

ABSTRACT

Purpose: With the increasing number of new spinal cord injuries (SCI) in our society, the importance of physical activity levels and predictors need to be examined to help these patients to prevent secondary complications that could potentially lead to death. Although it is well established that physical activity has the potential to promote health and enhance quality of life in persons without disabilities, large proportions of the population are physically inactive to the point that it negatively impacts their overall health status. By examining the oxygen consumption (VO_2), and energy expenditure in power soccer athletes with SCIs this could provide information regarding the type and level of physical activity necessary for positive health benefits in individuals with SCI that is currently limited. **Methods:** VO_2 , RER, RPE and METs were assessed on an athlete with SCI using objective measurements via a portable gas analyzer during free play, drills, and scrimmage. **Results.** The average VO_2 over the three various activities was 4.83 mL/kg/min, and the average rating of perceived exertion (RPE) was 12.5, indicating *somewhat hard* effort. This case study participant had a constant RER value of 0.92. **Conclusion:** Though there is not a large increase in muscle movement during the scrimmage this athlete with SCI increased his VO_2 and therefore will have some cardiovascular improvements.

LITERARY REVIEW

- ❖ Approximately 12,500 new SCI cases each year, and the prevalence is estimated to be about 276,000 within the United States.¹ The most common cause of death in SCI individuals is pulmonary illnesses, generally pneumonia.
- ❖ Physical activity has the potential to promote health and enhance quality of life in non-disabled individuals, large proportions of the population are physically inactive to the point that it negatively impacts their overall health status. This is true to a greater extent for people with SCI.² Based on the level and severity of the SCI, various physiological pathways can be affected. The most commonly affected pathway for SCI is the autonomic nervous system (ANS).
- ❖ VO_{2peak} , strength and respiratory function continued to improve after initial discharge. These improvements may be based on the different levels of physical activity.
- ❖ In a study by Leich et al.³, they examined tetraplegic, paraplegic and non SCI athletes and found that there were no differences between subgroups with respect to $\%VO_{2peak}$ or rating of perceived exertion.
- ❖ Physical activity is a complex issue for individuals with SCI and more research is required to better understand the predictors of physical activity participation and the decrease in secondary complications for this population.

OBJECTIVE

- ❖ To examine the oxygen consumption (VO_2), and energy expenditure in power soccer athletes with SCI.

METHODS

SUBJECT CHARACTERISTICS

- ❖ A 62 year old power soccer athlete with an T5 level SCI, was tested at the Paralympic Training Facility in Birmingham, AL.
- ❖ His BMI was 26 and he has been actively involved in sport for the past 40 years, of which the last 3 years specifically in power soccer.

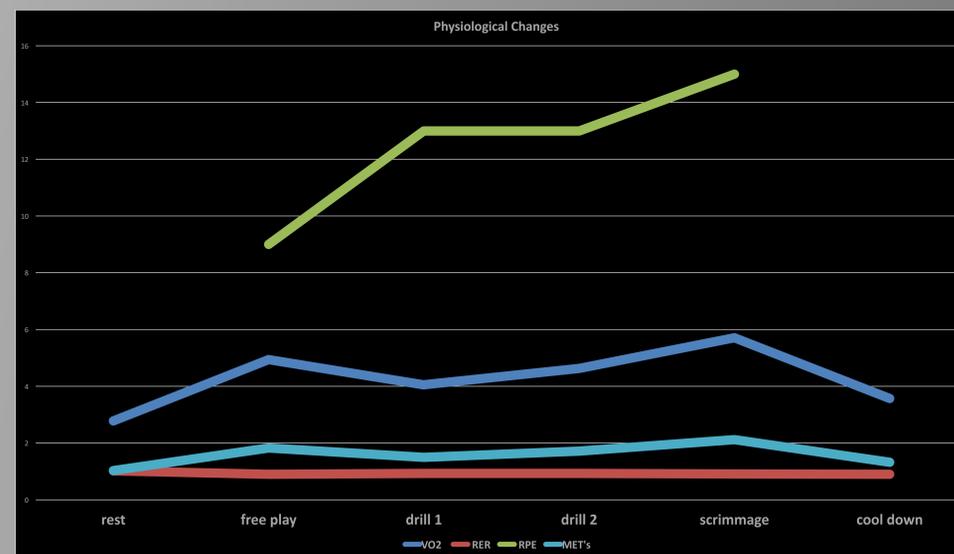
MEASUREMENTS

- ❖ CosMed K4b2 Portable Metabolic System®
 - A portable system to measure the gas exchange on a breath-by-breath basis.
- ❖ Borg Rating of Perceived Excretion (RPE)
 - Scale from 6 – 20 to rate the degree of perceived exertion you feel. Include the total amount of exertion and physical fatigue.



RESULTS

- ❖ Based on CosMed K4b2 ® results, showed a significant increase in oxygen consumption during both free play and during scrimmage.
- ❖ RPE increased throughout the entire practice session, highest rating occurring during the highest VO_2 .



DISCUSSION

- ❖ Some SCI athletes have an increase VO_2 , and energy expenditure with increasing levels of exercise intensities.
- ❖ RPE is a good resource to guide exercise prescriptions for patients with SCI when heart rates can not be used due to ANS.
- ❖ Though there is not a large increase in muscle movement during the scrimmage this SCI athlete increased their oxygen consumption and therefore will have some cardiovascular improvements.
- ❖ The more physical activity participation can potentially decrease in secondary complications (heart disease, cancer, and strokes) for this population.



Birmingham's Power Soccer Team

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REFERENCES

1. National Spinal Cord Injury Statistical Center, Facts and Figures at a Glance. Birmingham, AL: University of Alabama at Birmingham, 2015
2. Dearwater SR, LaPorte RE, Cauley JA, Brenes G. Assessment of physical activity in inactive populations. Med Sci Sports Exerc. 1985;17:651–655.
3. Leicht, C. A., Bishop, N. C. and Goosey-Tolfrey, V. L. (2012), Submaximal exercise responses in tetraplegic, paraplegic and non-spinal cord injured elite wheelchair athletes. Scandinavian Journal of Medicine & Science in Sports, 22: 729–736. doi: 10.1111/j.1600-0838.2011.01328.x