

INTRODUCTION

The carving turn is the basic move of the modern alpine skiing technique. In the carved turn steering takes place along the ski edges without any lateral skid component [1], which had lead changes in turning trajectory and speed [2]. In the competition skiers succeed requires good technical and tactical skills. The purpose of this study was determinate the differences between fast and slow carved turns among high level alpine skiers.

METHODS

Measurements were done in the males World Cup slalom competition in Levi, Finland 2006. The skiers' two turns at the steep part of the course (figure 1) were video recorded from the side and front with two stationary camcorders (50 Hz). The area was calibrated with the calibration sticks. According to the side view recordings group of 10 fastest (GF) and slowest (GS) skiers were chosen for 3D movement analysis using the APAS movement analyse software. Independent samples t-test was used to verify the differences between the groups.



Figure 1. Measured two turns.

RESULTS

Main findings are shown in table 1.

Table 1. Results (* = $p < .05$, ** = $p < .01$, *** = $p < .001$).

	GF	GS
Time between the gates (s)	0.97 ± .02	1.10 ± .03***
Velocity at the upper gate (m/s)	12.08 ± .39	11.48 ± .65*
Path of the centre of gravity between the gates (m)	11.86 ± .11	12.22 ± .32*
Start of the steering phase to the lower gate (m)	2.38 ± .64	1.15 ± .60*
Outside leg knee angle at the lower gate (°)	126 ± 7	134 ± 7*
Velocity at the lower gate (m/s)	12.50 ± .45	11.76 ± .47**

DISCUSSION

Because the faster skiers had higher velocity at the upper gate, they have been more successful already at the previous gate than the slower ones. Although the skis bypass the gate poles, the skiers' centre of gravity cut across the poles (figure 2). Especially among the GF skiers, whose mean length of the path of the centre of gravity was almost identical with the distance between the two gates.

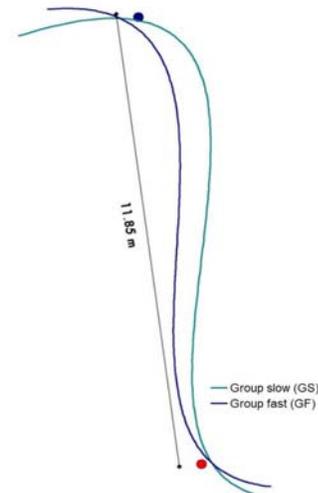


Figure 2. Paths of the centre of gravity between the gates.

High velocity allows more inclination towards the centre of turning radius without excess knee angle extension of the outside leg (figure 3 and 4). At the steep course it is difficult to reach lost velocity during two gates interval.



Figure 3. All GF skiers at the lower gate.



Figure 4. All GS skiers at the lower gate.

REFERENCES

- [1] Müller, E., Schwameder, H. (2003). Journal of Sports Science, 21, 679-692.
- [2] Vodikova, S., Zubek, T. (2004) Young Research Seminar, Innsbruck. Abstract book 88-89.