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The Critical Role of Nutrition in Acceleration of the Rehabilitation Process in Athletes

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Extended Abstract

Introduction

Sports injuries are among the most significant challenges that athletes, sports teams, and associated organizations encounter, resulting in substantial physical, psychological, and financial repercussions. Sports-related injuries have profound implications for athletes, encompassing their physical and mental health, a fact that must be acknowledged in light of the incidence of such incidents. High treatment costs, extended recovery periods, reduced athletic performance, and a risk of re-injury are among the most prevalent outcomes. The aforementioned expenditures comprise a wide range of medical interventions, including treatment, surgery, and the lengthy periods of rehabilitation that follow. In addition, organizations and sports federations bear significant financial burdens due to these injuries. A meticulously planned and precise nutritional plan implemented during the rehabilitation phase can substantially reduce costs by promoting speedy recovery and mitigating the likelihood of re-injuries. In this context, nutrition is a critical component that can significantly accelerate recovery, improve performance, and reduce rehabilitation expenses rather than solely a supplementary factor.

Method

This article aims to investigate the function of macronutrients, micronutrients, supplements, and nutrient timing strategies in the rehabilitation process of athletes through an analytical approach. Optimal nutrient intake is essential for maintaining muscle mass, reducing inflammation, repairing tissues, and preventing secondary injuries during the initial period of inactivity, the gradual return-to-training phase, and the psychological rehabilitation phase, as indicated by the findings.

Results

The article emphasizes the importance of consuming 1.6 to 2.5 grams of protein (PRO) per kilogram of body weight daily, with a particular emphasis on the amino acid leucine, which can stimulate the synthesis of muscle protein. Protein is essential for tissue repair and preventing muscle degeneration during rehabilitation. A daily protein intake of 1.2 to 2 g/kg of body weight is strongly advised, with leucine being particularly crucial. It is beneficial to distribute PRO equitably throughout meals, particularly with a serving before bedtime, as it encourages muscle recovery and minimizes muscle breakdown. It is recommended to incorporate a combination of fast-digesting proteins, such as whey, alongside slow-digesting proteins, such as casein, consumed throughout the day. This approach can help optimize PRO utilization and support overall health.

The body's primary energy source is carbohydrates (CHO), which should be consumed daily at 3 to 5 g/kg of body weight. This should account for 50–55% of the total caloric intake, comprise complex carbohydrates. Complex CHO from whole cereals, fruits, and vegetables are consumed to maintain energy balance, prevent muscle catabolism, and support immune function. Low CHO intake may be associated with slowed tissue regeneration and reduced PRO synthesis. Due to their status as the primary energy source, carbohydrates play a crucial role in facilitating the process of recovery.





It is crucial to emphasize that lipids should constitute approximately 20 to 25% of one's daily caloric intake. The article emphasizes the significance of unsaturated fatty acids, particularly omega-3s, when it comes to lipids, recommending a range of 0.8 to 2 g/kg of body weight per day. Empirical evidence supports the notion that integrating nourishing components into one's dietary plan, such as fish, avocado, flaxseeds and olive oil, is advantageous. These fatty acids diminish inflammation and facilitate joint and muscle repair. It has been discovered that these nutrients reduce inflammation and promote tissue repair effectively. Conversely, it is advisable to reduce the consumption of saturated and trans fats, as they can potentially exacerbate inflammation.

Micronutrients are also essential for rehabilitation. Calcium, zinc, iron, magnesium, and vitamins A, C, D, and E enhance immune function, collagen synthesis, bone repair, and tissue regeneration. The article also highlights the advantages of bioactive compounds, including curcumin, resveratrol, and polyphenols, which possess antioxidant and anti-inflammatory properties that facilitate muscle recovery and mitigate oxidative damage.

Another significant aspect that the article emphasizes is the timing of nutrients. Strategically consuming nutrients at critical periods, such as before and after rehab workouts or before sleep, can enhance functional outcomes and influence PRO synthesis. Specifically, the efficacy of rehabilitation can be improved by ingesting PRO every 3 to 4 hours and incorporating supplements such as creatine, HMB, and whey PRO at critical intervals.

Discussion and Conclusion

The author concludes that implementing a nutrition plan that is injury-specific, well-balanced, and customized to the individual's physiological requirements and rehabilitation stages can facilitate a more cost-effective, safer, and expedited return to competition. Achieving this necessitates the cooperation of athletes, nutritionists, instructors, and physicians. Coaches, athletes, and sports administrators can develop and implement effective nutrition programs by collaborating with sports nutrition specialists. This collaborative effort mitigates the financial strain of sports injuries while concurrently expediting the recuperation process. A balanced and concentrated dietary plan, comprising adequate quantities of protein, complex carbohydrates, and nourishing fats, is the foundation for athletes to reestablish their highest performance levels rapidly. The article aims to offer a practical guide for optimizing the rehabilitation process and provide a comprehensive, evidence-based perspective on the role of nutrition. Additionally, this dietary plan contributes to reducing recovery periods and relevant costs.

Keywords: Rehabilitation, Sports Injury, Carbohydrate, Protein, Fat, Micronutrient.

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