

Research and Professional Development Proposal
Balance Assessment of Para-equestrian Athletes
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Description of Project

Aims & Objectives

The primary objective for this R&PD grant is to determine if there is a relationship between the grading categories of the para-equestrian Profile System and rider balance while astride a horse. In other words, this project will test the balance of a disabled equestrian when riding a horse. This will be done through the use of a wireless sensor and computer program that will collect and provide data on changes in range of motion and velocity. The information analyzed will be compared to the current system that is being used to categorize disabled athletes in competitions, such as the Paralympics. This project will require purchase of specific sensors and computer software which will analyze the information collected.

Background

Para-equestrian sport has grown exponentially, along with the worldwide growth of disabled sports. The Profile System, created over 20 years ago, is the classification system currently being used to categorize athletes and allow them to compete through a fair system (Meaden, 1991). This system was developed to ensure athletes with similar disabilities or impairments will compete against one another. With the large influx of new athletes, there has been some recent challenges and controversy regarding the current Profile System. One concern is that the system does not account for balance, a skill that is highly important when riding a horse. The Profile System tests the strength, range of motion or the coordination of the athlete in a static position. Balance is tested, but not incorporated into the scoring of the athlete. The current system gives a score for the head/neck, upper trunk/pelvis and for each extremity. Athletes are tested in a chair or on a table, not on a horse. This is done to eliminate bias for those riders who are more or less skilled. Unfortunately, testing in this manner does not account for the dynamic movement of the horse. I have observed that athletes with impaired coordination have greater difficulty coordinating tasks when on a dynamically moving horse (as compared to a stationary chair). The Fédération Equestre Internationale (FEI), the international organization responsible for governing the sport, is encouraging more evidence-based research. In addition, the International Paralympic Committee recognizes the need for evidence-based research into the classification systems, assistive technology use and sport development (IPC, 2015). In fact, Tweedy and Vanlandewijck (2011) discuss the IPC Classification Code and its mandate for the development of evidence-based classification systems. The research from this proposal will help determine if changes should be made to the current Profile System.

As one of 26 internationally-ranked classifiers for para-equestrian sport, I have the expertise necessary to conduct research regarding potential changes to the Profile System. As a physical therapist who specializes in neurologic conditions, I understand balance assessment in disabled populations. As an equestrian myself (having competed successfully at the international level), I understand the balance requirements that are needed when riding a horse and understand the

requirements of this sport. Because of my experience as a classifier, a physical therapist and an equestrian, I have the unique ability to assess this area of research from all angles.

This project will also serve as a foundation for the research I may use for my upcoming Ph.D. thesis. Research into balance assessment will also assist me in maintaining my credentials as a Neurologic Certified Specialist. The equipment that would be purchased through this project can be used to continue this research in a variety of directions and can also be incorporated into many future research projects. The equipment would allow for collaborations with other faculty members to study gait and balance in stroke, Parkinson Disease, or pediatric neurological conditions (to name only a few of the countless options). This R&PD grant would provide me with the opportunity to pursue a focused research agenda for many years to come.

Procedures/Methodology

This proposal will involve balance testing as many athletes as possible to establish a range of normative values which can then be used to compare athlete balance to the Profile System. The equipment needed to accomplish this is a small, wireless inertial measurement unit. This unit contains two sensors (additional sensors can be added); one sensor will be fixed to the front of the saddle and the other to the athlete's torso. This has the ability to capture the athlete's anterior/posterior, lateral and rotational change in movement. Any para-equestrian athlete who has been classified will be eligible to participate in this research. For consistency, data will be collected from the athletes riding selected portions of the "team test" which they would normally ride in a competition; the requirements of the test is based on their profile. There are a number of athletes in the mid-Atlantic region and at various competitions throughout the U.S.A.; arrangements will be made to collect data at these sites. As a competitive equestrian, I already travel to many of these competitions and I will be serving as a classifier at other events and sites. Opportunities may arise that I can collect data on athletes outside the U.S.A., if I am asked to classify at an international event in another country.

Estimated Timeline:

- Submit for IRB approval prior to May 21, 2015.
- Verify with Animal Care and Use Committee if approval is needed. In this study, the disabled riders will be astride a horse, however, the horse is not the subject of testing or experimentation.
- Order equipment (estimated summer 2015).
- Collect data beginning in summer of 2015. This will continue until an adequate number of subjects is reached (approximately 50-100 riders, based on a small population size of U.S. athletes).
- Analyze data using SPSS (estimated spring/summer 2016).
- Prepare for poster presentations and/or publication (estimated summer/fall 2016).

Importance or Value

This study will contribute to important evidence-based research in disabled sports which has been verbally requested by the FEI and is also supported by the IPC. It will help to establish if

the current Profile System adequately incorporates balance into its evaluation and categorization of para athletes for competition. This research has the potential to influence decisions about whether a revision of the current system is needed to ensure fair sport for all athletes involved in para-equestrian sport worldwide.

Further Research

This study serves as a foundation for many future studies. Balance data can be collected on able-bodied equestrians and compared to the data from this study, which assesses para-equestrian riders. Another potential study can investigate the influence of specialized or compensatory equipment on balance for para-equestrians. An intervention study examining the impact of a balance training program for para-equestrians could also be conducted. Finally, a study could investigate variations in balance based on a specific medical diagnosis or disability. The equipment purchased for this study can also be used in any research that investigates balance or mobility (such as elderly populations or other sports activities). Prior to submitting for this R&PD, I did investigate obtaining financial support from the School of Health Sciences. At this time, there is not available start-up funding for this project, which is crucial to my research agenda. However, there is the potential for additional funding to support continuation of an established project. Being awarded this R&PD grant is critical to allow me to begin a productive research agenda here at Stockton University.

Outcome

The data collected from the proposed study will be analyzed and prepared for presentation and publication. This research will be disseminated through a poster presentation and submitted to an appropriate journal for consideration of publication. The information will also be presented as a report to the FEI, IPC and the para-equestrian community to be utilized in the assessment of the current Profile System. Potential journals for submission are the *Journal of Sport for Development*, *Sport Management Review* or the *Clinical Journal of Sport Medicine*. A poster presentation would be submitted to Combined Sections Meeting (through the American Physical Therapy Association), Stockton University's Day of Scholarship, and various disabled sports conferences.

References

- International Paralympic Committee. (2015). *Science*. Retrieved from <http://www.paralympic.org/the-ipc/science>
- Meaden, C.A. (1991). Assessing People with a Disability for Sport: The Profile System. *Physiotherapy*, 77(6), 360-366).
- Tweedy, S.M. & Vanlandewijck, Y.C. (2011). International Paralympic Committee position stand – background and scientific principles of classification in Paralympic sport. *Br J Sports Med*, 45(4): 259-269. doi: 10.1136/bjism.2009.065060.