

Nelson Alexandre Campos Vinagre, **Studies on the performance structure and relevant parameters determining individual performance in the Paralympic Sport Alpine Skiing – Case Study -**
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ABSTRACT

This study directed at athletes from the German Paralympic Alpine Ski Team (*DPS*), encompasses an overall evaluation focused on two main assessments, together with some complementary tests. Most of the athletes involved are wheelchair bound and therefore race in the sitting classes (monoski), although two stand-skiers were also evaluated. Cardiopulmonary exercise testing took place using either a wheelchair (WC) on a treadmill or stationary bicycle, as appropriate, to check the parameters related to the physical conditioning of the athletes. The second form of assessment carried out as a part of the evaluation process was a wind tunnel (WT) investigation of air loads on the athletes. The overall study aim is intended to bring forth new information regarding the performance structure of this particular sport. The individual results presented during tests performed in the physiology laboratory and wind tunnel cannot be generalized, but must be seen in the context of an individual analysis by means of a discussion for each athlete. The spiroergometry evaluation carried out to check the fitness of these athletes produced consistent and coherent results while the aerodynamics evaluation, that was intended to take account of the amount of drag produced by the athletes, generated innovative results.

In both cases the athletes could perform without been exposed to risk. The results obtained lead us to believe that there may be a direct relationship between the athlete posture, the use of the ski

suit/equipment and the aerodynamic performance. The drag force generated by the body area, which is the drag area and volume as a function of air resistance on the Paralympic Alpine Ski athlete, may represent a significant difference to the outcome. The athletes must concentrate more on their posture and maintain a high performance of this when skiing; they should perform specific training aimed at strengthening the trunk, arms and neck in the case of sit-skiers, and the hip and leg muscles in the case of the stand-skiers.