Female hyperandrogenism – new IOC rules

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Background

• Men have a decisive advantage in most sports
• Sport is organized by gender (few exceptions)
• “Gender verification” was introduced to prevent men from participating in women’s competition

Short history

• 1932 Olympics: Stella Walsh “the fastest woman in the world”
• 1936 Olympics: Dora Ratjen, later Heinrich Ratjen
• 1948: British Women’s Amateur Athletic Associations requests sex certificate
• 1966/67: “Nude parade”
• 1968: Sex chromatin screening was introduced at Olympic games

• 1983/85 (different results): Maria José Martinez Patino
• 1990: IAAF abandons gender screening
• 1992: IOC introduces Y-chromosome (SRY) screening
• 1999: IOC abandons Y chromosome screening
• 2004: Regulations regarding transsexuals

Why do men have a physical advantage?

• Body size, body composition
• Muscle mass, muscle strength
• Cardiovascular function
• Aggressiveness
• Sex hormone levels

Male and female testosterone levels

Male normal range: 10 – 35 nmol/L
Female normal range: 0.2 – 2.7 nmol/L
Exogenous androgens

Do androgens confer an advantage for physical performance?

- Exogenous androgenic/anabolic steroids are known to increase muscle strength and performance in both men and women and are therefore forbidden in sports.
- Endogenous levels of testosterone in men are positively associated with physical performance.
- There is an increased prevalence of female hyperandrogenism and disorders of sex development (DSD) among Olympic female athletes.

Female hyperandrogenism

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Incidence</th>
<th>Karyotype</th>
<th>Testosterone levels</th>
<th>Advantage in sports?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Congenital adrenal hyperplasia (CAH, 21-hydroxylase deficiency)</td>
<td>Classic 1/12000 XX</td>
<td>Non-treated in the male range.</td>
<td>Only if undertreated with cortisone</td>
<td></td>
</tr>
<tr>
<td>5α-Reductase type 2 deficiency</td>
<td>Very rare XY</td>
<td>In the male range</td>
<td>Yes</td>
<td></td>
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<tr>
<td>Complete androgen insensitivity syndrome (CAIS)</td>
<td>1/50000 XY</td>
<td>In the male range</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Ovotesticular DSD</td>
<td>? XX or XY</td>
<td>In the male range</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Polycystic ovary syndrome (PCOS)</td>
<td>Prevalence 5-10% XX</td>
<td>Usually in the upper normal range</td>
<td>Probably</td>
<td></td>
</tr>
</tbody>
</table>

Symptoms of severe female hyperandrogenism (virilisation)

- Deep voice
- Breast atrophy
- Hirsutism
- Increased muscle mass
- Amenorrhoea/no uterus
- Clitoromegaly

Polycystic ovary syndrome (PCOS) in female athletes

PCOS criteria

Two out of three criteria:
1. Anovulation
   - Oligomenorrhea
   - Amenorrhea
2. Hyperandrogenism
   - Hirsutism
   - Biochemical hyperandrogenism
3. Typical ultrasound features
Other specific causes of hyperandrogenism should be excluded
Menstrual disorders in female athletes

PCOS and physical performance

Polycystic ovaries in Olympic athletes

Aims

Whom should be examined?

Women with severe hyperandrogenism who want to compete with other women:

- At the request of the woman herself
- Noted by national sports physician at pre-competition examination
- Noted at regular anti-doping routines
- Noted by a medical official at a competition
Work-up at 3 levels

- **Level 3**: Specialist Reference Centre
  Full examination and diagnosis.

- **Level 2**: National or Continental
  Preliminary endocrine assessment.
  The Expert Medical Panel is evaluating the results and decide on further actions.

- **Level 1**: National
  Physical examination by authorized sports physician or endocrinologist.

Alternatives for the Expert Medical Panel

- **If testosterone >10 nmol/L** (the lower limit for normal adult males) the Panel will refer the woman for further diagnostic work-up

- **If androgen insensitivity is proven**, the woman can compete as before, irrespective of testosterone levels

Diagnostic work-up at level 3

- The results of the work-up will be the basis for recommendations by the Expert Medical Panel about future treatment as a prerequisite to accept eligibility for competing against other women

- The IAAF or IOC will decide on further actions

- If treatment is requested, future monitoring will be required

IOC Miami Jan 2010

- Working group of medical experts, sports lawyers, one ethicist, one intersex community representative, female athlete representatives

- Fairness in competitive female sports was particularly discussed

IOC regulations on female hyperandrogenism

- A female recognised in law should be eligible to compete in female competitions provided that she has androgen levels below the male range or, if within the male range, she has an androgen resistance such that she derives no competitive advantage from such levels.

- An evaluation with respect to eligibility should be made on an anonymous basis by a panel of independent international experts in the field of hyperandrogenism that would in each case issue a recommendation on eligibility for the sport concerned.

- The investigation of a particular case should be conducted under strict confidentiality.

- If an athlete fails or refuses to comply with any aspect of the eligibility determination process, while that is her right as an individual, she will not be eligible to participate as a competitor in the chosen sport.
Ethical issues

• Confidentiality
• Obliged to undergo treatment
• Monitoring of medical treatment
• Non-compliance
• Return to competition
• The view of other female competitors: still unfair advantage?

Thank you for your attention!