Introduction

Tour de Ski (TDS) represents the most intense period of competition of the XC skiing season. Not only are competitors required to push their bodies to the physical limit, they are also exposed to the additional stressors of travel, cold temperatures, altitude, and the psychological pressure of competition.

Previous studies suggest that intense periods of training and competition may lead to an increased susceptibility to infections, in particular colds and influenza. Furthermore, a large proportion of XC skiers choose to take part in TDS in the same year that they also participate in the Olympic Games or World Championships. However, it is not known whether taking part in TDS could have a deleterious effect on subsequent race performance.

This study therefore aimed to determine:

1) Do athletes experience increased illness as a result of taking part in TDS?
2) Does taking part in TDS adversely affect subsequent training and race performance?
3) Do any of these effects differ between males and females?

Methods

Self-reported training and illness data from 45 male and female elite XC skiers were included. In total, 125 years' of data was collected, typically consisting of 2-3 seasons per athlete from 2006-2014. Of these, 42 included participation in TDS. Seasons without TDS participation were used as a control group. From the data, illness incidence and training development was calculated, and race performance was determined from results from major international competitions (World Cup, World Championships, Olympic Games).

Results

Taking part in TDS resulted in a significant increase in training load (TRIMP) compared to 6 weeks before TDS for both men and women (p<0.01, Figure 1). The female athletes had significantly higher average training loads than the male athletes both 6 weeks before and 6 weeks after TDS, but there was no sex-difference in TRIMP during the competition period itself. However, total TDS competition time was significantly higher for men than women (246 ± 40 vs. 170 ± 21 min, p<0.001), as was total race distance (101 ± 6 vs. 59 ± 4 km, p<0.001).

In 20 / 42 (48%) seasons which included participation in TDS, athletes reported becoming ill during or immediately after, compared to only 12 / 73 (16 %) of the athletes who did not take part in TDS. A larger proportion of the male athletes, both in the TDS and CON group, became ill compared to female athletes (Figure 2). Taking part in TDS resulted in a significant increase in training load (TRIMP) during the competition period itself. However, no sex-difference in TRIMP was observed.

Conclusion

Taking part in TDS appears to result in a ~3-fold increase in the risk of illness in this period. Male athletes appear more prone to illness and also see a drop in race performance for at least 6 weeks following TDS, possibly due to a concurrent reduction in training load. Male athletes also typically perform worse in World Championships / Olympic Games when taking part in TDS earlier in the season, while female athletes tend to perform somewhat better.