

# **Athletic Performance Analysis Based on Disabilities and Rehabilitation**

**Malihe Miri Beydokhti**

Department of Physical Education and Sport Sciences, Mashhad Branch, Islamic Azad University, Mashhad, Iran

**Iman Bagheri**

Department of Biomedical Engineering, Imam Reza International University, Mashhad

## **Abstract**

This systematic review aimed at the following: firstly, to decide whether adaptive sports could be helpful for people with acquired central nervous system lesions; secondly, depending on the domains of the ICF to evaluate the impact of the mentioned approach; and thirdly, to present recommendations for further studies. For comparative trials, research studies were explored and this has formed the basis for a qualitative synthesis after a review of the sampled articles to identify information on demographics, outcome measures, findings, and conclusions. Taken together Adaptive sports seem to be a functional, effective, and inexpensive addition or perhaps an alternative to conventional therapy. Overall, effects appeared significant in all ICF areas except for environmental factors. Ways in which the impact can be measured encompass type, volume, intensity of the intervention, and so on. This will be the first review on adapted sports training, which will utilize prospective evidence to demonstrate the benefits of adapted sports training for persons with neurological disorders.

**Keywords:** Individual Athletes, Adaptive Sports, Neurorehabilitation, Disability, Rehabilitation

## Introduction

Patients who have central neurological injury engage in a number of sedentary behaviors, the majority of which are inactive [1][2]. Furthermore, less than twenty percent of these patients engage in moderately vigorous physical activity on a weekly basis, which is the amount that the World Health Organization recommends. Individuals who are elderly tend to become less active when their mobility decreases, and there is evidence to suggest that this is the case [3]-[6].

It has been demonstrated that participation in physical activity on a consistent basis can reduce morbidity and mortality in the case of motor disability, in addition to affecting disease modification [7][8].

As the International Classification of Functioning, Disability, and Health (ICF) defines it, health is the promotion of physical environmental elements that improve the quality of life, social responsibilities in the community, and everyday chores in order to reduce disability. For example, physical health [9]-[12].

Nevertheless, the practice of physical activity over a prolonged period of time drops dramatically, and this is the reason why it should be addressed programs that entail physical exercise involve some type of energy expenditure in terms of body activity, and the majority of patients lower their activity involvement once they have completed therapy [13]-[15]. From one perspective, sports culture places a strong emphasis on performance, regulations, competition, and teamwork, which ultimately results in increased levels of enjoyment and compliance [16][17].

Due to the fact that adaptive sports involve task-specific, repetitive, and intensive training, they have the potential to favorably contribute to the motor recovery of an individual as well as the general motor function of people who have suffered from a neurological disease [18][19].

In light of the anticipated increase in the number of people who have central neurological disabilities, effective and practical treatment approaches for these individuals must be discovered so that they can be prescribed in rehabilitation settings [20][21].

This systematic review will adhere to the ICF model in order to conduct a coherent analysis of the literature in order to spread guiding principles for future research. It will also synthesize the various characteristics and outcomes that have been obtained via the utilization of adaptive sports as a form of rehabilitation [22][23].

## Methods and Materials

The methodology used in the present systematic review conforms to the guidelines provided by PRISMA in 2009, and the objective of the systematic review was to establish the neurological disorders that are most costly. Such disorders include Multiple Sclerosis (MS), stroke, and Spinal Cord Injury (SCI).

To conduct the research, the PICO framework was adopted to guide the process as described below: There were three groups within the population, one of which consisted of persons who had obtained central neurological injuries.

Two types of Boolean operators were used by the researchers to connect terms that were related to the populations of interest and the intervention. These keywords were then incorporated into other databases such as Pub Med, Scopus, Cochrane, Pedro, and Sporting Disc.

The selection criteria therefore included longitudinal and prospective design, written report in English or French, participants with a stroke, spinal cord injury, or multiple sclerosis, feasible sporting activities, and primary outcome comprising of physical/psychological factors. Specifically, the research excluded publications of the review or case study type that incorporated cognitive/mental/sensory impairments, and technology and focused on profound direct physiological effects.

After the exclusion of the duplicates, two researchers assessed each study by their title and abstract to determine the study's relevance for inclusion. The articles selected and concluded as relevant for exclusion were included in the full-text lecture, while the articles that met all the requirements set in the article were included in the qualitative synthesis. Disputes and differences were settled by mutual consent to ensure that each partner got what was due to him.

## Evidence Quality and Results

As for the research objectives, this study aimed to assess the effectiveness of adaptive sports on MCI patients with stroke or SCI. Overall, there were participants included in the study with a mean age of 45 years, and 70% of them were male. Based on the findings of this research, the most commonly investigated domain was that of 'bodily functions and structures,' followed by 'activity and participation' and 'personal factors. ' Furthermore, it was identified that 90 percent of the studies only reported about post-intervention changes, while the remaining 10 percent reported about follow-up measures. Most of the efforts were conducted in the initial phases of the project. This study design defined the ranks in terms of literature evidence, the RCT's works received the highest rank. Overall, the study's methodological quality was moderate; the most serious omission seemed to be the lack of options for assessing true effect size. Average literature analysis also

indicated that 87% of the studies focused on post-intervention changes and the majority of explored inquiries were conducted during the early stage.

It has also been evidenced that people with MS or stroke perform at better cognitive and mental abilities, cardiovascular health, physical fitness, body fat, muscle strength, and motor coordination than are in engaging adaptive sports. It has been evident from the discussion that not only is it safe but also beneficial to experience these perks. The study demonstrated that fifteen patients with multiple sclerosis participated in a group kickboxing program that forms either 4 or 8 weeks and without any danger with eighty percent compliance out of the patients. Similarly, forty-five men and women with SCI engaging in eight weeks of hand-cycling or nine stroke patients undergoing four weeks of dance also showed excellent levels of compliance and As for safety.

In this case, it has been revealed that playing adapted sports has an impact on the cardiovascular, muscular, neurological, and movement systems. In a study, six MS patients observed an enhancement in their global cognition through ballet dancing, while it was noted that fourteen stroke patients witnessed an enhancement in their visual-spatial memory through golf and social communication. In a sample of 20 MS patients, hatha yoga improved selective attention while no such effects were found for sports climbing. Furthermore, evidence has shown that engagement in adaptive sports is beneficial in improving the health of the cardiovascular system, and physical fitness and has been reported to alleviate chronic fatigue by one-third. Thus, while there was no control group, it can be inferred that among tetraplegic participants having trained in wheelchair rugby for at least 4 months, their physical fitness was not improved. Specifically, level III trials conducted with a group of elite wheelchair basketball players showed that during the season, the physical performance was no different from the factory median. However, after having dancers involved in treatment for a month, MS patients have recorded an improvement in their balance of movement.

## Discussion and Future Works

This systematic review with a focus on analysis of prospective data reveals the impact of adapted sports on individuals with acquired neurological disability. This is so because some adaptive sports programs may embrace youths who are even in the early stages, thus the possibility of continuity and a higher instructor-to-partaker ratio which may in turn reduce the expensive medical costs of rehabilitation in adapted sports. Adaptive sports improve physical facilities and effects, from shielding individual indulgers from the adverse effects of a lack of active movement.

In general, athletes with SCI require less medical attention more common with men participants who are involved in sports are seen fewer times by doctors as compared to those who are non-

involved Sports athletes with SCI see doctors far fewer times compared to those who are not involved in sporting activities.

Nonetheless, they must consider certain factors: and should be evaluated by using an approach that will bring out sensitivity analysis. Recommendation: Most often, manual evaluations and field testing should not be implemented. Two major factors are the frequency and extent of training involved The major causative factors include: Longer training sessions – those that are more than 100 hours in duration are thus postulated to produce better changes in lung function and aerobic fitness than their shorter counterparts.

Moderate and intense forms of training and exercising are advised. As has been noted earlier, adaptive rugby is, to some extent, less intense than many other wheelchair sports and entails less energy expenditure as compared to handbike training, which implies that it may not be as useful in enhancing endurance as the training in this sport. Heightened participation brings in the added incentives to practice a sport.

Training dedication increases, and research participants achieve higher levels of physical fitness and enhanced dealings with wellness. Overall, the physical effect that sport-specific training has on the body, is strongly determined by the kind of sport that is being participated in. Gains in upper limb muscles through the cycles via cycling have been proven to be positive with activities of daily living in both tetraplegics and paraplegics. Golfing, dancing, boxing, and horse riding individuals revealed better balance systems if they have multiple sclerosis or stroke.

The study demonstrated that contextual modifiers influencing adaptive sports programs affect their ability to increase physical performance and motor control. Besides any of the physical changes, other related aspects such as mood, motivation towards the physical exercises, and self-image too c HttpContext kenneth Murphy Prof. Brown English 102 16 October 2012 adaptive sports and individual changes change.

It has been shown in trials though, that 5 weeks of group kickboxing training had no great impact on the quality of life of MS participants. It is also possible that people with minor disabilities selected for this study and without clinically significant depressive symptoms at baseline may represent an inherently high-functioning group and thus the reduction in depressive symptoms to a minimal level may reflect a ceiling effect.

In this section, the results of the exhaustive literature search on adaptive sports are presented, including 87 articles classified into four categories: quantitative, qualitative, discussion, and systematic review, 135 articles have been examined. Limitations were that the sample size and application of the results were limited by the evaluator blinding and biases due to the use of questionnaires and self-assessment evaluations, and there were multiple inclusion criteria. Certain

disadvantages were also found in the use of volunteer-based procedures that were often used to recruit participants. These studies were further confounded by variations in the sample populations, intervention techniques used, or the collected data outcomes.

It was difficult to compare results within a study because the Intention group received a frequency of treatment that was higher than the frequent groups that were treated with conventional speech therapy. In trying to attribute the changes to the sport alone, it is difficult considering the intervention group has undergone a drastic transformation.

It is found that there is a gap in the knowledge of the impact of adaptive sports programs on persons with ACSL in the early state and therefore more research should be done in the future. The effectiveness of exercise programming for patients appears to strongly relate to how it is implemented in a clinical setting and hence the role of future research to determine optimized strategies for using exercise intensity and volume in individualized models of care is highlighted. Future studies must probe further into the mental aspects of adaptive athletics, ensure proper allocation of study subjects, and mask the evaluators, likewise provide equal therapeutic interventions for both experimental and placebo groups. As this, it will be feasible to incorporate adaptive sports in established and efficient healthcare contexts using evidence-based practice.

## Conclusion

Based on such findings, it is possible to conclude that adapted programs of sports and rehabilitation are sufficient, safe, cost-effective complementary to any stage of the recovery process. In return, the participants are happy and will not revolt against this technique and the negative impacts or results are rare. Patients who have locomotor disabilities as the outcome of neurological conditions stand to gain a lot by engaging in adapted sports and this has been evidenced in every ICF program for Individuals with Disabilities in Sports. However, it is worth noting that these impacts depend on the volume and intensity of the sport, its character whether it occurs within a team, and whether the event involves competition. Adaptive sport stands the prospect of being clinically beneficial in that it may be practical to utilize it in combination with traditional physical therapy.

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