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Research article



### Seasonal Strength Performance and Its Relationship with Training Load on Elite Runners

Carlos Balsalobre-Fernández , Carlos M. Tejero-González, Juan del Campo-Vecino[More Information >>](#)

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The aim of this study was to analyze the time-course of force production of elite middle and long-distance runners throughout an entire season and at the end of the off-season, as well as its relationships with training load and hormonal responses. Training load was recorded daily throughout an entire season by measuring and evaluating the session distance (km), training zone and session-RPE in a group of 15 elite middle and long-distance runners (12 men, 3 women; age = 26.3 ± 5.1yrs, BMI = 19.7 ± 1.1). Also, basal salivary-free cortisol levels were measured weekly, and 50-metre sprints, mean propulsive velocity (MPV), mean propulsive power (MPP), repetition maximum (RM) and peak rate of force development (RFD) of half-squats were measured 4 times during the season, and once more after the off-season break. There were no significant variations in force production during the season or after the off-season break, except for the RFD (-30.2%,  $p = 0.005$ ) values, which changed significantly from the beginning to the end of the season. Significant correlations were found between session-RPE and MPV ( $r = -0.650$ ,  $p = 0.004$ ), MPP ( $r = -0.602$ ,  $p = 0.009$ ), RM ( $r = -0.650$ ,  $p = 0.004$ ), and the 50-metre sprint ( $r = 0.560$ ,  $p = 0.015$ ). Meanwhile, salivary-free cortisol correlated significantly with the 50-metre sprint ( $r = 0.737$ ,  $p < 0.001$ ) and the RM ( $r = -0.514$ ,  $p = 0.025$ ). Finally, the training zone correlated with the 50-metre sprint ( $r = -0.463$ ,  $p = 0.041$ ). Session-RPE, training zone and salivary-free cortisol levels are related to force production in elite middle and long-distance runners. Monitoring these variables could be a useful tool in controlling the training programs of elite athletes.

**Key words:** Endurance, exercise, testing, physiology**Key Points**

- Session-RPE, training zone and salivary free cortisol levels correlate significantly with strength-related variables in middle and long-distance elite runners.
- A month of active rest during the off-season break is enough to prevent decreases in force production of such athletes.
- Monitoring training loads through session-RPE is a suitable and simple method for controlling the training process in elite middle and long-distance runners.

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