

Study shows anabolic steroid abuse leads to impaired insulin sensitivity

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New research presented at this year's European Association for the Study of Diabetes (EASD) meeting in Munich, Germany (12-16 Sept) shows that anabolic steroid abuse is associated with impaired insulin sensitivity. The study is by Dr Jon Rasmussen, Herlev University Hospital, Copenhagen, Denmark and colleagues.

Misuse of anabolic androgenic steroids (AAS) causes a dramatic increase in plasma androgens and side-effects have predominantly been investigated in relation to disturbances in the hypothalamus-pituitary-gonadal axis (which regulates various body functions such as the reproductive and immune systems). However metabolic side effects have not yet been discovered. The objective of this study was to investigate the impact of AAS misuse on abdominal fat distribution and insulin sensitivity (IS) in young men.

A cross sectional case-control study among young men (age 50 years and under) was carried out including three study groups: current AAS misuse, former AAS misuse and age-matched healthy controls who had never used AAS. All participants were engaged in recreational strength training. A 120 min oral glucose tolerance test (OGTT-a standard test for diabetes) was performed after a minimum of 8-hour overnight fasting. Plasma glucose and insulin were obtained at five time points during the OGTT: 0, 30, 60, 90 and 120 min. IS was then calculated using a formula known as the Matsuda index, with higher values indicating better insulin sensitivity. Body composition was assessed by a DEXA-scan including measurements of abdominal fat distribution, divided into

visceral adipose tissue (VAT-fat around organs) and [subcutaneous adipose tissue](#) (SAT).

A total of 100 participants were included: current AAS misuse, n = 37 (mean age 31.4 years) former AAS misuse, n = 33 (mean age 34.8 years, mean duration since AAS cessation 2.6 years); and healthy control participants, n = 30 (mean age 31.5 years). Participants with current AAS misuse and former AAS misuse had a clearly lower Matsuda index score reflecting impaired IS as compared with the control group (mean Matsuda score 6.49 current abuse vs. 5.09 previous abuse vs. 8.51 no abuse).

Despite this, men with current AAS abuse had the greatest lean body mass and lowest total body fat % as compared with the healthy controls and subjects with former AAS misuse (means for lean body mass 25.4 kg/m² [current abuse] vs. 21.3 kg/m² [former abuse] vs 21.9 kg/m² [controls] and for body fat 14.1% [current abuse] vs. 17.3% [former abuse] vs 19.4% [controls]).

However, VAT volume was higher in the groups with current AAS and former AAS abuse than in the controls (means 388 cm³ current abuse vs 347 cm³ former abuse and 290 cm³ no abuse). Moreover, the three groups differed significantly in SAT volume, as participants with former [abuse](#) of AAS had the highest SAT volume (962 cm³) and men with current AAS misuse had lowest volume (546 cm³) vs control participants (748 cm³). Analyses showed that VAT and SAT were inversely associated with Matsuda Index score.

The authors say: "The current data suggest that a history of AAS misuse leads to impaired IS, even several years after AAS cessation, compared with healthy controls who had never used AAS. This effect could be mediated by increased VAT as the primary metabolically active fat tissue."

They add: "We have worked further on the data and found that both the higher visceral fat and impaired insulin sensitivity could be caused by reduced levels of the cardiac natriuretic peptides, which are predominantly known as key regulators of water and sodium stability in the cardiovascular system. Our results show these cardiac peptides are clearly suppressed by anabolic steroids and additionally that reduced levels are linked with impaired [insulin sensitivity](#)."

Provided by Diabetologia

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