THE EFFECTS OF BODY COMPOSITION ON JUMPING POWER

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What we wanted to find out:

• Vertical jumping power varies with age, sex, and athletic specialization.

• Body composition is affected by age: muscle mass decreases, and fat mass increases with age.

• Women tend to have relatively higher percentage of body fat.

• So, how much of the age- and sex-effects on jump power can be explained by body composition?

Which measurements we took:

• During the 2018 WMA championships in Málaga, 256 athletes participated.

• Peak muscle power was measured in a vertical jump test. The best out of 3 jumps was used for analysis.

• Body composition was assessed via bio-electrical impedance, *i.e.* with a small alternating current (Figure 1).

Figure 1: Body composition measurement. *Impedance to a small alternating current is measured between electrodes applied at the hands and feet.*

What we found:

• Vertical jumping power depicted the expected effects of age, sex and athletic specialization.

• Body composition depicted the expected effects of age and sex, but no effect of athletic specialization.

• Body composition could fully explain the effects of sex on jump power, and it explained the age effects to a large extent.

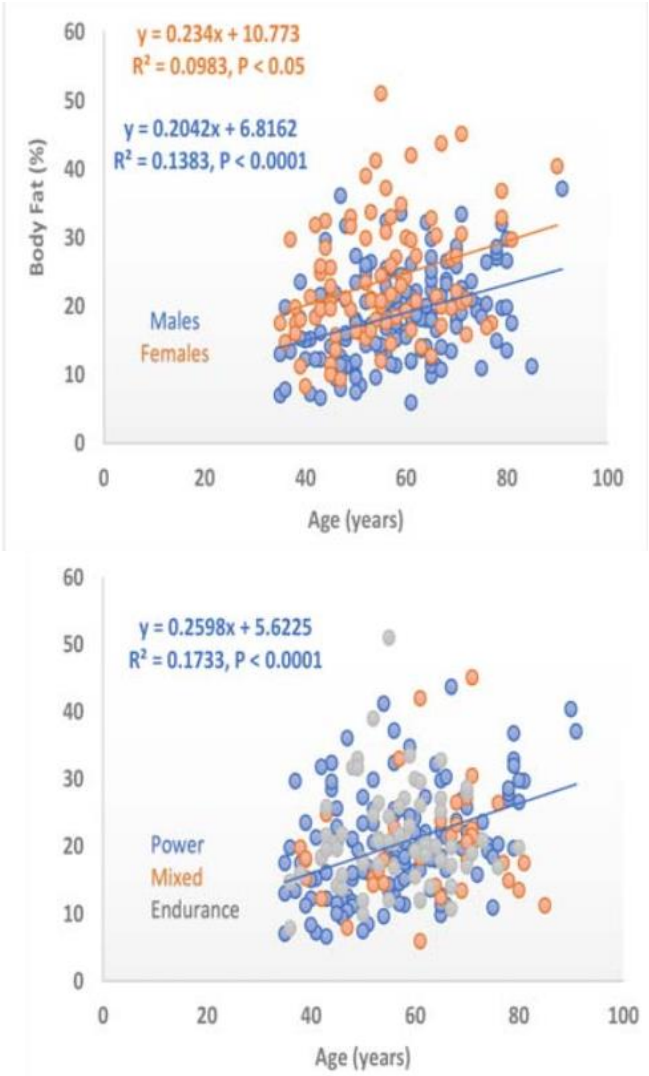
• However, the effects of athletic specialization is independent of are of body composition.

What we conclude from this study:

• Loss of muscle mass and accrual of body fat are important predictors of the age-related decline in whole-body power output.

• However, there also seems to be an age-related deterioration in muscle function that is independent of body composition.

• Counteracting the age-related loss in whole body power output may therefore target maintenance of both muscle as well as muscle quality.



What the diagrams mean:

The graphs show the relative amount of fat in the body increases with age. In the upper diagram, it can be seen that the trend line for women is above the trend line for men, meaning that women tend to have greater relative fat mass then men across the age spectrum. The lower diagram, by contrast, does not show a significant difference between trend lines for power athletes, endurance athletes or athletes with mixed specialization.

Figure 2*: Percent body fat (specific to body mass) over age, separated by sex (upper diagram) and by athletic specialization (lower diagram).*

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The full paper can be downloaded for free on https://www.frontiersin.org/articles/10.3389/fphys.2021.643649/full