Background

- Hormone levels can be used as biomarkers for training tolerance in athletes. In particular, cortisol and testosterone levels can be used to gauge overtraining and a decline in performance.
- Routine assessment of blood levels of these hormones during training may be useful for athletes and coaches.
- However, the need for blood samples to be collected by a medical professional can limit the usefulness of such an approach.
- **Objective:** The investigators of this study developed and validated a finger stick microspecimen test that could be self-collected to detect cortisol and testosterone levels in athletes.

Methods

- The study population included 46 Division I collegiate athletes: 16 men and 30 women, with ages ranging from 18 to 22 years.
- Finger stick microspecimens (~20 μL) and venous blood samples (~5 mL) were collected and analyzed.
  - Finger stick specimens were analyzed for total cortisol and testosterone using a newly developed microspecimen liquid chromatography-tandem mass spectrometry (LC-MS/MS) assay optimized for small specimen volumes.
  - Venous blood specimens were analyzed using both the microspecimen LC-MS/MS assay and a standard-volume LC-MS/MS assay.
- Agreement between the results of the microspecimen and standard-volume LC-MS/MS assay was evaluated using Deming regression and Pearson correlation analyses.

Results

- **Microspecimen vs standard-volume assays:** Results from the finger stick microspecimen LC-MS/MS assay correlated well with those from the venipuncture standard-volume LC-MS/MS assay for both total cortisol (r=0.92; P<0.0001) and testosterone (r=0.99; P<0.0001).
- **Finger stick vs venipuncture specimens:** The microspecimen LC-MS/MS assay was used to measure hormone levels from finger stick specimens and from venipuncture specimens. Results from the 2 specimen types correlated well for both total cortisol (r=0.96; P<0.0001) and testosterone (r=0.99; P<0.0001).

Conclusions

- Cortisol and testosterone levels determined by a microspecimen LC-MS/MS assay were in good agreement with levels determined by a standard-volume LC-MS/MS assay.
- These results suggest that finger stick collection of blood microspecimens may be a viable method for monitoring hormone levels in athletes.