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Risk factors for injury in talented soccer and tennis players

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CHAPTER

5

IS RISK-TAKING IN TALENTED JUNIOR TENNIS PLAYERS RELATED TO OVERUSE INJURIES?

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ABSTRACT

Overuse injuries are a serious problem in junior tennis. Gaining insight in age-specific risk factors can contribute to prevention. The developmental cognitive processes that take place during adolescence make talented players more inclined to take risks. This may be even more pronounced in the high performance culture in which they move. Therefore, the current study focuses on the relationship between risk-taking and overuse injuries in talented tennis players. 73 talented tennis players (45 boys and 28 girls, age 11 to 14 years) were monitored for 32 weeks, using the Oslo Sports Trauma Research Centre Questionnaire on Health Problems. Risk-taking was measured at the start of the season with the Iowa Gambling Task. Linear regression analyses were executed to predict (1) overuse injuries, (2) time loss overuse injuries and (3) overuse severity, by risk-taking, exposure time and injury history. In boys, risk-taking contributed significantly to time loss overuse injuries ($F(1,39)=7.764$, $p=.008$, $R^2=.15$) and to overuse severity ($F(1,39)=5.683$, $p=.022$, with an R^2 of .13). In girls, time loss overuse injuries ($F(1,23)=6.889$, $p=.018$, $R^2=.20$) and overuse severity ($F(1,23)=7.287$, $p=.013$, $R^2=.24$) were predicted by exposure time. Coaches and trainers should be aware that talented male tennis players who are inclined to take risks, are more likely to maintain risky behavioral patterns related to overuse injuries.

Keywords: youth tennis players, risk-taking, chronic injuries, prospective cohort study

INTRODUCTION

Overuse injuries can be defined as injuries that are caused by repetitive micro-trauma without a single, identifiable event [23]. Overuse injuries are a serious problem in youth sport and are still under-reported [2]. Most epidemiological studies record time loss injury, whereas overuse injuries in general lead to functional limitations and pain, but not necessarily to time loss [16,17]. A recent study indicated that during a single season 12% of talented tennis players aged 11 to 14, reported some form of overuse injury and 1 out of 8 players played with pain every week [37].

In tennis, like in other sports, substantial increments in training occur during puberty, a period in which as well as physical and cognitive changes take place [16, 19, 34]. This means that the demands of the sport are superimposed on those of normal growth and maturation. It has been suggested that the adolescent years are vulnerable years for athletes, especially when it comes to overuse injuries in talented athletes [16, 20].

Some of the drastic physical changes that occur during puberty (such as the adolescent growth spurt) have been linked to a temporarily increased risk of both traumatic and overuse injuries [30, 51]. However, the onset of puberty not only leads to drastic physical changes but also to emotional, behavioral and social changes [6]. There is substantial evidence that developmental processes that result from the onset of puberty, lead to temporarily increased risk-taking in adolescents, with potential detrimental effects on health [43, 47].

Risk-taking in adolescents probably serves a function from an evolutionary perspective as it may assist in acquiring the essential skills to survive away from parental caretakers, and to explore adult behavior and privileges [43]. However, it also has the potential to produce a negative outcome. This has been demonstrated for both:

- a) short-term risk-taking behavior, such as reckless driving and violence, that has been linked to an increase in injuries [44, 45, 49], and

- b) risk-taking behavior over longer time intervals, such as gambling, alcohol use, smoking, excessive internet gaming and excessive internet use in adolescents [24, 32, 33].

Crone and van der Molen [13] pointed out that increased risk-taking in adolescents reflects the inability to opt for choices that are advantageous in the long run. Instead, adolescents have an increased tendency of opting for short-term success, even though this may lead to future negative (health) consequences. The increase in risk-taking behavior is found in both boys and girls. The exact behavior that can be seen may differ though, due to the complex interaction between biology and social context [12].

Risk-taking in adolescents primarily takes place in 'affective salient social contexts' (in contexts in which they are being observed with peers) and in emotionally 'charged' or 'hot' situations (situations in which they have high-intensive affective experiences) [12]. The elite tennis context seems to be such a context: from a young age on, athletes spend enormous amounts of time focusing on sport-related topics and social domains to the exclusion of almost everything else [1, 5]. Several authors described the sport culture as 'a culture of risk', in which athletes willingly accept, minimize or ignore risks of pain and injury, and this applies both to boys and girls [14, 36, 40]. This strategy works as long as the athletes perceive that they can still perform at their peak. However, risky behavior like ignoring minor pain and injuries can lead to overuse injuries, even irreversible injuries or diseases, and negatively influence long-term sports performance.

Thus, adolescent athletes may be inclined to take increased health risks from the perspective of the developmental cognitive process that takes place within them (i.e. puberty) but also from the perspective of the 'risk culture' in which they move. Many studies have focused on the relationship between risk-taking and detrimental behavior in adolescent health, but none studied talented adolescent athletes, or focused on the relationship with (overuse) injuries. The aim of the current study was to investigate the relationship between risk-taking and overuse injuries in talented junior tennis players. We hypothesize that higher

risk-taking is related to a higher number of overuse injuries, number of time loss overuse injuries and overuse severity. We expect this to be the case for both boys and girls.

METHOD

Study design and procedure

All players participating in the national high performance program of the Royal Dutch Lawn Tennis Association (KNLTB) took part in the study (n=73, 45 boys and 28 girls, age 11 to 14 years). Parents and players were verbally informed of the purpose and procedures of the study during a pre-season intake and testing day. Written informed consent was obtained from participating players and their parents and the medical ethics committee of the VU University Medical Centre, Amsterdam, the Netherlands approved the study.

The prospective cohort study was performed during the tennis season (September – June 2012-2013). At the start of the season, players completed a questionnaire on demographics, tennis experience and injury history, psychological characteristics and stage of puberty (using self-assessment Tanner stages: breast development in girls, genital development in boys and pubic hair development in boys and girls) [39]. Anthropometry, physical fitness and function, and psychological characteristics (including risk-taking) were also recorded. Stage of puberty and anthropometry were relevant because brain development and behavioral changes, including risk-taking, are related to the onset of puberty and rapid physical changes such as the adolescent growth spurt [6].

During the season players received a weekly email invitation (using online survey software, Questback, Netherlands) in which they were invited to report their training and match exposure over the previous week, as well as any health problems they had experienced over that time. An automatic reminder was sent to non-responders after three days, urging the player to complete that week's registration. If an athlete did not respond for three weeks, or if their answers to the questionnaire

were unclear, they were contacted by telephone by a KNLTB physician. For the exact procedure we refer to Pluim et al. [37] .

Participants characteristics

Table 1 provides the characteristics of the tennis players. 45 boys and 28 girls took part in the study. Their mean age was 12.4 (± 1.1) years. Mean Tanner Stage was 2.1 (± 1.0). Girls were on average further in pubertal development than boys (2.5 ± 1.1 vs. 2.0 ± 0.9). The vast majority of the players (33 boys and 26 girls) had a Tanner stage >1 , indicating pubertal onset. Total tennis exposure was 11.0 (± 1.0) hours/week for boys and 11.6 (± 0.8) hours/week for girls.

Table 1. Participant characteristics.

	Total	Boys	Girls
N	73	45	28
Age, years (SD)	12.4 (± 1.1)	12.3 (± 1.1)	12.5 (± 1.2)
Height, centimeters (SD)	157.0 (± 8.9)	155.4 (± 8.5)	159.5 (± 9.0)
Weight, kilograms (SD)	45.2 (± 9.2)	43.6 (± 7.6)	47.6 (± 11.0)
Total exposure hours/week	11.3 (± 0.7)	11.6 (± 0.8)	11.0 (1.0)
Training exposure hours/week	9.1 (0.6)	9.3 (0.7)	8.7 (0.7)
Match exposure hours/week	2.2 (0.7)	2.2 (0.7)	2.2 (0.9)

Measurement of risk-taking

Risk-taking was measured using a computerized version of the Iowa Gambling Task [4]. The Iowa Gambling Task (IGT) was originally developed to measure risky “real-world” decision making in individuals with ventromedial prefrontal cortex damage but has been used extensively in both clinical and non-clinical populations, including adolescents [13, 50] and (albeit to a lesser degree) in youth athletes [18, 31]. Buelow and Suhr [8] conclude in their review of the IGT that the preponderance of the evidence provides support for using the task to detect risky decision making deficits in clinical populations (albeit with precautions). This is especially the case in situations in which decision-making involves emotional and affective response options (such as the elite sport context). Impaired scores on the IGT are associated with ‘myopia for the future’ (focusing more on direct positive outcomes instead of long-term

positive outcomes). In adolescents, impaired scores on the task predict future unhealthy behaviour such as smoking and drinking [53, 54] and 'unplanned risk behavior' (including risking injury to oneself) [35].

In this task, four decks of cards, labelled A, B, C and D, are presented to the participant. The participant starts with a virtual currency of €2000 and the instruction to win as much money as possible by choosing cards from the different decks. The participant is expected to make 100 card selections throughout the game, without knowing the number of trials in advance. For two decks (the 'disadvantageous' decks A and B) choosing a card is followed by a high reward (€100,-), but the selection of the card is associated with an unpredictable high penalty (bad or disadvantageous decks). For the other two decks (the 'advantageous' decks C and D), the immediate gain is smaller (€50,-), but the unpredictable loss is also smaller (good or advantageous decks). In deck B the 'punishment' is less frequent but of a higher magnitude than in deck A, where the punishment is more frequent but in smaller amounts. The same accounts for deck C and D: in deck D losses are less frequent but of a higher magnitude relative to those in deck C. Thus, decks A and B are equally disadvantageous in the long run, whereas deck C and D are equally advantageous. The test was assessed in a quiet room, in which three participants were taking the test at the same moment. The participants could not see each other during the test. The performance on the IGT was assessed in the standard manner using net scores, measured by subtracting the total number of disadvantageous deck choices from the total number of advantageous deck choices.

Injury registration

The Oslo Sports Trauma Research Centre Questionnaire on Health Problems [10,11] was included in the weekly online logs. The questionnaire has a high internal consistency, with a Cronbach's alpha of .91 and good face validity [11]. The questionnaire was translated into Dutch from the original Norwegian version using a forward-backward translation method. The backwards translated Norwegian questions were discussed within the research group to check for inconsistencies in the translation process [37].

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The questionnaire consists of four key questions. Each question has four or five response options leading to scores between 0 and 25. The questions and response options are provided below:

- (1) Have you had any difficulties participating in full training and competition due to injury, illness or other problems during the previous week? Response options: full participation, without health problems (0), full participation, but with health problems (8), reduced participation due to injury/illness (17), cannot participate due to injury/illness (25)
- (2) To what extent have you reduced your training volume due to injury, illness or other problems during the previous week? Response options: no reduction (0), to a minor extent (6), to a moderate extent (13), to a major extent (19), cannot participate at all (25)
- (3) To what extent have injury, illness or other problems affected your tennis performance during the previous week? Response options: no effect (0), to a minor extent (6), to a moderate extent (13), to a major extent (19), cannot participate at all (25)
- (4) To what extent have you experienced other symptoms in the previous week? Response options: no symptoms/health complaints (0), to a mild extent (8), to a moderate extent (17), to a severe extent (25)

Based on those four questions a severity score is calculated ranging from 0-100 for each player each week. If no problems were reported (severity score 0), the questionnaire is finished. If a problem is reported in any of the four questions, the athlete is asked to specify the problem (illness or injury). In case of an injury, athletes are asked to specify the anatomical location of the injury. In case of illness, they are asked to report major symptoms. The number of complete days which resulted in time loss (total inability to train or compete) are also registered. Participants were instructed to report all problems, regardless of whether or not they had already reported the same problem in the previous week or received treatment for the problem.

Classification and diagnosis of reported problems

The sports physician of the KNLTB checked and classified all reported problems. Players or their physiotherapist were contacted in case of missing or unclear data. Overuse injuries were defined as those injuries that could not be linked to a single, identifiable event [38]. Injuries were classified using the Orchard Sports Injury Classification System V.10 [23]. Recurrent injuries were defined as injuries that occurred at the same site and were of the same type as the index injury and which occurred after a player's return to full participation from the index injury (Fuller et al, 2006). In order to get insight into overuse problems (and their relationship with risk-taking), three outcome scores were calculated for each player:

- 1) Number of Overuse Injuries (total number of overuse injuries in one season)
- 2) Number of Time Loss Overuse Injuries (total number of overuse injuries in one season leading to absence from training and/or competition)
- 3) Overuse severity (average weekly severity score).

Statistical analysis

Medians and ranges were calculated for IGT net scores, number of overuse injuries, number of time loss overuse injuries and overuse severity score - separately for boys and for girls using SPSS 20.0. Multiple linear regressions (method: forward) were calculated to predict overuse injuries, time loss overuse injuries and overuse severity scores based on IGT net scores, exposure time (average hours of tennis exposure per week) and injury history (dichotomous variable showing if players had (1) or had not (0) been injured in the 12 months before the start of the study) [21]. Regression analyses were executed separately for boys and girls.

RESULTS

All 73 participants were monitored for the entire study period of 32 weeks. The average response rate of the online logs was 80%. In total, 187 health problems were reported during the study period, of which 67 were illnesses and 113 were injuries. Of these 113 injuries, 88 (77%) were overuse injuries, occurring in 54 players. Six of the 73 players reported no health problems during the study period. The most commonly affected areas of overuse were the knee, followed by the back/spine and shoulder (see Figure 1). The average duration of the overuse injuries was 2.5 weeks (± 2.8). The average duration of substantial overuse injuries (defined as those leading to moderate or severe reductions in training volume, moderate or severe reductions in tennis performance, or complete inability to play tennis) was 3.4 weeks (± 3.5). The other 23% consisted of acute injuries (25 injuries were reported in 23 players, none were recurrent). The most commonly reported acute injuries were to the ankle (36% of acute injuries), followed by the groin (25% of acute injuries). The average duration of acute injuries was 2.2 weeks.

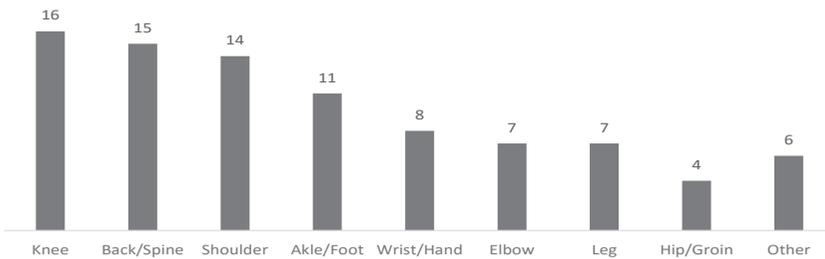


Figure 1. Affected areas and number of injuries in 73 talented tennis players over a period of 32 weeks.

Table 2 presents descriptives for IGT net scores, number of overuse injuries, number of time loss overuse injuries and overuse severity for boys and girls separately. Median IGT net score was 10.0 for boys and 6.0 for girls, indicating higher risk-taking in girls. Median for overuse severity was 2.09 in boys and 6.83 in girls. No significant differences were found between boys and girls on any of the variables.

Is risk-taking in talented junior tennis players related to overuse injuries?

Table 2. Median scores (Inter Quartile Range), minimum and maximum values for IGT net score, overuse injury variables in talented tennis players.

	Boys			Girls		
	Mdn (IQR)	Min	Max	Mdn (IQR)	Min	Max
Iowa Gambling Task Net score*	10.0 (16.5)	-42	62	6.0 (13.0)	-14	28
Number of overuse injuries	1.0 (2.0)	0	4	1.0 (1.0)	0	2
Number of time loss overuse injuries	1.0 (3.0)	0	3	1.0 (1.0)	0	2
Overuse severity	2.1 (5.1)	0	19.2	6.8 (13.4)	0	45

In boys, a significant regression equation was found for number of time loss injuries ($F(1,39)=7.764$, $p=.008$, with an R^2 of .15), in which IGT net score was a significant predictor of number of time loss overuse injuries:

EQ.1: Number of time loss overuse injuries = 0.893 - (0.020 (IGT net score))
(see Table 3)

Table 3. Multiple linear regression modelling for prediction of time loss overuse injuries in boys, by IGT net score.

	B	SE(B)	β	t	p
Constant	0.893	0.131		6.807	.000
IGT Net score	-.020	.007	-.407	-2.786	.008

Also, a significant regression equation was found for overuse severity score in boys ($F(1,39)=5.683$, $p=.022$, with an R^2 of .13), in which IGT net score was a significant predictor:

EQ.2: Overuse severity = 4.435 - (.095 IGT net score) (See Table 4)

Table 4. Multiple linear regression modelling for prediction of overuse severity in boys, by IGT net score.

	B	SE(B)	β	t	p
Constant	4.435	0.713		6.223	0.000
IGT Net score	-0.095	0.040	-0.357	-2.384	0.022

In girls, a significant regression equation was found for number of time loss overuse injuries ($F(1,23)=6.889$, $p=.015$ with an R^2 of .20) in which weekly hours of tennis exposure was a significant predictor:

EQ.3: Number of time loss overuse injuries= -0.944 + (.155 average hours of tennis exposure per week) (See table 5)

Table 5. Multiple linear regression modelling for prediction of time loss overuse injury in girls, by tennis exposure.

	B	SE(B)	β	t	p
Constant	-0.944	0.707		-1.335	0.195
Exposure time per week	0.155	0.059	0.480	2.625	0.015

Also, a significant regression equation was found for overuse severity in girls ($F(1,23)=7.287$ $p=.013$, with an R^2 of .24), in which only weekly hours of tennis was a significant predictor:

EQ.4: Overuse severity= -22.510 + (2,799 average hours of tennis exposure per week) (See Table 6)

Table 6. Multiple linear regression modelling for prediction of overuse severity in girls, by tennis exposure.

	B	SE(B)	β	t	p
Constant	-22.510	12.406		-1.814	0.083
Exposure time per week	2.799	1.037	0.491	2.699	0.013

No significant regression equations were found for number of overuse injuries.

Is risk-taking in talented junior tennis players related to overuse injuries?

Figure 2 and 3 show the relationship between risk-taking (measured as IGT net score) and overuse severity, respectively in boys and in girls. On the horizontal axis, risk-taking is shown as the netscore on the IGT, in which a higher score indicates lower risk-taking. Participants high in risk-taking, are at the left in the figure, whereas the participants lower in risk-taking are at the right. The vertical axis shows the average overuse severity score per week. This was based on the weekly score ranging from 0 to 100, based on the extent to which overuse problems had affected their (1) tennis participation, (2) training volume, or (3) tennis performance during the previous week, as well as (4) the extent to which they had experienced other symptoms.

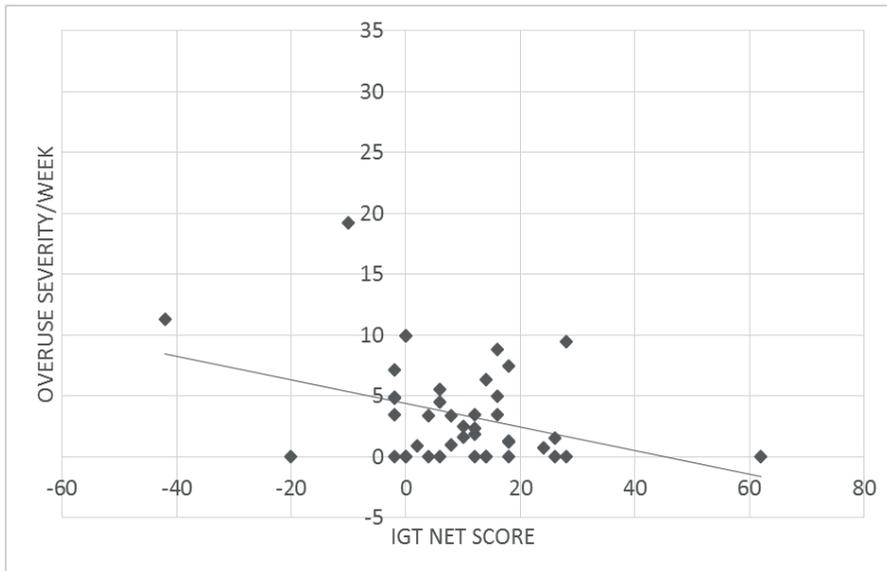


Figure 2. Relationship between risk-taking (measured as IGT net score) and overuse severity score in talented male tennis players.

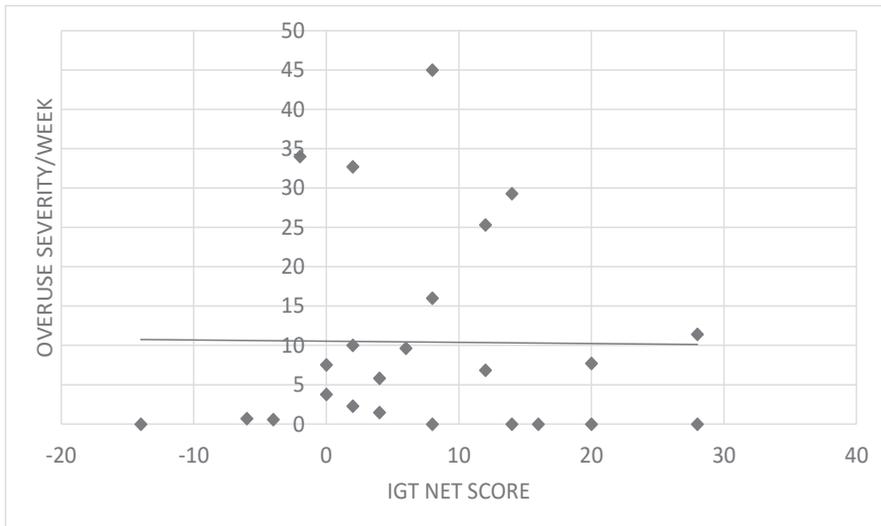


Figure 3. Relationship between risk-taking (measured as IGT net score) and overuse severity in talented female tennis players.

DISCUSSION

The focus of the current study was to investigate if risk-taking was related to overuse injuries in talented adolescent tennis players. A significant regression equation was found for time loss overuse injuries and for overuse severity in boys, in which risk-taking (measured with the Iowa Gambling Task) significantly predicted 15% of time loss overuse injuries and 13% of overuse severity scores.

The regression equation was significant in boys for both time loss overuse injuries and for overuse severity but not for total overuse injuries. Crone and van der Molen [13] pointed out that increased risk-taking in adolescents reflects the inability to opt for choices that are advantageous in the long run. Possibly, the time loss overuse injuries and overuse severity reflect the long-term consequences of risk-taking behavior (e.g. playing with pain or despite functional limitation) better compared to just the overuse injuries. That is, overuse injuries in general (playing with pain or despite functional limitation) seem to be a consistent phenomenon in elite athletes [2, 37]. The decision to

continue playing despite having symptoms (an indication of risk-taking), will influence the severity of the injury and in the end the chance of time loss due to the injury.

Besides being risk-prone from a developmental cognitive perspective, the context of elite sports may also reinforce risk-taking behavior and vulnerability for overuse injuries. Bette et al. [5] described the 'biographical trap' meaning that the enormous investment of personal resources in training and competition forces athletes to abstain from age-typical non-sports activities. As a result, athletes focus themselves almost exclusively on their social role of athlete, which might lead to them being "trapped" in the competitive sports system. This means that regarding their health, athletes are likely to maintain risky behavioral patterns like ignoring pain as long as possible with possible detrimental health consequences. Specifically in tennis, not only players but also parents make extensive investments in emotional, financial and logistical support and have a strong influence on the players' sport participation [3]. Parental pressure, parental criticism and parental expectations have been related to burnout and overuse in talented athletes, among which tennis players [7, 25, 29].

We think that it is the combination of the developmental phase of adolescence and the context of elite sports that contributes to a higher vulnerability for overuse injuries. However, from a methodological perspective, it is not possible to draw this conclusion from the current study. To do so, future research should compare risk-taking and overuse injuries between adolescent and adult athletes. Also, comparing adolescent athletes that play tennis in competitive and non-competitive environments could help clarify this topic.

In girls, risk-taking did not contribute significantly to any of the overuse scores. A possible explanation is that both the risk-taking scores and the overuse scores showed less variation in girls than in boys. Also, girls had lower median scores on the Iowa Gambling Task, indicating higher risk-taking compared to boys. Bos et al [50], in a review on sex differences in the Iowa Gambling Task found that women generally score lower on the Iowa Gambling task due to an increased sensitivity to initial losses on decks that are advantageous in the long run. They need more trials

before they show the same results as men. Therefore, the lower scores in the first part of the test are not the result of increased risk-taking, but instead, the result of a higher focus on win-loss frequencies in the first part of the test. This may reduce the chance on finding a relationship with injuries. Only exposure time significantly predicted number of time loss overuse injuries and overuse severity score. Exposure time has been identified as a risk factor for injuries in recreational youth tennis [28], but in the current study we only found this to be the case for girls. As previously mentioned, several studies indicate that overuse injuries are more common in females than in males [28, 42, 55], but others do not (e.g. Hjelm et al., 2012), and the underlying mechanisms are not well understood yet. Structural and bio-mechanical differences have been mentioned as possible explanations [15, 27], especially in pubertal females during periods of rapid physical growth, which is the case for the majority of girls in the current study [9, 22]. However, more research is needed.

The current study is one of the first that reports overuse injuries irrespective of time loss. This makes it unique, but limits comparison with other studies. A total of 77% of the injuries in the current study were overuse injuries, which is fairly similar to the percentage of 87% found in Straccolini et al. [48], but higher than the 54% found in the study of Hjelm et al. [28]. This is possibly due to the fact that the population in the study of Hjelm consisted of recreational tennis players and the authors used a time loss definition of overuse injuries. In contrast to Hjelm et al. (2010), the girls in the current study tend to score higher than boys on both time loss overuse injuries and on overuse injury severity (but not on overuse injuries). Other studies on overuse injuries in several sports found higher overuse injury rates in girls compared to boys [42, 55] but data on elite young tennis players are lacking. Studies measuring injuries in tennis players [41, 41], found higher injury rates in males than in females, but none of these studies analyzed overuse injuries separately from other injuries.

One of the strengths of this study was the fact that we used a new method to monitor overuse injuries [11]. This surveillance method was designed specifically to monitor injuries that lead to pain or functional limitations, but not necessarily to time loss, as it has been suggested

that traditional methods underestimate the true impact of injuries [2, 26]. We calculated the overuse severity score to accurately capture the extent to which these injuries influence training volume, performance and cause other symptoms like pain. To ensure a high compliance, the physician continuously monitored the injury data and encouraged athletes to fill out the weekly online logs. As a result, the average response rate was over 80%. In case of an injury, the player was seen by a physician to confirm the health problem. This provided us with an opportunity for a valid and more in-depth analyses on overuse problems and its relation with risk-taking.

A potential limitation of this study is the fact that we measured risk-taking at the start of the season and monitored injuries in the 32 weeks afterwards, but not the risk-taking behavior itself. As such the process of risk-taking and the possible effect on injury occurrence, could not be taken into account. Also, the Iowa Gambling Task has been widely used in both clinical and non-clinical populations, including normal developing adolescents and to a lesser degree in athletes [13, 18, 50]. However, more evidence is needed on the ecological validity of the task when it comes to the relationship with real-life risk taking behavior. An important issue that Buelow and Suhr [8] addressed is that the task is a complex behavioural measure assessing a complex construct. Although relationships between impaired IGT scores and unhealthy behaviour have been found in adolescents, and we found a link with overuse injuries in adolescent tennis players, the exact construct the IGT measures is still unclear. More research is required on the exact construct the IGT measures and on the exact behaviours that are related to the IGT scores. The relationship between IGT scores and acute injuries is another topic that should be addressed in future studies.

Perspectives

This study is the first that applies the new surveillance method for overuse injuries [11] to study the relationship with risk-taking in talented tennis players. We were able to take a closer look at the relationship between risk-taking and three types of overuse injury variables. Higher risk-taking is related to a higher number of time loss overuse injuries and to higher

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overuse severity, in male tennis players. They may be more inclined to maintain risky behavioural patterns - like ignoring pain or playing with functional limitations with detrimental health consequences over a longer period. Girls in the present study report higher overuse severity scores than boys. Future research should identify risk factors for overuse injuries in talented female tennis players.

From a prevention perspective, the Iowa Gambling Task and the Oslo Sports Trauma Research Centre Questionnaire on Health Problems could be used to provide feedback about a player's risk profile and about (weekly) overuse severity scores. This could make players, but also coaches and parents more aware of the risks they are taking regarding injuries. Some players were so used to playing with pain, that neither they, nor their parents or their coaches considered they were suffering from an injury. Good communication between players, coaches and medical staff is crucial in order to prevent and manage overuse injuries. With the results of the current study, players who are more inclined to take health related risks (as identified by IGT net scores), can be made aware of that fact and receive advice. Players, coaches and trainers can be provided with regular feedback on pain or physical limitation that players report, in order to help them plan their training and competition load better and prevent and manage overuse injuries. Future studies are recommended to study the effect of providing feedback about risk taking and injury severity as a preventive intervention.

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