Sex does not influence CPK level kinetic after eccentric exercise?

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Introduction

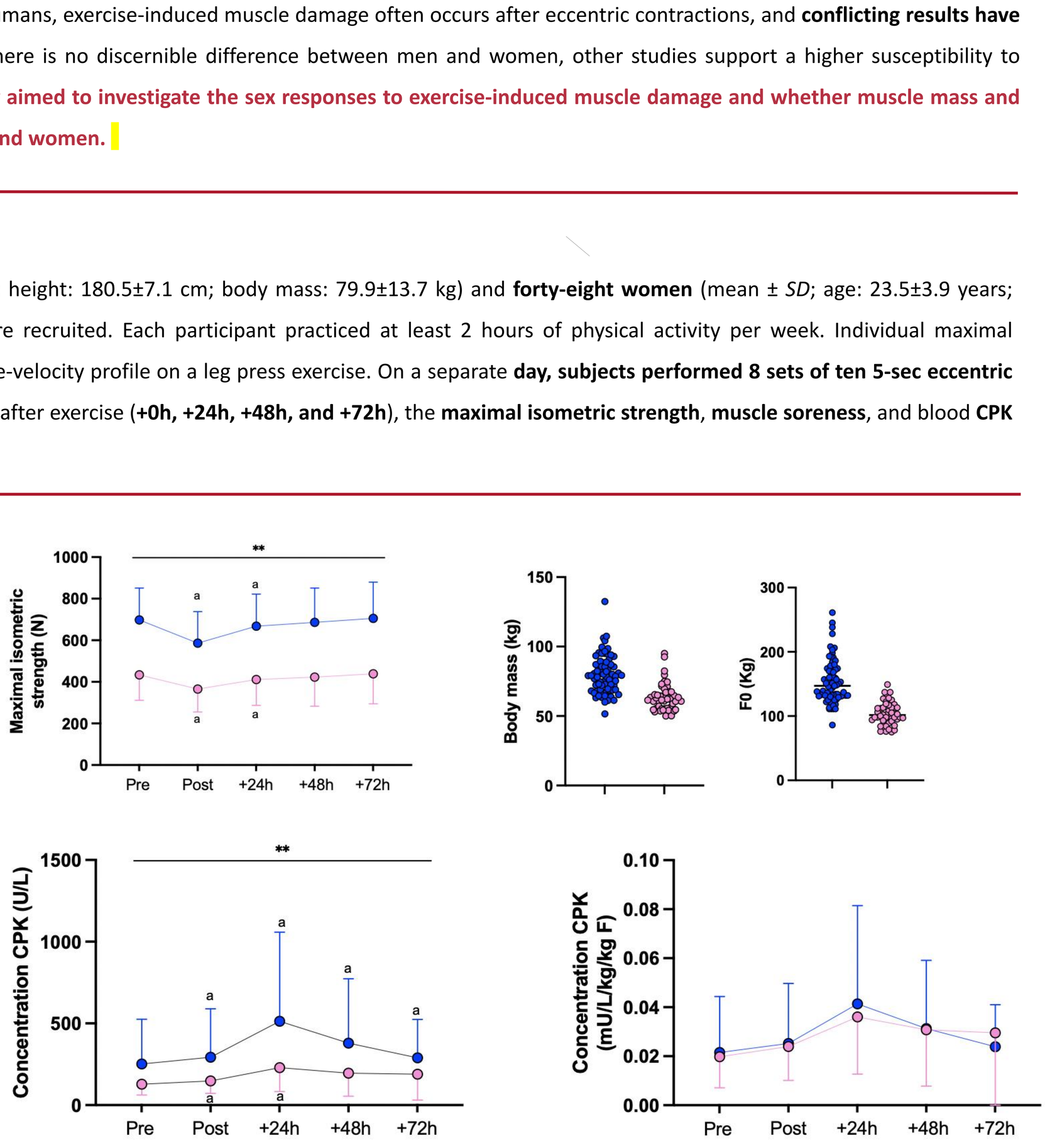
Sports practice in competition or training **can create muscle damage**. The **damage reflects** a **stress imposed** on the athlete in different ways, such as increased training workload, contacts, impacts, accelerations, decelerations, or eccentric exercise. The **permeability of the cell membrane** is **increased**, and proteins such as creatine phosphokinase (**CPK**), myoglobin, or lactate dehydrogenase are **released in** the **blood**. **Muscle damage** alters **performance**, at least transitory, and may lead to the injury. For these reasons, **muscle damage monitoring** can be **performed** to **determine** the biological **recovery state** of the athletes and to adapt the workload prescriptions. **CPK** is an **easily quantifiable** biological **parameter that** can be measured near to the field, which is very practical for sports staff. **CPK values** are **influenced by sex**, age, **muscle mass**, or athlete's physical level. For example, the median rest value is 72 U/L for women and 103 U/L for men (Brancaccio et al., 2007; Strømme et al., 2004). In humans, exercise-induced muscle damage often occurs after eccentric contractions, and **conflicting results have been reported**. While some studies suggest that there is no discernible difference between men and women, other studies support a higher susceptibility to exercise-induced muscle damage in men. **This study aimed to investigate the sex responses to exercise-induced muscle damage and whether muscle mass and strength account for any difference between men and women.**

Methods

Seventy-one men (mean ± *SD*; age: 24.5±4.8 years; height: 180.5±7.1 cm; body mass: 79.9±13.7 kg) and **forty-eight women** (mean ± *SD*; age: 23.5±3.9 years; height: 165.1±6.0 m; body mass: 63.3±9.8 kg) were recruited. Each participant practiced at least 2 hours of physical activity per week. Individual maximal isometric strength (F0) was determined using a force-velocity profile on a leg press exercise. On a separate **day, subjects performed 8 sets of ten 5-sec eccentric repetitions** at 85% of their individual F0. Before and after exercise (**+0h, +24h, +48h, and +72h**), the **maximal isometric strength**, **muscle soreness**, and blood **CPK** levels of each participant **were assessed**.

Results

Maximal isometric **strength decreases significantly after exercise and 24-h** after for both men and women. Muscle **soreness** was **affected by** the **time** but not by the sex. An **effect** of **sex** on **absolute CPK levels** was observed at all time points ($p<0.01$): men have higher CPK level values compared to women. **However**, **the sex–difference** was **blunt** when **CPK levels** were **normalized to** the **maximal strength** and body mass. When considering a pooled group, a significant **time effect** was **found** with a x1.22 increase of CPK levels after exercise, x1.84 at +24h, and x1.39 at +48h.



Conclusions

Our results showed that the differences in **muscle damage** observed **between men** and **women** after an eccentric exercise **on** absolute **CPK** values **were blunt when** the **data** were **normalized to** both **mass** and **maximal strength**. **Differences** in **CPK level seem explained by** the **higher muscle mass** and **muscle strength engaged** by the men during the exercise and not by the sex. However, the **sex appears** to influence the **recovery** of the **initial strength** levels.

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