

# **CARICO DI ALLENAMENTO E INDICATORI DI FATICA ASSOCIATI A LESIONI E MALATTIE: UN'ANALISI SISTEMATICA DI STUDI LONGITUDINALI**

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## **INTRODUZIONE**

Allenatori, sport scientist e personale medico sono alla ricerca costante di una metodologia per programmare un carico di allenamento sufficiente a produrre un adattamento al carico stesso, riducendo così al minimo l'affaticamento, l'inibizione della prestazione e il rischio di subire lesioni o malattie.

## **OBIETTIVI**

L'obiettivo di questa analisi è stato quello di valutare il rapporto tra lesioni e malattie e tra il carico di allenamento e l'indice di fatica nella popolazione sportiva.

## **METODI**

Sono stati analizzati tutti gli articoli scientifici pubblicati fino ad agosto 2015 che hanno studiato i rapporti tra carico di allenamento/indice di fatica e lesioni/malattie negli atleti.

## **RISULTATI:**

Dei 5943 articoli individuati inizialmente, sono stati selezionati 68 studi, 45 dei quali riguardavano solamente il rapporto carichi di allenamento-lesioni muscolari, 17 il rapporto tra allenamento e malattia e i restanti 6 studi riguardavano invece entrambe le categorie (lesioni e malattie).

Questa analisi ha evidenziato una serie di risultati fondamentali, tra cui la non univocità terminologica utilizzata in letteratura per indicare il carico di allenamento, la stanchezza, le lesioni e le malattie.

Gli atleti hanno un rischio maggiore di subire lesioni o malattie nelle fasi chiave della stagione e della competizione. Sono compresi in particolar modo i periodi di intensificazione del carico di allenamento e i periodi di accumulo del carico di allenamento (overtraining).

## **CONCLUSIONI**

È necessaria, quindi, un'ulteriore indagine sulle caratteristiche individuali dell'atleta a causa del loro impatto sul carico di allenamento interno che li rende perciò soggetti a lesioni e/o malattie.

## **PUNTI CHIAVE**

È molto importante monitorare in maniera adeguata gli atleti durante tutte le fasi dell'allenamento oltre che nelle competizioni; in particolar modo, durante i periodi di intensificazione e di variazione del carico e durante il periodo di accumulo del carico di allenamento. Non monitorarli porterebbe ad un rischio significativo di subire lesioni.

L'immunosoppressione si verifica a seguito di un rapido aumento del carico di allenamento: riduce in maniera molto elevata l'attività del sistema immunitario e abbassa molti valori fisiologici come, ad esempio, quelli dei globuli bianchi e degli anticorpi. Gli atleti che non ritornano ai livelli standard, in un periodo di latenza compreso tra i 7 e i 21 giorni, sono esposti ad un rischio maggiore di contrarre malattie.

Le caratteristiche individuali degli atleti come la struttura fisica, il livello di gioco, la storia di un infortunio e l'età hanno un impatto significativo sui carichi di allenamento interni. Si raccomanda quindi la gestione globale dell'atleta in modo da ridurre il rischio di incorrere in problematiche mediche.

# TRAINING LOAD AND FATIGUE MARKER ASSOCIATIONS WITH INJURY AND ILLNESS: A SYSTEMATIC REVIEW OF LONGITUDINAL STUDIES

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## Abstract

**Background** Coaches, sport scientists, clinicians and medical personnel face a constant challenge to prescribe sufficient training load to produce training adaptation while minimizing fatigue, performance inhibition and risk of injury/illness.

**Objective** The aim of this review was to investigate the relationship between injury and illness and longitudinal training load and fatigue markers in sporting populations.

**Methods** Systematic searches of the Web of Science and PubMed online databases to August 2015 were conducted for articles reporting relationships between training load/fatigue measures and injury/illness in athlete populations.

**Results** From the initial 5943 articles identified, 2863 duplicates were removed, followed by a further 2833 articles from title and abstract selection. Manual searching of the reference lists of the remaining 247 articles, together with use of the Google Scholar 'cited by' tool, yielded 205 extra articles deemed worthy of assessment. Sixty-eight studies were subsequently selected for inclusion in this study, of which 45 investigated injury only, 17 investigated illness only, and 6 investigated both injury and illness. This systematic review highlighted a number of key findings, including disparity within the literature regarding the use of various terminologies such as training load, fatigue, injury and illness. Athletes are at an increased risk of injury/illness at key stages in their training and competition, including periods of training load intensification and periods of accumulated training loads.

**Conclusions** Further investigation of individual athlete characteristics is required due to their impact on internal training load and, therefore, susceptibility to injury/illness.

## KEY POINTS

Athletes training load and fatigue should be monitored and modified appropriately during key stages of training and competition, such as periods of intensification of work training load, accumulated training load and changes in acute training load, otherwise there is a significant risk of injury.

Immunosuppression occurs following a rapid increase in training load. Athletes who do not return to baseline levels within the latency period (7–21 days) are at higher risk of illness during this period.

Individual characteristics such as fitness, body composition, playing level, injury history and age have a significant impact on internal training loads placed on the athlete. Longitudinal management is therefore recommended to reduce the risk of injury and illness.

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