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Risk factors for injury in talented soccer and tennis players

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ENGLISH

SUMMARY

This thesis describes research on risk factors for injury in talented soccer and tennis players. These risk factors are specific, because they take place in a period of maturation into adulthood. Talented athletes experience an adolescent growth spurt and their brain develops substantially, leading to changes in risk-taking behavior and metacognitive skills. This thesis focuses on risk-factors for injury that are the result of this maturation process.

Chapter 1 contains the theoretical framework of this thesis. First, the scope of the injury problem in the target group of talented soccer and tennis players is described. Next, the processes that result from maturation and that could be of influence on injury are mentioned. With regard to the adolescent growth spurt, it is substantiated that tempo as well as timing are possible risk factors for injury. The role of increased risk-taking behavior that results from puberty is described. Last, the possible preventive role of the developing metacognitive skills for the occurrence of injuries is explained.

Chapter 2 focuses on how injuries develop around the adolescent growth spurt. In a group of one hundred and ten talented soccer players, Peak Height Velocity (PHV) was determined using the maturity offset protocol. Twenty-six players could be followed for three years around this growth spurt, and the numbers of traumatic and overuse injuries were determined for each player for each year. Players had significantly more traumatic injuries in the year of PHV, compared to the year before PHV. Also, the number of days missed due to injuries seemed higher in the year of PHV.

The aim of **Chapter 3** is to investigate whether an increased risk of injury occurrence can be determined through frequent anthropometric measurements. One hundred and one soccer players between 11 and 19 years old are followed for one season. Height and body mass are monitored at monthly measurement intervals and fat percentage is assessed every 3 months. 0.6 centimeter growth per month, 0.3 kg/m² increase of body mass index value per month and low fat percentage lead to an increased risk for injury in the next month.

In **Chapter 4** differences in traumatic and overuse injury incidence between talented soccer players who differ in the timing of their adolescent growth spurt are identified. From a set of 110 soccer players, 26 could be followed longitudinally for 3 years around PHV. The group was divided in earlier and later maturing players by median split. Later maturing players had a significantly higher overuse injury incidence both in the year before PHV and the year of PHV.

Chapter 5 focuses on the relationship between risk-taking and overuse injuries in talented tennis players. Adolescents are more inclined to take risks as a result of cognitive development. This may be even more pronounced in the high performance culture of sport. Of 73 talented tennis players, risk-taking is measured at the start of the season with the Iowa Gambling Task. Overuse injuries are monitored for one season using the Oslo Sports Trauma Research Centre Questionnaire on Health Problems (OSTRCQ). In boys, risk-taking contributes significantly to time loss overuse injuries and to overuse severity. Tennis players who are inclined to take risks, are possibly more likely to maintain risky behavioral patterns related to overuse injuries.

The purpose of **Chapter 6** is to identify the relationship between metacognitive skills and overuse injuries in talented tennis players. Metacognitive skills are measured in 73 talented tennis players using the elf-Regulation of Learning Self Report-Scale (SRL-SRS). Overuse injuries are monitored for one season using the OSTRCQ. In girls, moderate or low self-monitoring skills (compared to high self-monitoring) and exposure time are associated with more time loss overuse injuries. Higher reflection scores and exposure time predict overuse severity. Possibly, self-monitoring can help athletes to prevent themselves from time loss overuse injuries.

Chapter 7 contains the discussion, conclusion and practical implications. Maturation-driven processes can result in risk-factors for injuries in the target group of talented athletes. Soccer players have more traumatic injuries around Peak Height Velocity. Later maturing players are especially at risk for overuse injuries. We advise to estimate the moment of PHV with the maturity offset protocol to take injury preventive measures at the right moment. Individual monthly monitoring of length

and weight could help to predict an increased risk for injury in the next month. Risk-taking is related to overuse injuries. The Iowa Gambling Task could be used to provide feedback about which players are more inclined to maintain risky behavioral patterns. An instrument such as the OSTRCQ can be used to give players feedback on the development of overuse complaints, to make them aware of the risks they take. At last, the metacognitive skill of self-monitoring can possibly reduce injury risk in tennis players. We advise to educate talented athletes in using this skill. Future research should focus on the effect of the preventive measures mentioned in this thesis.

