

# Key Nutritional Strategies to Optimize Performance in Para Athletes



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## KEYWORDS

- Bone mineral density • Carbohydrate • Protein • Vitamin D • Iron
- Spinal cord injury • Amputee • Dietary intake

## KEY POINTS

- Dietary intakes of Para athletes are often insufficient to meet needs and lead to macronutrient and micronutrient deficiencies.
- Carbohydrate, protein, vitamin D, and iron are 4 key nutrients that have a great impact on athletic performance.
- When working with Para athletes, it is important to understand that there are a variety of factors related to their impairment that can impact their dietary intakes of carbohydrate, protein, vitamin D, and iron to support athletic performance.
- Depending on the nature of an athlete's impairment, a Para athlete may be at greater risk for suboptimal nutrient status, decreased bone mineral density, increased susceptibility to illness and injury, weakened oxygen utilization and transport, and a reduced ability to sustain high-intensity training.
- There is an increased need for sport nutrition education to support Para athletes by improving dietary knowledge and awareness of risk factors that may lead to decreased health and performance.

## INTRODUCTION

Dietary recommendations for optimal sports performance at all competitive levels are well documented in the literature. However, there are limited studies on dietary

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Disclosures: The authors have no financial or commercial conflicts of interest, or sources of income, other than the US Olympic Committee.

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Phys Med Rehabil Clin N Am 29 (2018) 283–298

<https://doi.org/10.1016/j.pmr.2018.01.005>

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intake patterns in Para athletes, and those that are available are mostly focused on athletes with a spinal cord injury. Para athletes of all impairment types are at risk for inadequate dietary intakes to support athletic performance.<sup>1-6</sup> For example, Para athletes competing in wheelchair sports have been reported to consume inadequate total energy and specifically, inadequate carbohydrate, fat, and fiber.<sup>1-5</sup> These inadequate energy intakes often result in micronutrient insufficiencies, namely B vitamins, iron, vitamin D, vitamin C, calcium, and magnesium, all of which have an impact on athletic performance.<sup>1-6</sup> Second to inadequate intakes, the nature of an athlete's impairment may also put the athlete at greater risk for micronutrient deficiencies.

These shortfalls can lead to suboptimal nutrient status, poor bone health, and subsequently higher risk for future fractures, weakened oxygen utilization and transport, and impaired training capability.<sup>7-9</sup> Athletic performance aside, insufficient macronutrient and micronutrient intake weakens the immune system and increases the risk of illness, leading to time off the field of play during training and competition.<sup>6</sup> Limited nutrition education and lack of knowledge regarding how to balance dietary intake to meet recommended daily allowances (RDA) is likely responsible for these nutrient deficiencies in Para athletes.<sup>5</sup> Fewer than 50% of elite wheelchair basketball athletes surveyed on nutrition topics answered basic nutrition questions correctly.<sup>1</sup> Most did not have adequate general or sport-related nutrition education and support.<sup>1,5,6</sup> In fact, only 18% of wheelchair basketball athletes studied identified a dietitian as their source of nutrition knowledge.<sup>1</sup>

Provision of nutrition education and feedback significantly improved Para athletes' dietary intake and food choices. For example, 24% more Para athletes surveyed met the RDA for calcium intake after nutrition education.<sup>5,6</sup> Athletes' interest in further nutrition education increased 36.2% and overall attitudes about nutrition increased by 27.8% following nutrition education.<sup>5</sup> This highlights the need for more sports nutrition interventions and education to support the performance needs of Para athletes, and to minimize nutrient deficiencies that may impact performance, illness, and injury. An individual approach is recommended to identify risk factors associated with nutrient deficiencies unique to each Para athlete and ensure sports nutrition recommendations are individualized to the athlete's specific needs, from level of nutrition education to attitudes toward nutrition information, preferred style of learning, and impairment type.

The aim of this article was to review the current literature on nutrition recommendations for athletes, specifically nutrients that impact performance, training adaptations, and overall health, and to propose potential reasons why Para athletes may not always meet these recommendations. This article focuses on the following impairment types: spinal cord injury (SCI), amputees, cerebral palsy (CP), acquired brain injury (ABI), visual impairment (VI), and intellectual impairments. An overview of factors affecting nutrition status and performance for Para athletes is outlined and 4 key nutrients are explored: carbohydrate, protein, iron, and vitamin D.

## NUTRITION CONSIDERATIONS IN PARA ATHLETES

When working with Para athletes, it is important to understand impairment-related factors that impact athletes' dietary intakes or needs. **Table 1** outlines such factors and the associated impairment types.

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