Analysis of the Performance of Transgender Athletes

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1) Introduction:

Despite the limited success of transgender female athletes, there is still great resistance to their presence in women's sport. Beyond the pioneering work of Louis Gooren (2) there has been little in the way of scientific study of transgender athletes until Joanna Harper (4) published her paper studying transgender distance runners in 2015. The Harper study included no data from elite athletes and the current study rectifies that limitation, as well as expanding the study beyond distance running.

2) Methods

Athletic performance data was acquired from one transgender sprinter, one rower, one cyclist, and three distance runners, both before and after gender-based transition. The race times from all of the runners were given an age-graded score using the WMA tables (3). The age-graded system is designed to account for both the 10-12% gender-based performance difference (1) and the decrease in performance due to aging beyond age thirty. Race times were verified using on-line race-results services such as All-athletics.com. Both the sprinter and the cyclist were former elite-level athletes in men's competition. It was not possible to use the age-graded methodology on the performances of the cyclist or the rower, but the raw data was used to make a comparative evaluation. All of the subjects had undergone at least one year of Hormone Replacement Therapy (HRT) prior to competing in the women's category.

3) Results

The age-graded scores of the runners collectively decreased after transition.

	Pre- transition data				Post-Transition Data			
	Age	Distance	Time	AG	Age	Distance	Time	AG
R1	27	100 meters	10.71	91.4	39	100 meters	12.54	86.6
R1	27	200 meters	21.65	89.2	39	200 meters	25.47	87.6
R2	28	half-marathon	1:16:45	77.2	33	half-marathon	1:35:21	69.3
R3	26	5 kilometers	17:08	71.8	29	5 kilometers	23:09	63.9

| R4 | 17 | 10 kilometers | 36:40 | 76.7 | 35 | marathon | 2:58:18 | 77.1 |

The cyclist had an 8 minute power meter test performed by CTS in 2011 prior to transition and in 2016 after HRT. In 2011 she had a lactate threshold of 304 watts and in 2016 her lactate threshold is 270 watts. This 11% difference is consistent with the difference between elite male and female cyclists.

The rower's times for two kilometers on the ergometer before and after 18 months of HRT were 7:01 and 7:25 respectively. The rower was 6% slower at an age when she should have been getting faster.

4) Discussion and Conclusions

The above data can be explained by the fact that, after one year of HRT, transgender women have testosterone levels below the mean of cisgender women (2) and hemoglobin levels equal to that of cisgender women (2).

The data presented offer further support for the recent IOC decision (5) to allow transgender women to compete against cisgender women in the 2016 Olympics after one year of HRT, as well as solidifying the conclusions made in the Harper study (4).

Rererences

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(5) International Olympic Committee. IOC Consensus Meeting on Sex Reassignment and Hyperandrogenism .Available from: www.olympic.org/Documents/Commissions_PDFfiles/Medical_commission/2015-11_ioc_consensus_meeting_on_sex_reassignment_and_hyperandrogenism-en.pdf