anatomical differences, some of her joints have a greater range of motion, giving her the edge in gymnastics and figure skating. Hormones may also play a part in making joints more lax.



Deeper pelvis  
 Shallower pelvis allows more flexibility



He can generate the power to spin four times in the air.  
 She can do this.

Sources: Barbara Bushman, exercise physiologist and editor of the American College of Sports Medicine's "Complete Guide to Fitness and Health;" Wayne Westcott, professor of exercise science at Quincy College and author of 25 books on strength training; "Gender differences in strength and muscle fiber characteristics," by A.E. Miller, et al., McMaster University, Ontario; American Academy of Orthopaedic Surgeons; American Heart Association.