



**CANADIAN ACADEMY OF SPORT MEDICINE
ACADÉMIE CANADIENNE DE MÉDECINE DU
SPORT**

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POSITION STATEMENT

SEX TESTING (GENDER VERIFICATION) IN SPORT

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It is the position of the Canadian Academy of Sport Medicine that gender verification be eliminated from all sport competition.

INTRODUCTION

Sex testing (also known as “femininity testing” and, more commonly, as gender verification) was introduced in the mid-1960’s in response to concerns about males masquerading as females in women's sports events in order to gain an unfair physical advantage. This concern was based on the belief that men's performances exceed those of women because of the effect of male hormone levels on the determination of differences in physical characteristics such as height, body composition, muscle mass, muscle endurance, and cardiovascular capacity. While it is recognized that the term "gender" refers to one's identity as a man or a woman and that "sex testing" is more accurate terminology in this context, the term "gender verification" will be used interchangeably with "sex testing" in this paper, in keeping with the terminology commonly used in the literature and in practice.

In more recent years, laboratory based sex testing has been widely criticized on the basis of scientific, socio-cultural, and ethical perspectives, and is generally deemed unacceptable and unnecessary. The Canadian Academy of Sport Medicine (CASM) supports these criticisms and recognizes the importance of eliminating sex testing (gender verification) practices in future sport competition.

This paper presents the case for elimination of sex testing by reviewing the historical background of the issue, examining the current scientific, socio-cultural and ethical criticisms, discussing the development of alternative approaches, and concluding with specific recommendations.

HISTORICAL BACKGROUND

Since the 1930's, there have been anecdotal reports of individuals who competed as females and who were subsequently identified as men. Examples are as follows:

- The 100 m. women's sprint champion of the 1932 Olympic Games who, on autopsy in 1980, was discovered to have testes.
- The European women's high jump champion and world record holder in 1938 who was barred from competition after she was found to have both male and female sex organs.
- A runner who broke the female world track records in the 400 m. and 800 m. events in 1964 who was later discovered to be a male.
- The winner of the women's 800 m. race and world record holder in 1934 who subsequently underwent a sex change operation to become a man.
- The two members of a women's relay team which placed 2nd in the European championships in 1946 who later underwent sex change procedures to become men.
- The winner of the 1966 women's world downhill ski title who retired after receiving a medical examination in 1967. After undergoing surgery, the athlete was pronounced a male and later married and fathered a child.

It is likely, in the majority of these cases, that there was ambiguity of the external genitalia and testicular maldescent. The androgen levels in these individuals may have contributed to their athletic success but it is unlikely that, as young women athletes, they were aware of this or sought to exploit this advantage.

In the late 1950's and 1960's, as televisions became widespread, sport began to take on a much higher profile throughout the world. Success in international sport was increasingly sought for the purposes of achieving not only personal glory, financial rewards and national prestige but also as a means by which some countries could establish political superiority and achieve world-wide identity and status. With such high stakes involved in winning, the drive to excel intensified and led to improved training and coaching methods as well as to advances in sport science, nutrition, sport psychology and equipment technology. Unfortunately, cheating by means of drug use to enhance performance also became widespread. Little was known at that time about the masculinizing effects of anabolic steroids on females and rumours arose that these masculine appearing women may actually be men.

An additional influence in the suspicions during the 1950's and 60's was the ambivalent attitude towards women in sport. The traditional cultural stereotype of femininity was challenged as women who engaged in vigorous training programs developed muscular bodies and started producing remarkable performances. Women who excelled at sport were pressured to actually prove that they were women and not men cheating.

There was clearly an atmosphere of mistrust in this era. In order to put an end to the rumours and prevent the possibility of men cheating by participating in women's events, the International Amateur Athletic Federation (I.A.A.F.) decided to introduce "femininity

testing" to determine an athlete's eligibility to compete as a woman. Until this point, the athlete needed only a medical certificate signed by a doctor in her own country.

A. Gender Verification by means of Physical Examination

The first "sex test" was held at the European Track and Field Championships in Budapest in 1966. All athletes entered in women's events were required to parade naked in front of a panel of female physicians. All athletes passed and were ruled eligible to compete. Unexpectedly however, five world class athletes chose not to compete and did not undergo the physical inspection test, fuelling speculation that they might be male impostors.

A similar protocol took place at the 1967 Pan American Games in Winnipeg. In 1966, at the Commonwealth Games in Kingston, Jamaica, a manual examination of the external genitalia was carried out by a gynaecologist on all women athletes.

At the 1967 European Cup Track and Field Event in Kiev, USSR, close-up visual inspection of the genitalia was used to establish eligibility. One athlete, an Olympic gold and bronze medallist, was ruled ineligible. A six man medical commission who subsequently investigated her case discovered that she had a genetic condition known as mosaicism, whereby some of her cells had an XXY sex chromosome make-up, the remainder having a normal XX sex chromosome composition. She was aware of the condition and had not only undergone surgical treatment to remove intra-abdominal testes, but was also being treated with female sex hormones. Nevertheless, she suffered public disgrace by being disqualified from further competition in women's events; her name was later removed from the record books.

With each of these situations, deep resentment was expressed by the athletes related to the humiliation and loss of dignity experienced. It was becoming increasingly apparent to the international sport governing bodies that these physical inspections and examinations to determine eligibility were unacceptable and that alternative methods of gender verification had to be sought.

B. Gender Verification by means of Sex Chromatin Testing

At the Mexico Olympic Games in 1968, the International Olympic Committee introduced the buccal smear screening test. It met with approval as it filled the criteria of being inexpensive, quick and easy to obtain, allowing confidentiality and causing minimum physical and psychological disturbance to the athlete. This buccal smear, or sex chromatin test, consists of a microscopic analysis of epithelial cells scraped from the inside of the cheek. The cells are smeared on a slide and stained to reveal the presence or absence of the Barr Body, which is caused by the inactivation of one of the two X chromosomes in genetic female (46, XX) cells. Genetic males (46, XY) do not show this Barr Body as they only have one X chromosome, which remains active.

It was the intention of the I.O.C. that, should the screening test prove negative or inconclusive, a full chromosome analysis would then be conducted and blood hormone levels measured. If inconclusive results were again obtained, a gynaecological examination would follow. A final judgement would then be made regarding the individual's eligibility to compete in women's events.

Unfortunately, the I.O.C.'s intentions have rarely been carried out in practice. Shocked athletes, having failed the sex chromatin screening test shortly before a major

competition, have tended to withdraw rather than undergo further investigations which might have proved them eligible. Indeed, these athletes have been advised by officials and team physicians to feign illness or injury and retire immediately to avoid public humiliation.

Pooled data gathered from sex chromatin testing over seven international events have allowed the frequency of ineligible athletes to be estimated at 1 in 500-600 female athletes. Due to confidentiality and the fact that most of these athletes withdrew from competition, exact diagnoses and follow-up were rarely available. There are no reported cases of sex chromatin testing detecting a normal male attempting to cheat.

This general protocol has remained unchanged since 1968. Despite refinements in the process, there is no support for these tests among the medical community.

CRITICISM OF GENDER VERIFICATION

A. SCIENTIFIC VALIDITY

Due to its susceptibility to human error, geneticists no longer use sex chromatin analysis to determine sex chromosome abnormalities. False positives and false negatives are common. There is at least one known case in which an athlete received different results from separate tests at two different events. Furthermore, leading geneticists do not support the use of sex chromatin testing in sport because: 1) some women who have genetic abnormalities that offer no conceivable strength advantage are disqualified unfairly, 2) some men with genetic disorders would pass the sex chromatin test, and 3) it fails to detect the vast majority of female athletes who may have an unfair strength advantage, most of whom have normal chromosomes but achieve this advantage through steroid use or other performance enhancing drugs.

1. Genetic Disorders in Women Which Give No Physical Advantage But Result In "Failed" Sex Tests

a) Androgen Insensitivity Syndrome (formerly called Testicular Feminization)

Androgen Insensitivity Syndrome occurs in females with 46, XY sex chromosomes whereby a mutant gene on the X chromosome results in an inability to produce normal androgen receptors. Cells are unable to respond to circulating testosterone secreted by small intra-abdominal testes. As a result, the individual's chromosomal, gonadal and hormonal sex are male, but the secondary sex characteristics as well as musculature, are female. Thus, these women have no advantage over normal 46, XX women in terms of muscle mass and strength. This is the most common abnormality detected by sex chromatin testing in sport. It is apparent that a discrepancy exists between the incidence of this condition in the general population (1 in 60,000 male births) and the estimated incidence in the population of women athletes competing at an international level (1 in 500). This suggests that some advantage may be conferred to affected women. As there may be varying degrees of androgen insensitivity, the potential for circulating male hormone levels to have some effect on various tissues of the body exists. These effects are very difficult to measure, however, with no satisfactory methods currently available.

b) Gonadal Dysgenesis

These 46, XY females do not form functioning testes and therefore do not produce male levels of testosterone. They are phenotypically females and have no physical characteristics which would confer any unfair advantage over normal 46, XX women.

c) Turner's Syndrome

These women have a 45, XO sex chromosome make-up. They appear female and have no physical advantage over normal 46, XX women. Mosaic forms exist.

2. Genetic Disorders In Men Who Would Pass the Sex Chromatin Test

Klinefelter's Syndrome and 46, XX Males

In Klinefelter's Syndrome, males have an XXY sex chromosome make-up. In XX males, part of the Y chromosome containing the testes determining genes has been transferred to one of the two X chromosomes. Although infertile, they are men, with masculine body build and muscle strength and male psychosocial orientation. While they are as unlikely as normal men to register to compete in women's competition, men with either of these disorders would pass the sex chromatin test and be eligible to compete in women's events.

3. Women Athletes Having a Physical Advantage Who Would Pass the Test

a) Congenital Adrenal Hyperplasia (21-Hydroxylase Deficiency)

In this common congenital hereditary disorder, the adrenal glands produce excess androgenic hormones, resulting in a masculine-type body build with greater than normal muscle mass and sometimes increased body hair and ambiguous genitalia. While such females may have an advantage in sports requiring strength, they would pass the sex chromatin test.

b) Females With Androgen Producing Tumours

Females with these rare tumours have increased intrinsic production of androgens which may give them a strength advantage, although they are extremely unlikely to be competing at an international level.

c) Anovulatory Androgen Excess (so called "Polycystic Ovary Syndrome")

This common condition may lead to higher than normal male hormone levels which could potentially confer an advantage over women who do not have this condition.

d) Females Who Use Exogenous Male Hormones

Sex chromatin testing does not detect the use of anabolic steroid hormones, which do have a masculinizing effect on muscles and give an advantage over females who do not use steroids. These women would be ruled eligible to compete.

4. Genetic Disorders in Phenotypic Males or Females who may Pass or Fail the Test

Pseudohermaphrodites and True Hermaphrodites

These are rare conditions caused by complex genetic abnormalities and include a range of physical appearances from almost male to almost female. They tend to have ambiguous genitalia and masculinize at puberty but are infertile. Many are raised as females but undergo sex-change operations in late adolescence.

B. SOCIO-CULTURAL ISSUES

This section addresses concerns arising from the complex definition of gender, various social and cultural factors and, finally, the long term psychosocial consequences of athletes failing the sex test.

The term "gender" is distinguished from "sex" (which refers to biological characteristics) in that gender refers to one's psychosocial identity as a man or a woman and is influenced by social and cultural factors. Indeed, the term gender includes a number of components:

- chromosomal sex
- gonadal sex
- internal genital structure
- morphological sex or secondary sexual characteristics
- hormonal sex
- psychosocial sex.

In most individuals, all components are concordant in being either all male or all female. However, congenital or acquired conditions exist whereby one or more of the components is in opposition to the rest and the resulting disorders may or may not be detected by routine sex chromatin testing. In this context, sex chromatin testing fails in that it determines gender solely through the determination of chromosomal sex, which is the least relevant parameter of gender.

While genetics determine many of the differences between males and females, environmental factors play varying roles on some differences such as height, weight, intelligence and personality. Behavioural differences are, to a large extent, the result of social influences and expectations, which vary over time and among cultures. In the past, social pressures have generally deterred women from pursuing high levels of achievement in sport. The argument that sex testing levels the playing field assumes that the differences between men and women and their performances in sport exists only because of physiological differences and disregards the role of sociological factors and opportunities for participation and advancement.

Gender division has always existed in competitive sport, with men's performances being generally superior to those of women. Thus, when a woman produced an exceptional performance in competition, her sex has been questioned, underscoring the belief that "anyone who performs well must be a man". However, the gap between men and women's performances is narrowing and women are participating in sports which in the past had been pursued exclusively by males, such that gender distinctions are becoming less appropriate.

Gender distinction is also quite apparent in the media. Research has shown that while there has been a decline in sexist language and devaluation of women athletes, male commentators still tend to describe male athletes using terms such as "strong" and "powerful" while women athletes, often referred to as "girls", are more likely to be described on the basis of emotional strengths and weaknesses. This persistent emphasis on the difference between men and women suggests that considerable discomfort regarding women and sport still exists.

The potential long-term psychological and social consequences for athletes excluded from competition represent further limitations inherent in the current sex testing procedure. While all athletes must eventually progress through the transition from high performance sport to former athlete, it is an adjustment that is especially challenging for many. Athletes who lose the opportunity to achieve their performance goals as a result of unplanned or involuntary termination of their careers and who are unjustifiably or indiscriminately forced out of the sport are much more likely to experience difficult or traumatic transitions. The feelings of disappointment, dissatisfaction, uncertainty and disgrace as well as the loss of the sense of identity which may be experienced by athletes who fail the sex test are clearly detrimental and preventable.

C. ETHICAL ISSUES

There are several criticisms related to ethics:

1. Sex testing is compulsory rather than voluntary
2. Sex testing is discriminatory as only female athletes are tested
3. Sex testing is discriminatory as athletes are unfairly disqualified for genetic abnormalities which do not give them an unfair advantage
4. Sex testing is regarded as invasive and abusive of female athletes. The testing is performed once the athlete has arrived at the international competition site, away from home and without her personal support group. The devastating psychological and social consequences of failing the sex test after being raised and competing all of one's life as a female are tragic
5. The opinions of the athletes are not considered in the debate on sex testing

DEVELOPMENT OF ALTERNATIVE APPROACHES

In 1990, the I.A.A.F. held a workshop in Monte Carlo with participants representing various medical specialties and women's sports, including former world class female athletes. Included in the proposals set forth was the recommendation that laboratory based gender verification testing be abandoned. As an alternative, it was advised that a general medical examination of all athletes, male and female, be performed by a physician accredited to each national federation under internationally standardized guidelines. The purpose of the examination would be to ensure satisfactory physical status for competition and would include simple inspection of the genitalia.

In 1991, the I.A.A.F. Council adopted these recommendations and the new protocol was accepted by the athletes and most of the team physicians without objection. However, due to lack of unanimity regarding the exact content of the examination, a second Working Group discussion took place in 1992. The result was a decision to eliminate gender screening in any form at I.A.A.F. competitions. While health checks of all athletes

are advised prior to participation in international competition, they are no longer compulsory. Provision does remain, however, within the I.A.A.F. for investigation of any questionable cases, including gender, by the medical delegate.

CURRENT INTERNATIONAL OLYMPIC COMMITTEE POSITION ON GENDER VERIFICATION

The I.O.C. continues to conduct laboratory testing for gender verification purposes. At the 1992 Winter Olympics in Albertville, the new polymerase chain reaction (P.C.R.) technique was introduced and is currently the procedure in use. This technique, which is also applied to a buccal smear, identifies athletes with a Y chromosome. It is criticized on two major points. Firstly, it is so highly sensitive that it results in an unacceptable number of false positive results. Secondly, and most importantly, it has the same shortcomings as sex chromatin testing, being merely a test for the presence of a DNA sequence and not a test for sex or gender.

CASM RECOMMENDATIONS

The Canadian Academy of Sport Medicine supports the following points regarding the issue of gender verification in sport:

The initial purpose of gender verification was to prevent men from posing as women for the purpose of entering women's competition illegally. There is no evidence to suggest that this is relevant at present. The use of communal dressing rooms and showers, as well as the clothing currently worn in competition by women athletes, significantly reduce the possibility of men posing as women, as does the current protocol used for drug testing (urine voided by an athlete is carefully observed by an official to ensure that the sample comes directly from the athlete's urethra). Under these conditions, it is extremely unlikely that a male, with both a personal and a sporting history, would reach an international level of women's competition without detection.

An additional purpose of sex testing in selected individuals may be the identification of XY females, who may have higher than normal male hormone levels and may or may not have an advantage in sport. For medical reasons, these athletes should be detected to ensure that their dysgenetic gonads are surgically removed to prevent malignancy. (Female hormone supplementation is then added.) They should then be eligible to participate in sport with their phenotypic sex. Towards achieving this purpose, a thorough medical evaluation, including a reproductive health assessment, of all athletes, both women and men, is recommended.

Individuals who were raised as females and are psychologically and socially females from childhood should be eligible to compete in women's competition regardless of their chromosomal, gonadal and hormonal sex.

Women athletes who have developed greater than average muscle mass, whether due to extreme training programs or to genetic abnormalities such as congenital adrenal hyperplasia, incomplete androgen insensitivity or chromosomal mosaicism should be accepted as part of the normal range of variation, similar to individuals who have grown to extreme heights. Male hormone levels may vary by 100 fold within genotypically normal females and do not ensure athletic prowess, emphasizing the essential role of skill, intensive training and other factors in achieving athletic success.

Individuals who have undergone genital sexual reassignment should be eligible to participate in sport competition with their phenotypic sex.

Only women who have cheated by using steroids or other performance enhancing drugs to increase their muscle strength should be disqualified. This is possible with the current doping control procedures.

CONCLUSION

It is clear, from the scientific, socio-cultural and ethical criticisms outlined in this paper, that sex testing (gender verification) is inappropriate. The Canadian Academy of Sport Medicine supports the recommendation that laboratory based sex testing for eligibility purposes be abandoned for all future sport competition. CASM recommends that all athletes, both women and men, undergo a thorough medical evaluation including assessment of their reproductive health. This evaluation should occur in their country of origin prior to entering the international sport arena.

RECOMMENDED READING

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GLOSSARY

- Androgen - any substance that has masculinizing effects e.g. testosterone
- Gonad - an ovary or testis
- Genotype - the genetic constitution of an individual
- Phenotype - the entire physical, biochemical, and physiological makeup of an individual as determined both genetically and environmentally
- Mosaicism - the presence in an individual of two or more cell lines that are genotypically distinct

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