



Intersex and the Olympic Games

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Introduction

The assignment of sex at birth determines the manner in which a child is raised. It determines their appearance and governs their development.¹ Sexual ambiguity – intersex – may result in a broad spectrum of physical problems. Certain anomalies may be detectable only by the astute clinician and would otherwise go unnoticed, whereas more profound anomalies may result in considerable developmental and psychological difficulties for both the child and his or her parents and family. Sex determination in individuals with sexual ambiguity has created difficulties in the arena of international sports for many years. While Hitler's Olympic Games in Berlin in 1936 generated much controversy around the issue of racial and religious discrimination, it also brought the complexities of gender verification to the forefront of competitive sport for the first time.

In this paper we review the historical impact of intersex in the area of international sports and discuss current thinking with regard to determination of sex in sports men and women.

Intersex

Intersex refers to the atypical appearance of the external genitalia at birth where they differ from the usual development of either sex and create difficulty in sex assignment.² This condition is uncommon, with an estimated incidence of 0.018%. Whether conditions such as Klinefelter's syndrome and Turner's syndrome should be included in the definition of intersex is debatable – they are not traditionally regarded as true intersex. If included, the incidence may be as high as 1.7%.³ Classification of intersex is challenging and controversial; some authorities suggest three broad groups – conditions resulting in the masculinized female, the under-masculinized male and true hermaphroditism.² This contrasts with other classifications

which include male and female pseudohermaphroditism.⁴ A recent consensus statement from the International Intersex Consensus Conferences recommends using the term Disorder(s) of Sex Development (DSD) to encompass the myriad of conditions featuring varying types of sexual ambiguity.⁵ Table 1, adapted from this consensus statement, gives an example of the classification of DSD.

Sport

Historically, sport's first 'encounter' with DSD was in 1936 at the infamous Berlin Olympics, commonly known as Hitler's Olympics. The lead up to the Berlin Olympics had been blighted by Hitler's attempts to disadvantage Jewish competitors, preventing them from training and issuing them with threats to discourage their entry to the competition. Controversy continued during the games, most notably in the women's 100-metre sprint. Stella Walsh, a Polish-born athlete with US citizenship, and Helen Stephens, an American sprinter born in Missouri, had competed fiercely in previous competitions – Walsh won the 100 metre sprint in 1932 and therefore attended Berlin as defending champion. Stephens finished just in front of Walsh, posting a world record time of 11.5 seconds; Walsh completed the sprint in 11.7 seconds. Physically, both women appeared virilized, with muscle patterns and facial features more characteristic of the male sex (Figure 1). The sporting press nicknamed Stella Walsh 'Stella the Fella'. Indeed, fellow athletes noted that she always changed by herself and isolated herself from her competitors.

Rumours circulated the Games that both Walsh and Stephens were men, competing with the wrong sex to gain unfair advantage. Walsh, in fact, publicly accused Stephens of being male after she won the 100-metre sprint in 1936. Since no formal

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gender verification program existed at this time, the Olympic committee felt compelled to perform a sex check on Stephens. This sex test was a crude physical examination involving the gross inspection of the external genitalia; it confirmed Stephens possessed female external genitalia.

The truth of their rivalry only came to light decades later following Walsh's murder – she was shot and killed in the cross-fire of an armed bank robbery in Los Angeles in 1980. A post-mortem examination confirmed that Walsh possessed ambiguous genitalia and abnormal sex chromosomes, although the exact DSD was not established.

In the following 30 years, the sporting media speculated that several other female athletes had DSDs because they possessed physical attributes which would generally be associated with the male sex. Still without formal gender verification, these rumours remained as such, fuelled by the media who were fully aware that there would be never be any scientific evidence to disprove them. Thus, journalists reported that genetically male Eastern Bloc athletes were binding their genitals and competing as females. Gender controversy also surrounded Irina and Tamara Press, two Russian sisters (Figure 2) who were dominant in a variety of female track and field events during the 1950s and 1960s. They won 26 world records and six Olympic gold medals.

As media hype reached fever pitch, compulsory gender verification in the form of a gynaecological

Figure 1
Stella Walsh and Helen Stephens



examination was introduced prior to the 1966 European athletics championship. In these so-called 'nude parades', athletes were forced to

Table 1
Classification of Disorder(s) of Sex Development

Sex chromosome DSD	46,XY DSD	46,XX DSD
45,X (Turner's syndrome & variants)	Disorders of testicular development: <ul style="list-style-type: none"> ● Gonadal dysgenesis ● Gonadal regression ● Ovotesticular DSD 	Disorders of ovarian development: <ul style="list-style-type: none"> ● Ovotesticular DSD ● Testicular DSD ● Gonadal dysgenesis
47,XXY (Klinefelter syndrome & variants)	Disorders in androgen synthesis or action: <ul style="list-style-type: none"> ● Androgen biosynthesis defect ● Defect in androgen action e.g. androgen insensitivity syndrome ● Luteinising hormone receptor defects ● Disorders of anti-Mullerian hormone or receptor 	Androgen excess: <ul style="list-style-type: none"> ● Foetal ● Foetoplacental ● Maternal
45,X/46,XY (mixed gonadal dysgenesis, ovotesticular DSD)		Other: <ul style="list-style-type: none"> ● Cloacal extrophy ● Vaginal atresia
46,XX/46,XY (chimeric, ovotesticular DSD)		

Adapted from Lee *et al.*⁵

Figure 2
Irina and Tamara Press



stand naked in front of a committee and were subjected to an inspection of their external genitalia. 243 women attended for examination and no abnormalities were reported. Neither of the Press sisters attended and they were never to appear in athletic competition again. Their absence was widely interpreted as evidence they both possessed abnormal external genitalia. It is still not known whether the Press sisters deliberately misrepresented their gender or, as seems more likely, they both had a DSD.

Gender verification for female athletes

Following the introduction of gender verification in 1960, it became increasingly clear that inspection of external genitalia was not a satisfactory or acceptable process. For the 1968 Olympics, Barr body detection was introduced and was widely proclaimed to be the solution to gender misrepresentation in sport. This reportedly 'simpler, objec-

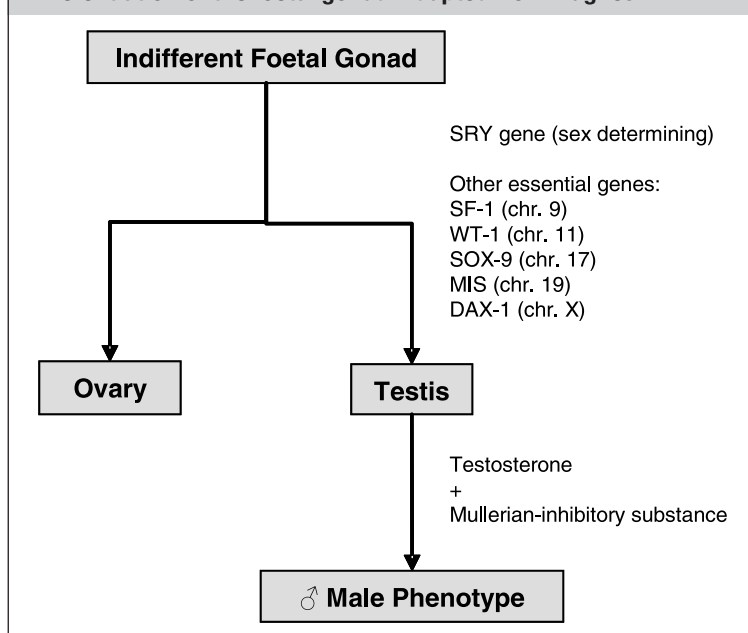
tive and more dignified'⁶ test involved the cytological analysis of a buccal smear. The Barr body was first detected by Murray Barr in 1948 during research on the nervous system of cats – cells were analysed following electrical stimulation and a dark staining body was found in the nucleus of some animals and not others. The distinction was found to be related to sex and a similar finding was noted in human autopsies. The findings were published in *Nature* in 1949 and the nuclear marking became known as the Barr Body.⁷ This Barr body is only found in cells with XX sex chromosomes, and represents a chromatin clump which occurs as a consequence of deactivation of one of the paired sex chromosomes.

Ewa Klobukowska, a Polish sprinter, became the first woman to be disqualified from sport following the introduction of the Barr body test. She was stripped of her medals and publicly chastised. It is believed that she had XX/XXY mosaicism. In the eyes of the regulatory bodies, the case of Klobukowska and others justified gender verification and enthusiasm for compulsory testing continued. In reality, however, the introduction of Barr body analysis created more problems than it solved – confirming or refuting sex purely via a chromosomal test fails to take account of the complexities of sex determination itself. Women with complete androgen insensitivity syndrome would have been barred from competing due to the presence of XY sex chromosomes despite an entirely female phenotype. Men with Klinefelter's (XXY) would be eligible to compete as females due to the presence of the Barr body on cytological analysis and would potentially gain clear sporting advantage because of their physique.

Advances in technology introduced polymerase chain reaction (PCR) amplification into the arena of gender verification. In 1991, Barr body analysis was replaced with PCR analysis for the SRY locus. The SRY gene was previously considered essential for differentiation of the indifferent foetal gonad into the male testis (Figure 3).² It is now accepted that other genes are prerequisites for the normal development of the testes and male internal and external genitalia.⁸ Indeed, certain 46XX individuals have testes but do not possess the SRY gene, implying that male differentiation of the indifferent foetal gonad can be induced by alternative sex determining genes alone.⁸ Ovarian differentiation is also likely to be an active rather than passive process, induced by genes that have not yet been determined.⁹

The PCR analysis for the SRY locus was performed on DNA extracted from buccal smears. All

Figure 3
Differentiation of the foetal gonad. Adapted from Hughes.²



women were screened in Olympic competition from 1992 onwards, with over 2000 tests performed at the 1992 Barcelona games. Fifteen tests were reported positive, with a further eight out of over 3000 positive tests at the Atlanta games in 1996. Of the eight athletes found to have the SRY locus in Atlanta, seven had androgen insensitivity syndrome and the final athlete had 5-alpha-reductase deficiency. All athletes were allowed to compete in their respective competition. The morphological status of those whose tested positive in Barcelona is strictly confidential and it is not known whether these athletes were allowed to compete.¹⁰

Notably, gender testing in athletics has never identified an individual deliberately misrepresenting their gender.^{11,12} Testing has, however, created controversy and embarrassment for a significant number of female athletes competing, often unknowingly, with some form of intersex disorder. Indeed, there is no evidence that female athletes with DSDs have displayed any sports-relevant physical attributes which have not been seen in biologically normal female athletes.^{6,12} However, numerous female athletes have been unfairly barred from competing. Concerns regarding gender verification after the introduction of DNA extraction techniques for the 1992 Barcelona Olympics culminated in a renowned Spanish geneticist refusing to assist with gender verification at the 1992 Olympics for this reason.^{11,13} Despite this, the International Olympic Committee

(IOC) were determined to persist with gender verification in the 1992 Winter Olympics in Albertville, citing the rarity of disorders such as XX men as justification for ongoing DNA testing.¹⁴

Suspension of gender verification

The decision to abandon compulsory gender verification in Olympic competition was taken in 1999, following many years of debate. Although initially taken as a temporary stance, this policy continues at present. The IOC has the authority to request gender verification on an individual basis if there is suspicion of masquerading. No complaints have been voiced by competing nations regarding possible gender misrepresentation.

As our understanding of gender and sexual identity increased in the late 20th century, it became increasingly apparent to scientists and athletes alike that determination of sex is derived from far more than our genotype. In the words of Eric Vilain:

*'Sex should be easily definable, but it's not. Our gender identity, our profound sense of being male or female is independent from our anatomy.'*¹⁵

Gender testing was initially welcomed by female athletes as a method of preventing 'cheaters'. However, it has become apparent that the discrimination against those with DSD was unfair and detrimental to the sport.

Conclusion

DSDs are a hugely complex group of conditions. These abnormalities challenge both our scientific and social understanding of what 'sex' and 'sexual differentiation' are. The management of DSDs is challenging; the traditional approach bases sex assignment around future reproductive potential, future sexual potential and the cosmetic appearance of the external genitalia.¹⁶ Recent neuroscience research suggests that sexual dimorphism of the brain may occur prenatally, implying that gender-typical behaviour may be determined prior to sex assignment at birth. A more flexible approach to DSD management, involving parental decision making and close liaison with a child psychiatrist, is currently suggested.¹⁶

Sport has struggled with the issue of gender anomalies for years and the controversy regarding how to 'test' for DSD remains. Chromosomes can be tested but sex is not so easily determined – our upbringing and society's attitude towards us plays a crucial role in defining sex. For those female

athletes with DSD, it seems far more likely that they are doing their best to compete as the sex chosen for them at birth rather than attempting to attain unfair advantage through masquerading their gender. As such, compulsory gender verification seems unfair, humiliating and unproductive in the majority of situations, although vigilance must remain to identify those whose aim is to win no matter what the cost.

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