

Overtraining and Burnout in Individual Sports

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Introduction

To be successful in sports, individuals must have well-developed biomechanical characteristics and a high level of sport-specific technical and tactical skills (Brewer, 2017). Sports, categorized into team and individual disciplines, require specific anthropometric, demographic, physiological, psychological, and technical characteristics inherent to their nature. Although this need remains generally the same up to a certain level, it increases beyond a certain level for various reasons, such as increasing age and competition level in individual sports, and increasing team performance, rising to a higher level, and increased competition with other athletes on the team in team sports (Bishop and Girard, 2013). Athletes must meet this need according to their sport. To do so, they are required to train on specific days of the week and complete specific technical and tactical training appropriate to their sport. The sports in which athletes generally perform best, fully express themselves individually, and demonstrate their highest level of skill are individual sports such as swimming, wrestling, modern pentathlon, taekwondo, and athletics (Nevill, Atkinson, and Hughes, 2008). Individual sports consist of activities that require intense focus and concentration, involve a great deal of responsibility, and depend on performance for success or failure, with a high level of competition (Başer, 1998). The high level of responsibility causes athletes participating in individual sports to experience more stress than those participating in team sports. Because they must solve most problems arising from their sport alone during competitions or the competition period, they may feel lonely. If they fail to learn how to cope with stress, the problems they encounter can significantly impact their daily lives, leading to various physiological and psychological impairments (Neil et al., 2011). Instead of overcoming this feeling of loneliness and the resulting impairments, continuing to train or compete in sports can lead to overtraining, characterized by the inability to continue training due to physiological reasons, and burnout syndrome, which is related to motivation and psychological factors (Pacewicz, Smith, and Frank, 2025). Although these two important concepts are used similarly, they address different points and appear as two separate syndromes.

Over Training

Overtraining can be defined as a decline in biophysiological performance in athletes who,

after training at or above their maximum performance level for an extended period, subject their bodies to high-intensity training for an excessively prolonged period (Weinberg and Gould, 2010). The literature suggests that the concepts of overtraining and excessive exertion should be evaluated separately, as it is correct to consider these two concepts independently (Kreher and Schwartz, 2012). The concept of overtraining is defined as a temporary decline in performance that occurs during the recovery process necessary for performance improvement, following an increase in training intensity required to elevate the athlete's performance level to higher levels (Lehmann et al., 1999). This short-term decline in performance capacity is regained through a brief recovery period, leading to higher performance outputs, and is known in the literature as physiological adaptation or supercompensation (Carfagno and Hendrix, 2014). Overtraining, on the other hand, is defined as the chronic physiological and psychological decline in performance resulting from continued high-intensity and high-volume training without properly addressing the fatigue caused by an imbalance between training and rest (Bompa and Buzzichelli, 2019). Within this framework, previous research shows that respiratory muscle fatigue, neuromuscular decline, and reductions in inspiratory strength may occur during periods of excessive loading—findings supported by studies examining inspiratory muscle training and acute inspiratory warm-up effects (Vural et al., 2024; Bilgiç, Özdal & Vural, 2022). Although there are many definitions of the concept of overtraining, it is generally used synonymously with the concepts of fatigue, exhaustion, or burnout. However, there are important points that distinguish these concepts from one another (Kreider, Fry, and O'Toole, 1998). When defining overtraining, it has been observed that many scientists have subjected it to different classifications. According to Kuipers, the concept of overtraining can be divided into two aspects: mechanical and psychological. Mechanical overtraining is defined as injuries or damage to the locomotor system and damage to skeletal muscles due to excessive loads, while psychological overtraining is thought to result from the athlete being exposed to factors that cause intense stress (sociodemographic factors, family, economic problems, etc.) and the heavy training undertaken to improve the athlete's level during this process (Kuipers and Keizer., 1988). At the same time, Kuipers stated that overtraining is often developed by the coach, who ignores the fatigue it causes in the athlete without paying attention to the training and rest ratio, leading to exhaustion, and that this exhaustion can become chronic, ultimately causing overtraining (Kuipers and Keizer, 1988). In 2013, Meeusen and colleagues stated that the concept of overtraining can be divided into two categories: functional and non-functional overtraining (Meeusen et al., 2013). Functional overtraining is defined as the process of adapting to training, where high-intensity training is followed by adequate rest, leading to an optimal increase in performance. Non-functional overtraining, on the other hand, is defined as injuries that cause serious physiological and psychological symptoms when adequate rest is not provided after high-intensity training (Halsen, 2017). The distinction between non-functional overtraining and functional overtraining is difficult, but it is

generally thought that the symptoms caused by non-functional overtraining syndrome are more severe (Jurgen, 1994). As another classification, scientists have divided the concept of overtraining into sympathetic and parasympathetic overtraining, stating that overtraining originates from the autonomic nervous system (Vrijkotte et al., 2019). This classification is the most comprehensive classification in the literature. Sympathetic overtraining occurs when athletes are subjected to stimuli of high intensity beyond their normal capacity, resulting in excessive fatigue in athletes during training periods where rest is not adequately provided, or when symptoms such as rapid heartbeat, sweating, irritability, restlessness, and nervousness are observed after high-intensity training, similar to Base Dow disease (Jurgen, 1994). Symptoms of sympathetic overtraining originating from the autonomic nervous system include:

- Emotional changes (quick temper, crying easily)
- Excessive emotional stress
- Weight loss
- Sleepiness
- Smelly sweat and sweaty hands
- Decreased Appetite
- Loss of Libido
- Increased Basal Metabolism
- Restlessness
- Lack of Coordination in Movements
- Increased Blood Pressure and Body Temperature
- Inability to Recover Quickly After Exercise
- Increased Resting Heart Rate
- Increased risk of infection as a result of disorders in the cardiovascular, cardiorespiratory, neurological, and endocrine systems (Günay and Cicioğlu, 1998).

As mentioned above, sympathetic overtraining, which exhibits common symptoms, is often observed in young athletes who transition to professional status at an early age, accompanied by a decline in performance. It is not difficult to treat and is a syndrome that can be easily corrected with appropriate programming and expert medical advice (Günay and Cicioğlu, 1998). Parasympathetic overtraining occurs as a result of chronic fatigue in the body, which can develop after periods of high-intensity training, and its treatment is known to be quite challenging (Jurgen, 1994). Parasympathetic overtraining can lead to low blood pressure, increased anemia, and various digestive system disorders in athletes. The symptoms of parasympathetic overtraining in athletes are as follows:

- Low performance and difficulty in recovery
- Fatigue and persistent pain
- Decreased skill, coordination, and technical level upon returning to training
- Inability to recover despite prolonged rest periods and low blood pressure (Günay

and Cicioğlu, 1998)

Studies suggest that parasympathetic overtraining can occur even without excessive training load, is generally seen in elite athletes, and can be eliminated with long-term treatment (Lehmann, 1999). The emergence of the concept of overtraining can be explained in many etiological, physiological, psychological, and neurological ways, and it is important to evaluate this concept from a pathophysiological perspective. When examining the pathophysiological causes of the concept, we encounter numerous theories. These are:

- Cytokine Theory
- Autonomic Imbalance Theory
- Glycogen Theory
- Central Fatigue Theory

(Smith, 2000; Carfagno and Hendrix, 2014). To understand whether an athlete is overtrained, it is first necessary to know their sport, the problems they are experiencing, changes in their mood, levels of fatigue and muscle pain, dietary habits, sleep levels, training intensity or the level of increased training intensity at competition level, and whether they are using any specific medications (Hawley et al., 2003). With this information, along with the athlete's biochemical markers (blood parameters, CK, lactate level, hormonal markers) and various tests (emotional assessment questionnaires, stress and recovery questionnaires, anxiety and motivation questionnaires, etc.), it is possible to determine whether they are overtrained (Dinçer and Ertuna, 2020). Various methods are used to help overtrained athletes return to specific training periods. First, it is possible to reduce the overtraining process and prepare the athlete for a new training period by having the athlete enter the necessary rest period and using various rehabilitation exercises, rapid recovery exercises, a regular nutrition process, glutamine supplementation, and drug treatment to prevent further performance loss during this period (Brukner, 2012; Hiscock and Mackinnon., 1998). For the athlete to successfully navigate this process, the athlete, coach, and family must maintain high levels of communication and progress through it together. In cases where the process does not progress together, the athlete's overtraining can become chronic, leading to burnout syndrome and potentially causing serious discomfort, which may even lead the athlete to quit the sport.

Burnout

The concept of burnout was first addressed in a sporting context in 1984 in a study conducted by Caccese and Mayerberg on coaches. It is believed that the media played a significant role in spreading the concept worldwide by focusing on the decline in performance and dramatic drop in performance levels experienced by world-renowned athletes, despite their numerous achievements following intense training, and by publishing various news stories on this topic (Caccese and Mayerberg, 1984). According to the concept of burnout, which was attempted to be explained in 1984, this concept

should be examined in three dimensions:

- Emotional Exhaustion
- Depersonalization
- Decline in Athletic Performance

It has been discovered that burnout is formed when an athlete is affected by events they have directly experienced (Caccese and Mayerberg, 1984). In a study on burnout among swimmers, an individual sport, it was explained that athletes defined this concept as a loss of sense of achievement, loss of feelings for the sport, reluctance to participate, anger, and withdrawal from the sport both physically and psychologically (Raedeke, Lunney, & Venables, 2002). Following this explanation, scientists concluded that the first dimension of burnout, emotional exhaustion, is related to intense training and competition reaching unmanageable levels. The second dimension, cynicism, is related to the athlete's attitude of not caring about their work, viewing the sport as worthless, and increased indifference towards the sport, resulting in an increase in anger. Finally, the dimension of reduced performance is thought to be related to the athlete's inability to achieve personal goals despite their ambition, skill, and talent, along with a decreased sense of achievement following a lack of success despite intensive training in the sport (Goodger et al., 2007). At the same time, Schaufeli and Buunk contributed to the literature in 2003 by summarizing burnout with the following five symptoms:

- Emotional Symptoms (Depressive mood, sudden mood swings, irritability, nervousness, etc.)
- Cognitive Symptoms (Feelings of helplessness, impaired attention and coordination, memory loss, etc.)
- Behavioral Symptoms (Absenteeism from training, poor performance during training, etc.)
- Physical Symptoms (Illness before or after training, persistent fatigue, weakness, etc.)
- Motivational Symptoms (Loss of sense of achievement, unhappiness during training, feeling of failure, loss of competitive spirit, etc.)

(Schaufeli & Buunk, 2003). Recent studies show that burnout is a concept that emerges when an athlete no longer enjoys the sport they love as much as before or no longer derives pleasure from it, leading to both physiological and psychological discomfort that progresses into a syndrome and ultimately results in quitting the sport (Özdemir and Cömert, 2023). Despite similar studies, at the beginning of the 2000s, burnout was examined in three dimensions, and it was determined that there are three causes for the formation of burnout:

- Emotional Exhaustion (hopelessness, depressive feelings, and loss of motivation)
- Incompetence (It is thought to arise when athletes question themselves due to their performance and success falling short of their expectations in their sport.)
- Depersonalization (Athletes withdrawing into themselves, weakening their social

relationships in their daily lives)

(Raedeke and Smith, 2001). Supporting this, studies conducted during the COVID-19 pandemic showed that athletes experienced significant psychological stress, decreased training motivation, and mental health deterioration (Akgün, Biçer & Vural, 2021; Cagdanlıoğlu, Biçer & Vural, 2021). These findings align with the concept that environmental and psychosocial burdens may accelerate burnout.

It is thought that burnout syndrome in athletes is not only affected by the intensity of training or competition, but also by certain external factors. High levels of stress in the athlete's environment can lead to anxiety and, as a result, burnout. An intense competition schedule or more extensive training periods than necessary can cause fatigue in athletes, and this fatigue can lead to negative emotional states, subsequently causing them to withdraw from social environments and social support. Separately, athletes who have to balance their personal and social lives outside of their athletic identity are thought to be at increased risk of depression, not only due to decreased athletic performance but also due to the negative impact on their social relationships as a result of the social or personal problems they experience (Smith, Pacewicz, & Raedeke, 2019). Increased psychological, cognitive, and physical symptoms can affect an athlete's athletic ability, leading to them quitting sports (Larson, Young, McHugh, & Rogers, 2020). Athletes, especially in individual sports where they experience loneliness and bear all the responsibility during competition, face an intense and exhausting process involving long competition periods, intense and demanding training schedules, family and friend relationships, and coping with personal, physical, cognitive, and psychological problems. During this process, the athlete's coach, manager, family, friends, and other members of their social circle must work together in complete harmony. It is considered that the athlete's coach should maintain a balanced progression of the rest-training ratio required by the sport, utilize various recovery strategies during competition periods, ensure the athlete is satisfied both financially and emotionally in their professional sport, and provide extra motivation during planned important competition periods.

Conclusion

For an athlete to reach a professional level and achieve success on the international stage, it is essential that they continue training. Despite advances in training science, the intense training programs athletes undergo during competition periods cause fatigue. It is known that when adequate rest periods or proper recovery exercises are not provided after fatigue sets in, athletes suffer from certain physiological and psychological injuries. Particularly in individual sports, where athletes train alone, take full responsibility, and achieve success individually, numerous factors affect the athlete, including the responsibilities assigned, social pressure, the need to be self-sufficient financially and emotionally, the ability to cope with psychological pressure, and the necessity to motivate oneself. When athletes cannot withstand both intense training and these external factors,

they may experience overtraining (overtraining syndrome) in physiological terms and are unable to continue training. When rest and training frequency are not completed, overtraining can become chronic, leading to serious injuries and even causing athletes to quit the sport. Along with these physiological and psychological disorders, the athlete experiences a loss of motivation, decreased performance, and a diminished sense of the sport's importance, ultimately leading to burnout syndrome. This can lead to various psychological disorders, and the athlete may regain their health through psychological treatment methods. Consequently, it is necessary to monitor the athlete's physical and psychological exhaustion or overtraining at certain intervals through various tests, carefully examine the dynamics of the athlete's social and cultural environment, and ensure that the rest periods required for the technical and tactical training of the individual sport are controlled by the coach. During the preparation phase for the competition period, it is essential to design the program appropriately in accordance with the athlete's performance level, development level, and demographic characteristics, such as gender and age. Additionally, the coach should monitor the athlete's readiness through various physiological and psychological performance tests at regular intervals. Club managers, coaches, athletes' families, and athletes aiming for success in international competitions in individual sports are advised to implement the practices outlined above.

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