

## Injury rates in relation to training load in elite orienteering athletes

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### Introduction:

To be successful as an elite athlete, frequent and intense training is necessary. Orienteering athletes perform a great part of their training as running sessions. However, a high weekly running mileage is known to stress the athlete's musculoskeletal system substantially (Nielsen, Buist, Sorensen, Lind, & Rasmussen, 2012; van Mechelen, 1992). Consequently, injuries can occur, especially overuse injuries. The aim of this study was to investigate the relation between training characteristics and injury rates in Swiss junior and elite orienteering athletes.

### Methods:

Data were assessed retrospectively from currently and formerly active athletes of the Swiss Orienteering Federation national team. The athletes' medical records were used to classify injuries according to the Orchard Sports Injury Classification System (OSICS version 10.1). Training data were collected from the athletes' individual training diaries. A multiple linear backward regression analysis was performed to detect injury incidence rate risk factors. The results are presented as mean  $\pm$  standard deviation, injuries were allocated to anatomical location, acute or overuse onset.

### Results:

Data of 42 athletes (24 male, 18 female) were available for the observed age range 14 – 30 years. The mean training duration was  $461.0 \pm 114.6$  minutes per week distributed on  $7.5 \pm 2.1$  training sessions. High-intensity interval training was performed in 11.6% of all running sessions. Overall, 288 injuries were assessed, thereof, 63.5% were classified as overuse injuries. The most commonly affected anatomical locations were knee (26.4%), lower leg (22.2%), and ankle (18.8%). The mean injury incidence rate was  $1.2 \pm 0.8$  injuries per 1000 hours of training with a peak of  $2.6 \pm 3.6$  injuries per 1000 hours of training at 19 years of age. Four variables explained 14.7% of variance of injury incidence rate. Previous injury, low volume of endurance running, high volume of regeneration training, and a low proportion of high-intensity interval training were positively related to high injury incidence rates.

### Discussion:

The observed injury incidence rate in orienteering athletes was lower compared to the previously reported 2.5 – 5.8 injuries per 1000 hours of training in elite endurance runners and orienteering athletes (Johansson, 1986; van Mechelen, 1992). However, the most commonly injured locations were the same. Previous injury is a well-known risk factor; a more recent finding is that a higher proportion of high-intensity interval training might decrease the injury risk (Hespanhol Junior, Pena Costa, & Lopes, 2013). Regression analysis further showed that injuries might cause shorter endurance runs and more regeneration training. Swiss orienteering athletes are internationally top ranked and comparatively rarely injured; this supports the assumption of well-planned and well-executed training sessions. However, the percentage of high-intensity interval training within endurance running might be increased to further prevent running-related injuries.

### References:

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