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Letter to the Editor Response

Response to Letter to the Editor From Kirk & Stebbings: The Impact of Gender-Affirming Hormone Therapy on Physical Performance

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We thank Kirk and Stebbings for their interest in our paper (1). Kirk and Stebbings raise the point of absolute vs relative measures (2). Elite physical or sporting performance should be judged on absolute performance (ie, race times), which is the most important factor when assessing the impact of gender-affirming hormone therapy. However, given a lack of data (only 3 studies), our review also discusses contributing factors to physical performance (such as muscle mass and VO2 peak, which are dependent on weight) (1).

When comparing muscle mass among groups, such as women from different ethnicities, it is accepted that age, weight, and body mass index are covariates (3, 4), and body mass index is influenced by height. There is great diversity in heights and weights across cisgender populations, especially among elite athletes. Kirk and Stebbings raise the hypothetical situation of a 95 and 65 kg woman; if they are both cisgender women, outside of sports with defined weight categories, weight and height are not considered to be an unfair "competitive advantage."

Kirk and Stebbings claim "performance advantages [are] provided by greater stature"; however, we note that their referenced studies by Norton and Olds and Monson et al do not support this definitive assertion (5, 6). Male advantage in physical performance is driven by much more than just stature. The review by Norton and Olds found great diversity in morphology for athletes of different sports, some requiring larger players whereas others demanded smaller morphological characteristics (5). Similarly, Monson et al concluded that "athletic success are [sic] impacted by a myriad of factors, and some of the most successful professional athletes do not have particularly long arms relative to their height" (6).

Kirk and Stebbings' letter implies an equivalence between transgender women and cisgender men, assuming incorrectly that the taller height in transgender women leads to an advantage that is equivalent to the advantage that cisgender men have over cisgender women (2). This assumption overlooks the significant body composition changes (muscle mass reduces 3-5% but fat mass increases 20-30%) with feminizing hormone therapy, leading to distinct differences in muscle mass, strength, cardiorespiratory fitness, and physical performance (1). We do not advocate for sex categories to be removed, and relative measures are not equal between sexes. While the relative measures of muscle mass and strength in transgender women are no different from cisgender women, they are clearly lower than that of cisgender men (7).

Kirk and Stebbings draw attention to the only published small cross-sectional study examining cardiorespiratory fitness (7). Several absolute parameters show that transgender women have an intermediate value between cisgender women and cisgender men, expected due to height differences, with relative percentage fat mass and muscle mass comparable to cisgender women (7). It is imperative that VO2 peak is corrected or adjusted for weight when making comparisons between groups of women (whether they be transgender or cisgender) (1). Kirk and Stebbings reference De Pauw et al to support their assertion that absolute VO2 peak is most important; however, De Pauw et al's systematic review of cycling parameters in males in fact concludes that *relative* VO2 max (and absolute peak power output) are the most important performance parameters for cycling (8).

Ideally, prospective controlled studies before and after gender-affirming hormone therapy with physical performance outcomes relevant for individual sports should be performed. Until further research is conducted, our conclusions are based on existing performance data that suggest no significant difference in transgender women relative to cisgender women in terms of long-distance running, 1.5-mile running times, or sit-ups after feminizing hormone therapy (1).

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Data Availability

Data sharing is not applicable to this article as no datasets were generated or analyzed during the current study.

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