

Acute and Chronic Musculoskeletal Injury in Para Sport: A Critical Review



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KEYWORDS

- Injury epidemiology • Musculoskeletal injury • Paralympic sport • Para athlete
- Review

KEY POINTS

- Seated Para athletes sustain upper extremity injuries more commonly, whereas ambulant Para athletes frequently sustain lower extremity injuries.
- The upper extremity is the most commonly injured area in all Para athletes, unlike able-bodied athletes for whom lower extremity injuries predominate.
- Minor soft tissue injuries are the most common injuries among Para athletes, similar to injury patterns observed among able-bodied athletes.
- Football 5-a-side, powerlifting, Goalball, Wheelchair fencing, and Wheelchair rugby are the highest risk summer sports; ice hockey, alpine skiing, and snowboarding are the highest-risk winter Paralympic sports.
- Compared with elite Para athletes, recreational and youth Para athletes remain understudied in the literature.

The authors have nothing to disclose.

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Phys Med Rehabil Clin N Am 29 (2018) 205–243

<https://doi.org/10.1016/j.pmr.2018.01.014>

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INTRODUCTION

Congenital and acquired disabilities increase the baseline risk of lifestyle-related disease¹: obesity and its attendant medical comorbidities are nearly 4 times higher among those with disabilities compared with the general population.^{2,3} Physical activity and sport are thus important preventive health strategies for persons with impairment.⁴ The term 'Para athlete' is the International Paralympic Committee's (IPC) general term for sportspersons with impairment, and signifies athletes who compete at all levels. Similarly, the term 'Para sport' encompasses both recreational and elite levels of competition. In contrast, the terms 'Paralympian' and 'Paralympic sport' connote the highest level of international competition, the Paralympic Games. Thus, Paralympians are a subset of Para athletes who have competed at the Paralympic Games. Over the past decade, sport for Para athletes has increased in popularity and visibility.^{5,6} Like their able-bodied counterparts, Para athletes may enjoy the well-documented health benefits of increased physical activity.^{1,7-13} Sport has a particularly positive impact on mental health indices for athletes with impairment, including life purpose, self-acceptance, and autonomy; it also decreases health care costs.^{14,15}

All sports carry an inherent risk of injury and this is no different for Para sport.^{16,17} Musculoskeletal injury epidemiology among Para athletes is similar to able-bodied sports injury patterns; for example, strains, sprains, contusions, and lacerations are most common.¹⁸⁻²² However, the biomechanics of Para athlete injury are Para sport specific and relate to impairment, level of competition, mechanism, anatomic area, and equipment-specific factors.²³⁻²⁸

The aim of this critical review is to summarize current literature on the epidemiology of musculoskeletal injuries in Para athletes, and to discuss apparent research gaps.²⁹⁻³¹

METHODS

Five electronic databases were searched between May 31 and June 21, 2017, for relevant articles: Ovid Medline (1946 to June Week 2, 2017), Ovid Medline In Process & Other Non-Indexed Citations, Ovid Embase (1974-2017 June 15), Cumulative Index to Nursing and Allied Health (CINAHL), and Web of Science. Controlled vocabulary and free text terms were used. The Yale MeSH Analyzer (<http://mesh.med.yale.edu>) was used in the initial stages of strategy formulation to harvest controlled vocabulary and keyword terms from highly relevant, known articles. The search strategy for Ovid MEDLINE is documented in [Appendix 1](#).

Inclusion criteria were (a) written in the English language, (b) published in a peer-reviewed journal or book between January 1975 and June 2017, (c) inclusive of athletes with impairment participating in recreational or elite Para sports, and (d) describe sports-related injury/injuries to the musculoskeletal system including acute traumatic and/or chronic overuse injury to the appendicular and/or axial skeleton. Exclusion criteria were (a) not written in English, (b) not inclusive of athletes with impairment, (c) focused on injury/pathology unrelated to sports, and (d) review(s).

Before the removal of duplicate articles, the search yielded a total of 993 citations. This was reduced to 871 after the removal of duplicate records using the duplicate detection function of EndNote X7. Citations with abstracts were ingested into Covidence, a screening and data extraction tool. Two screeners selected 174 records for full-text review, and 47 citations were selected based on predefined inclusion/exclusion criteria ([Fig. 1](#)).

A number of analyses used retrospective data within a cross-sectional study design. For example, a cohort of athletes competing at a single tournament may have been asked to report demographic data, describe their impairment(s), and recall past

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