

CARICO DI ALLENAMENTO RELATIVO E ASSOLUTO E LA SUA RELAZIONE CON LA FATICA NEL CALCIO

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ABSTRACT

Lo scopo di questo studio è stato quello di valutare il rapporto fra gli indicatori di carico interno ed esterno con la fatica oggettiva e soggettiva, su 15 giocatori di calcio semi-professionisti impegnati per oltre otto settimane complete durante il periodo competitivo nella stagione 2015-2016.

La frequenza cardiaca massima (*FC Max*) e la velocità massima (*V Max*) sono state precedentemente misurate in prove specifiche. Il carico di allenamento (*Training load, TL*), invece, è stato monitorato con il metodo della session-RPE (*Rate of Perceived Exertion*, sforzo percepito), cardiofrequenzimetri e dispositivi GPS registrando: la distanza totale (*Total Distance, TD*), il Player Load®, la TD >80% della *V Max* (*TD80*), la TD in decelerazione <2 m/s² (*TDD <2*), la TD in accelerazione >2 m/s² (*TDA >2*), il tempo trascorso tra il 50% e l'80%, l'80% e il 90% e >90% della *FC Max* e lo sforzo percepito a livello respiratorio (*RPE_{res}*) e muscolare (*RPE_{mus}*).

Tutte le variabili sono state analizzate tenendo conto sia dei valori assoluti accumulati durante la settimana di lavoro, sia dei valori normalizzati in relazione alla prestazione fisica di gara individuale. La stanchezza neuromuscolare è stata misurata utilizzando il test di salto con contromovimento (*Countermovement jump, CMJ*) e la scala di autovalutazione del grado di recupero TQR (*Total Quality of recovery*).

È stato possibile evidenziare una correlazione tra l'affaticamento sperimentato dal giocatore, valutato oggettivamente e soggettivamente, e il carico accumulato durante la settimana valutato in termini relativi e assoluti. Le variabili relative alla frequenza cardiaca hanno evidenziato una maggiore relazione con il TQR.

Si è evidenziata, infine, una correlazione tra la fatica (oggettiva e soggettiva) e il TL accumulato da un giocatore durante la settimana, con una maggiore sensibilità quando comparata con i valori espressi in termini relativi rispetto alla competizione.

APPLICAZIONI PRATICHE

Grazie alle informazioni ottenute dal monitoraggio del carico di allenamento e dello sforzo percepito, si è più vicini all'applicazione del giusto TL ai giocatori e quindi ad ottenere nelle competizioni una migliore condizione fisica e una maggiore efficienza. **Normalizzare il lavoro svolto in allenamento rispetto a quanto fatto in partita potrebbe essere una strategia appropriata per individualizzare i carichi di allenamento dei singoli giocatori.**

CONCLUSIONI

In conclusione, nei microcicli settimanali dove i giocatori hanno percorso più metri rispetto alle quantità solitamente registrate, i valori di stanchezza neuromuscolare percepita sono stati più elevati.

Absolute and relative training load and its relation to fatigue in football

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The aim of the study was to assess the relationship of external and internal training load (TL) indicators with the objective and subjective fatigue experienced by 15 semiprofessional football players, over eight complete weeks of the competition period in the 2015–2016 season, which covered microcycles from 34th to 41st. The maximum heart rate (HRmax) and maximum speed (Vmax) of all the players were previously measured in specific tests. The TL was monitored via questionnaires on rating of perceived exertion (RPE), pulsometers and GPS devices, registering the variables: total distance (TD), player load 2D (PL2D), TD at >80% of the Vmax (TD80), TD in deceleration at < -2 m·sec⁻² (TDD < -2) and >2 (TDA >2), Edwards (ED), time spent at between 50 and 80% (50–80% HRmax), 80–90% (80–90% HRmax), and >90% of the HRmax (>90% HRmax), and RPE both respiratory/thoracic (RPE_{res}) and leg/muscular (RPE_{mus}). All the variables were analyzed taking into account both the absolute values accumulated over the week and the normalized values in relation to individual mean competition values. Neuromuscular fatigue was measured objectively using the countermovement jump test and subjectively via the Total Quality Recovery (TQR) scale questionnaire. Analytical correlation techniques were later applied within the general linear model. There is a correlation between the fatigue experienced by the player, assessed objectively and subjectively, and the load accumulated over the week, this being assessed in absolute and relative terms. Specifically, the load relative to competition correlated with the physical variables TD (-0.279), PL2D (-0.272), TDD < -2 (-0.294), TDA >2 (-0.309), and sRPE_{mus} (-0.287). The variables related to heart rate produced a higher correlation with TQR. There is a correlation between objectively and subjectively assessed fatigue and the accumulated TL of a player over the week, with a higher sensitivity being shown when compared to the values related to the demands of competition. Monitoring load and assessing fatigue, we are closer to knowing what the prescription of an adequate dose of training should be in order for a player to be as fresh as possible and in top condition for a match. Normalizing training demands with respect to competition could be an appropriate strategy for individualizing player TL.

PRACTICAL APPLICATIONS

With the information obtained from the monitoring of TD and assessment of fatigue (objective and subjective), we are closer to knowing what the prescription of an adequate dose of training should be in order for a player to be as fresh as possible and in top condition for a match.

CONCLUSION

The main conclusion of this study is that in those microcycles where the players accumulated a greater TD or high values in the load indicators normalized to those demanded in competition, the players showed a higher level of neuromuscular fatigue, measured with CMJ. However, the players were able to recover practically the same CMJ values (measured with the FATrel) as at the beginning of the week prior to competition. This research provides a better understanding of the load-fatigue relationship with respect to competition demands. Information about external objective load (distance, speed, and acceleration/deceleration), internal objective load (HR) and internal subjective load (RPE) on the one hand, and the objective (CMJ) and subjective (TQR) indicators for fatigue assessment on the other, can help trainers to better understand and adequately manage training status and player freshness throughout the training process. Finally, it would be necessary to know whether the load borne by the players in the weekly training process maintains or improves their fitness, and thus discover whether management of the load-fatigue binomial produces an improvement in the players' physical performance.

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