**Body type helps to determine success in alpine skiing events**

**VUB scientists study discipline-specific body characteristics of top alpine skiers in relation to international rankings**

**Body characteristics can determine in which category of alpine skiing an athlete will excel. Top alpine skiers with a higher body weight achieve better results in events where speed secures gold. For more technical events, greater weight does not give an extra advantage. Based on this knowledge, athletes and their coaches can adjust training and nutrition schedules to achieve optimal performance.**

Dirk Aerenhouts of the VUB research group Movement and Nutrition for Health and Performance (MOVE): “Regardless of the discipline, elite alpine skiers are clearly very muscular. In the speed events, some extra body mass can contribute to a greater momentum and higher speeds to a certain extent. In the more technical disciplines with lower speeds but with fast changes of direction, we don’t see this advantage.”

Alpine skiing consists of five categories or disciplines. Within these disciplines, some have a highly technical aspect while others are more speed-related. The technical disciplines, such as the short slalom, have a high dynamic load and moderate speed, while the speed disciplines, such as the downhill, typically have a moderate dynamic load and high speed. The differences in biomechanical and technical characteristics between ski competitions make various physiological demands and require a certain type of body profile. The physique of alpine skiers is therefore essential for optimising performance.

**Variations in body type influence performance**

MOVE studied the anthropometry of 58 elite alpine skiers. The researchers divided the participants according to gender and into two events depending on their individual scores in the international rankings: one discipline focused on speed and one on technique.

The results show a relationship between body characteristics and performance in each category. There are also some significant differences between men and women. Athletes with higher bodyweight and BMI scored better on the speed events. Athletes with a lighter physique achieved better results in the technical events. The extent to which an athlete can be successful in a given event can therefore be defined on the basis of body characteristics. It is useful to know the parameters within which athletes’ body values must lie in order to achieve optimal performance.

**Gender-specific differences**

In addition to bodyweight and BMI, female athletes with a higher relative fat percentage had an advantage in speed events. Older women were generally more successful in speed events, while younger women performed better in the more technical category. There was no significant difference in male participants based on age or relative fat percentage.

Athletes who need to travel at greater speed are better served by a heavier body. Both muscle and fat mass play a role here. Women more often have a higher fat mass than male athletes. Body weight is preferably increased by gaining muscle mass rather than fat mass, and it is important to monitor the fat percentage so that it remains within specific limits and does not increase the risk of injury.

**About the researchers**

Benjamin Vermeulen, Ron Clijsen, Jan Taeymans, Eva D’Hondt and Dirk Aerenhouts belong to the research group [**Movement and Nutrition for Health and Performance (MOVE)**](https://move.research.vub.be/en/about-us). The group is attached to the Movement and Sports Sciences Department of the Faculty of Physical Education and Movement Sciences and Rehabilitation Sciences and Physiotherapy of the Vrije Universiteit Brussel. MOVE combines the enthusiasm and expertise of young and more experienced scientists and focuses on three themes: health, performance and motor skills and didactics.

For this research, they worked with Raphaël Fässler of University College Physiotherapy Thim van der Laan, and with Bern University of Applied Sciences-Health through the appointments of Ron Clijsen and Jan Taeymans at both universities.