

Statement of FISA Sports Medicine Commission: Biological Effects of Testosterone

Stellungnahme der FISA Sportmedizin-Kommission: Biologische Effekte von Testosteron

Statement

The biological effects of testosterone on sexual differentiation and development and growth are well-established by in vitro and in vivo studies in animals and humans. Some beneficial effects of testosterone on muscle mass, strength, and sports performance have also been reported.

Because of the general and substantial effects of testosterone, there are only a few human interventional studies of testosterone supplementation in healthy males testing strength and exercise performance effects in a prospective, randomized double-blinded approach. There have been such studies in hypogonadal men demonstrating that testosterone supplementation confers anabolic benefits to muscle mass and increased strength. Cross-sectional studies have also found a correlation among muscle mass, strength, performance, and testosterone levels in men.

There have been studies of exogenous testosterone supplementation in females with and without oophorectomy that have demonstrated testosterone dose and serum concentration-dependent improvements in muscle mass, strength, and exercise performance. Cross-sectional studies of athletes have also correlated athletic performance with testosterone levels.

Prospective pharmacological studies of testosterone in elite male or female athletes will likely not be permitted because of doping regulations and because performance enhancement is not considered an ethical impetus for pharmaceutical clinical trials.

Because of conservation of the hormonal cellular response systems throughout evolution (e.g., hormone and hormone receptor structure, signaling pathways), the existing animal, human, and in vitro studies support the complex effects of testosterone, justifying the inclusion of androgens in the WADA prohibited list. Testosterone effects not only include those involving muscle growth, strength, and performance, but also include exercise recovery, mood state, motivation, and immune function. In developmental phases, testosterone drives differentiation of many tissues (e.g., muscle, nerves, and bone) and has effects on body height, body weight, brain function, bone mass, and other outcomes.

In conclusion, the FISA Sports Medicine Commission, in acknowledgement of the scientific and medical literature, see an important role of testosterone for performance, training, and regeneration in rowing and therefore supports the listing of testosterone in the WADA prohibited list (International Standard). Some selected readings regarding the effects of testosterone are provided below.

Conclusion

After recent public discussions and a request of the CAS to justify the biological effects of testosterone on performance, the FISA Sports Medicine Commission summarizes in this short statement the effects of testosterone on development, sex differentiation, many bodily functions, and performance.

This statement was drafted by Dr. Jürgen Steinacker and Dr. Kathryn E. Ackerman, it was revised and approved by the members of the FISA Sports Medicine Commission.

Conflict of Interest

The authors have no conflict of interest.

STATEMENT

ACCEPTED: February 2019

PUBLISHED ONLINE: March 2019

DOI: 10.5960/dzsm.2019.368

Steinacker JM, Ackerman KE, Koubaa D, Nielsen HB, Hannafin J, Hiura M, Poli P, Smoljanovic T, Wilkinson M, Zupet P, Lacoste A. Statement of FISA sports medicine commission: biological effects of testosterone. *Dtsch Z Sportmed.* 2019; 70: 83-84.

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