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Transgender Women Athletes and Elite Sport: A Scientific Review

Executive Summary



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Transgender Women Athletes and Elite Sport: A Scientific Review is an in-depth review of scientific literature on transgender athlete participation in competitive sport. The inclusion criteria for this report were research articles published in the English language between 2011 and 2021 inclusive. Only peer-reviewed articles or syntheses of academic literature (e.g., meta-analyses) in reputable academic journals were included. Grey literature, or non-academic literature, was included if it provided a summary of empirical data or if it described rules currently in place worldwide to include/exclude trans athletes. The resulting report is divided into two sections reflecting the primary perspectives by which the question of trans inclusion has been addressed - one that encompasses biomedical studies and a second that encompasses sociocultural studies. While there are questions of inclusion for non-binary and intersex athletes, this report focused on the population of trans women athletes in the context of elite sport.

The biomedical perspective views the physiology of trans women's bodies as the source of perceived unfairness, with medicalized interventions (such as estrogen supplementation and testosterone suppression) as the resolution. More specifically, this perspective holds that sexual dimorphism between those assigned male at birth (AMAB) and those assigned female at birth (AFAB) is the reason for athletic differences. Testosterone measures and boundaries are typically chosen as defining characteristics of manhood and womanhood in the context of sport and are used as the predominant marker to predict and level sex-related athletic advantage and the means for inclusion criteria.

The research findings in the biomedical area are inconclusive. Studies which make conclusions on pre- and post-hormone replacement therapy (HRT) advantage held by trans women athletes have used either cis men or sedentary trans women as proxies for elite trans women athletes. These group references are not only inappropriate for the context but produce conclusions that cannot be applied to elite trans women athletes. Further, there is little scientific understanding about the attributes or properties of HRT, namely testosterone suppression and estrogen supplementation, on the physiology and athletic ability of trans women athletes. This ignores the potential for estrogen supplementation to reduce Lean Body Mass (LBM), and for testosterone suppression to produce holistic health disadvantages.

The second perspective is a sociocultural one. Researchers in the sociocultural field of study argue that social factors contribute to performance advantages to a far greater

extent than does testosterone and that assessing testosterone levels is another way to perpetuate the long history of policing women's bodies in sport. Researchers highlight the many social factors that contribute to differences in athletic performance, including, for example: discriminations, disparate resource allocations, inequities, and violence against women in sport in the forms of sexism and sexual violence in sport contexts, arbitrary differences in rules and equipment between men's and women's sport, as well as histories of barring women from certain sports. This body of work also highlights the foundational histories of anti-Blackness, anti-Global Southness, and misogyny which maintain inequities in sport. Arguments are made that the use of testosterone to exclude trans women athletes represents another phase in the long history of policing women's bodies in sport. Once women were allowed into competitive sport in the early 20th century, those whose athletic ability was on par with their male counterparts, or whose physique was too manly, were disqualified from competition as deviants of the gender order. Through the history of women's sport, female athletes have been exposed to intrusive gender verification processes including medical inspection of external genitalia and chromosome testing that produced many false positives and had catastrophic impacts on athletes' careers. The current climate is one that focuses on testosterone levels of those athletes whose gender is deemed to be 'suspicious.'

In the context of sport policy development, biomedical and physiological data have to-date been privileged over other aspects such as social factors. Many policies cite biomedical studies to explain their conditions of inclusion, or their exclusion.

Methods

The findings of this report result from a thorough literature scan in May/June 2021. Academic (i.e., peer-reviewed primary or synthesized secondary research journal articles) and grey (not peer reviewed, reports, policy documents, do not follow a scientific process) literature were included.

Inclusion Criteria:

- Published between **2011** and **2021**;
- English language;
- **Primary research** or **syntheses** (e.g., meta-analyses, reviews);
- **Grey literature** was included if it was a **final evaluation** or report on empirical data;
- **Grey literature** was included if it was about **rules currently in place** worldwide for the inclusion/exclusion of trans women in high-performance sport.

Excluded: discussion articles, opinion pieces, or commentaries not presenting empirical or theoretical research.

Key Biomedical Findings

1. Biological data are severely limited, and often methodologically flawed.

- Most studies do not adequately adjust for factors such as height or lean body mass;
- Almost no studies examining the effects of testosterone suppression on trans women do so among trained athletes;
- Most studies on the effects of testosterone on sport performance involve examination of individuals who use performance-enhancing drugs.

2. There is limited evidence regarding the impact of testosterone suppression (through, for example, gender-affirming hormone therapy or surgical gonad removal) on transgender women athletes' performance.

- Most of these studies had small sample sizes, imperfect measurement techniques, poor reference group comparisons, and studied a sedentary/non-athletic/untrained sample population;
- Some significant studies used misleading data sources and actively ignored contradictory evidence.

3. Available evidence indicates trans women who have undergone testosterone suppression have no clear biological advantages over cis women in elite sport.

- The higher levels of red blood cell count experienced by cis men is removed within the first four months of testosterone suppression;
- There is no basis for athletic advantage conferred by bone size or density, other than advantages achieved through height. Elite athletes tend to have higher than average height across genders, and above-average height is not currently classified as an athletic advantage requiring regulation;
- On average, trans women who are pre-testosterone suppression still have lower Lean Body Mass (LBM), Cross Section Area (CSA), and strength than cis males. This indicates that the performance benefit experienced by these individuals cannot be generalized by examining cis male athletes;
- Non-athletic trans women experience significant reduction in LBM, CSA, and strength loss within 12 months of hormonal suppression. It is important to note that this 12-month threshold is arbitrarily defined, and no significant studies examine the rate of LBM, CSA or strength reduction over time;
- When adjusting for height and fat mass, LBM, CSA, and strength after 12 months of testosterone suppression, trans women still retained statistically higher levels than sedentary cis women. However, this difference is well within the normal distribution of LBM, CSA, and strength for cis women (Jassen et al., 2000);
- LBM, CSA, and strength loss continues for trans women after the 12-month initial testosterone suppression;
- The limited available evidence examining the effect of testosterone suppression as it directly affects trans women's athletic performance showed no athletic advantage exists after one year of testosterone suppression (Harper, 2015; Roberts et al., 2020; Harper, 2020);
- Post gonad removal, many trans women experience testosterone levels far below that of pre-menopausal cis women.

Key Sociocultural Findings

1. Biomedical studies are overvalued in sports policies in comparison to social sciences studies.

- The literature on trans sport policies, their implementation, people who write them and apply them, consequences for athletes, and the debates they frame is constitutive of the social hierarchy of knowledge, within which some sciences are discredited to the benefit of others;
- Excluding certain types of knowledge from the restricted definition of 'scientific' makes it possible for sport governing bodies to obscure the power relations at play in the creation, maintenance, and legitimization of regulations;
- There are troubling links between some researchers, sport organizations, and third organizations with anti-trans agenda;
- Some sport organizations use science strategically, drawing solely and uncritically on data which appears to support their claims;
- Only certain biomedical factors are policed under a mandate of 'fairness' in elite sport, despite strong evidence that financial material resources (such as access to infrastructure and equipment, nutrition, time to train, higher salaries) are associated with advantage in sport.

2. Policies that impact trans women's participation in elite sport are the continuation of a long history of exclusion of women from competitive sport – an exclusion that resulted in the introduction of a 'women's' category of sport in the first place.

- Since the early 20th century, elite sport policies worked to pathologize and control women's bodies and enforce dimorphic sex. There is, however, a significant overlap in all sexual characteristics. 'Male' and 'female' are not mutually exclusive categories and should not be treated as such;

- Many social factors continue to keep women's sport less valued than men's: fewer resources, lack of access to sport spaces or equipment, fewer coaches and teams, sexist discrimination, having to quit sports due to sexual violence, lesbophobia, classism, racism and/or transphobia;
- There are examples of competitive sport events that have changed sporting structures or put restrictions on particular athletes as women began to excel;
- The literature largely ignores areas where cis women have an athletic advantage over cis men (long-distance swimming, for example), as well as the ways in which trans women's participation in elite sport elevates sport for all women.

3. Many trans “inclusion” sport policies use arbitrary bounds that are not evidence based.

- Elite sport federations often apply none, one, two, three, or more of the following criteria based mostly on their own perspectives / ideologies: gender declaration (gender marker, letter, or just during registration), stable gender identification of two years or four years, hormonal level (not specified, 5 nmol / L or 10 nmol / L), request for Therapeutic Use Exemption (TUE), physical and morphological criteria, medical file or medical appointment;
- Many sport organizations circulate myths about trans women that are transphobic, harmful, and violent. For example, that trans women will overwhelm women's sport, when trans women are in fact under-represented in sport and especially elite sport; or that trans women are cis men in women's clothes, a dangerous misunderstanding of trans women's identities and experiences directly linked to trans women's decreased safety especially in such highly gendered spaces as sport.

4.

Cissexism, transphobia, transmisogyny and overlapping systems of oppression need to be recognized and addressed for trans women to participate in elite sport.

- Despite unavailability of the exact prevalence of trans women in the population, we can reliably conclude trans women are systematically underrepresented in elite athletics both in terms of participation and results;
- On a population level, trans women experience living conditions which are the result of downward social mobility and discrimination, including restricted access to and/or experiences of discrimination in vital spaces (i.e., housing, health care, work, public space including sports facilities);
- In qualitative studies, trans women have reported facing significant barriers to returning to sport after they transition;
- Trans women are not a monolith. Racism, classism, ableism, and overlapping systems of oppression must be addressed for trans women to be able to participate in elite sport. Trans women's diversity is also reflected in their transition journeys – diverse incomes, access, and desires affect in what medical gender affirmation processes a trans woman might participate and at what stage in her life course.

Conclusion

There is no firm basis available in evidence to indicate that trans women have a consistent and measurable overall performance benefit after 12 months of testosterone suppression. While an advantage in terms of Lean Body Mass (LBM), Cross Section Area (CSA) and strength may persist statistically after 12 months, there is no evidence that this translates to any performance advantage as compared to elite cis-women athletes of similar size and height. This is contrasted with other changes, such as hemoglobin (HG), which normalize within the cis women range within four months of starting testosterone suppression. For pre-suppression trans women it is currently unknown when during the first 12 months of suppression that any advantage may persist. The duration of any such advantage is likely highly dependent on the individual's pre-suppression LBM which, in turn varies, greatly and is highly impacted by societal factors and individual circumstance.

Any policy developed should carefully consider the current lack of participation of trans athletes (in many sport organizations there is a complete absence or outright exclusion) and balance the value of fairness with inclusion. Policies should be crafted in ways which clarify and highlight administrators' duty to prevent and actively attend to barriers, carefully considering the administration of any such policy in ways which do not further discourage participation through the creation of unnecessary barriers, or unnecessarily infringe on the individual's privacy (including their right to not openly identify as transgender). Additionally, these individuals should not be excluded during any non-competition periods from participating with a team through training, exhibition matches or social activities.

Further research is needed to ensure a foundation in sound evidence, a foundation which does not currently exist. Specifically, additional research is needed with sample populations of trained trans women and trained cis women as a comparison group, as current studies tend to focus on sedentary populations. These studies ought to include large populations, make comparisons with equivalent population groups (i.e., adjust for height and weight), and avoid using measures which are empirically proven to be unreliable outside of population-level analysis (i.e., handgrip strength).

Political, historical, and sociocultural contexts must also be intentionally considered in implementation, the framing of 'trans inclusion' policies, defining 'fairness' in sport, and participation in the hierarchy of knowledge and scientific processes.

