ABSTRACTS – 24TH CONGRESS OF THE EUROPEAN ANTHROPOLOGICAL ASSOCIATION
DOI: 10.20330/AnthropKozl.2026.67s.108

Anthrop. Közl. *67(Suppl.);* 108. (2026)

POSTER PRESENTATION – P20

STRESS AND SEX HORMONE CHANGES OF YOUNG ELITE HANDBALL PLAYERS IN RELATION TO THEIR MOOD PROFILES

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Background: Excessive training-induced stress in athletes is theorised to cause maladaptation in athletes, when there is an imbalance in training and recovery, which can later lead to overtraining syndrome (OTS). OTS detection is prominently based on the change of testosterone and cortisol levels due to maximal exertion, alongside mood profiling.

Objective: To study the relationship between mood profile, stress state, endocrine status and response to physical exertion in youth handball players. The analysis is part of a large study to develop a new screening method for overtraining status in athletes.

Subjects and methods: 584 elite Hungarian handball players (14–35 ys) were examined in the Sport Sciences and Diagnostic Research Centre of the Hungarian Handball Federation between 2023 and 2025. Saliva samples were collected in resting state and after vital maximum exertion to measure the concentration of testosterone and cortisol, and 17-β-oestradiol hormone levels. Hormone levels were estimated by ELISA method. Subjective stress state of the athletes was surveyed via Profile of Mood States questionnaire.

Results: The athlete references of resting levels of sex hormones, as well as the change in the ratio of sex hormone and cortisol hormone levels were constructed for athletes. Sex hormone levels showed deviations from the non-athlete references in both sexes: the resting testosterone level of male athletes was higher, while 17-β-oestradiol level of female athletes was lower than non-athletes' level in their age-groups. Physical exertion caused all three hormone levels to change significantly in both sexes. The testosterone/cortisol ratio change showed relation to the mood profile of the athletes.

Conclusions: New indices based on sex hormone and cortisol levels are under construction for the screening of overtraining in athletes. Our further aim is to study fatigue, inflammatory and immune biomarkers beside the studied hormone levels to analyse their relations with injury risk in elite athletes.

Keywords: Endocrine state; Overtraining; Stress state; Mood profile; Handball.