

# Adverse effects of anabolic androgen steroid abuse in the Netherlands: Tip of the iceberg

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Endocrine advantages can have a major impact on sporting performance. This is exemplified by the story of legendary cross-country skier Eero 'Mister Seefeld' Mäntyranta (1937-2013) who had primary familial and congenital polycythaemia causing an increase in red blood cell mass and haemoglobin due to a mutation in the erythropoietin receptor gene. Other well-known examples include acromegalics who become successful bodybuilders or wrestlers (for example Jorge 'El Gigante' González [1966–2010]) or basketball players (Gheorghe 'Little Gheorghe' Mureşan [born 1971]). There are numerous examples of professional athletes without genetic variants or endocrine tumours who aimed to leverage the endocrine effects of doping to enhance their performance. However, this number is in stark contrast to the estimated 160,000 amateur athletes in the Netherlands who use performance enhancing drugs.<sup>1</sup> Because of this large number, the medical consequences and side effects of self-administration of mostly illegal doping treatments make this a relevant public health problem.

In the current issue of the Netherlands Journal of Medicine, Smit and de Ronde<sup>2</sup> focus on the estimated 20,000<sup>1</sup> amateur athletes that abuse anabolic androgen steroids (AAS), of which the tip of the iceberg was analysed in their one-of-a-kind outpatient AAS clinic. From their data, the average Dutch AAS abuser requiring medical aid due to AAS abuse is a 34-year-old employed male bodybuilder using testosterone and/or non-prednisolone derivate steroids and relatively likely to use recreational drugs such as XTC or cocaine. Interestingly, the results of the study show that the mostly self-derived or acquaintance-derived endocrine knowledge of AAS users can be very detailed. This is illustrated by combined self-medication regimens that include growth hormone, thyroid hormone, tamoxifen, human chorionic gonadotropin and/or clomiphene citrate. As a consequence,

there is also very widespread endocrine-related symptomatology (including fatigue, decreased libido, gynaecomastia but also fluid retention and insomnia) and abnormal blood test patterns (including androgen deficiency, elevated creatine kinase, abnormal liver function tests and polycythaemia). Taken together, it seems evident that a specialised outpatient clinic is necessary in order to provide optimal care for these complex endocrinopathies that occur in such a heterogeneous group of patients. It can be challenging to set up good healthcare for medical issues that touch upon illegal substances or related to social outliers. The principles behind setting up a structured outpatient clinic for the consequences of AAS abuse fits with the progressive liberal mindset in the Netherlands. The same mindset has formed the basis for the successful medicalisation policies of heroin abuse in the 1970s and a frontrunner role in endocrine treatment of transsexual persons.<sup>3,4</sup>

## REFERENCES

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