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Original

Age of initiation, years of practice, and competition are related to junior ranking of youth elite tennis players

A. Andrade, P. de Orleans Casagrande, G. Guimarães Bevilacqua, F. Souza Pereira, J. Fic Alves, A. L. Goya Santos, D. Reis Coimbra.

Santa Catarina State University. Florianópolis. Brazil.

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ABSTRACT

Objective: Investigate the relationship between the initiation age and practice time, in training and competition, and the ranking position of youth elite tennis players.
Method: Participated 130 youth elite tennis players with a Brazilian ranking (102 boys and 28 girls) aged 13–18 years, selected in two international competitions. A Binary logistic regression was performed.
Results: The results showed that tennis players who started earlier have a 28% better chance of reaching the top 20 ranking, and that each additional year of training increases the chance of a tennis player to reach the top 20 by 1.43 times. Also, each year of experience in competitions increases the chance of tennis players to reach the top 20 ranking by 1.41 times, and that an earlier start each year in participating in competitions increases the chances of an athlete to reach the top 20 by 20%.
Conclusion: The initiation age of training and the experience in competitions are important factors there are related to better ranking positions of youth elite tennis players.
Keywords: Tennis, Sport, Athletes, Youth, Racquet sports.

La edad de iniciación, los años de práctica y la competición están relacionados con la clasificación junior de jóvenes tenistas de elite

RESUMEN

Objetivo: Investigar la relación entre la edad de iniciación y los anos de prática, en el entrenamiento y la competición, y la posición de clasificación de jóvenes tenistas de élite.
Metodo: Participarán 130 jóvenes tenistas de elite con una clasificación en la Confederación Brasileña de Tenis (102 chicos y 28 chicas) de 13 a 18 años selecionados en dos competiciones internacionales. Se realizó una regresión logística binaria.
Resultados: Los resultados mostraran que los jugadores de tenis que empezaron antes tienen una probabilidad un 28% mayor de alcanzar el Top 20 y que cada año adicional de entrenamiento aumenta la probabilidad de que un tenista alcance el Top 20 en 1.43 veces. También cada año de experiencia en competiciones aumenta la probabilidad de que los jugadores alcancen el Top 20 en 1.41 veces, y que un comienzo más temprano al participar en competiciones aumenta las posibilidades de que un atleta alcance el Top 20 en 20%.
Conclusiones: La edad de iniciación de la formación y la experiencia en competiciones son inportante factores que se relacionan a mejores posiciones en la clasificación de jóvenes tenistas de la élite.

Palabras clave: Tenis, Deporte, Atletas, Adolescente, Deportes de raqueta.

∗ Corresponding author.
E-mail-address: alexandro.andrade.phd@gmail.com (A. Andrade).

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Idade de iniciação, anos de prática e competição estão relacionadas com a classificação no ranking de jovens tenistas de elite

RESUMO

Objetivo: Investigar a relação entre a idade de iniciação e os anos de prática, em treino e competição, e a posição no ranking de jovens tenistas de elite.
Método: Participaram 130 jovens tenistas de elite com uma classificação na Confederação Brasileira de Tenis (102 meninos e 28 meninas) de 13 a 18 anos selecionados em duas competições internacionais. Foi realizada uma regressão logística binária.
Resultados: Os resultados mostraram que os tenistas que iniciaram mais cedo possuem uma probabilidade de 28% maior de alcançar o Top 20 e que cada ano adicional de treinamento aumenta a probabilidade de que um tenista alcance o Top 20 em 1.43 vezes. Além disso, cada ano de experiência em competições aumenta a probabilidade dos tenistas alcançarem o Top 20 em 1.41 vezes, e um início mais cedo em participações em competições aumenta a probabilidade de um atleta alcançar o Top 20 em 20%.
Conclusões: A idade de início de treino e a experiência em competições são fatores importantes que estão relacionados com melhores posições no ranking de jovens tenistas de elite.
Palavras-chave: Tênis, Esporte, Atletas, Adolescente, Esportes com raquete.

Introduction

Tennis is one of the most popular sports worldwide.[1] In addition, there has been an increase in the professionalization and commercialization of the sport in recent decades.[2] In this context, many tennis players practice the sport from an early age, with the goal of making a career as a professional athlete. However, to achieve professional success, studies have pointed out that several main factors can determine the success and performance of athletes, including financial support, training facilities, and access to a team of qualified trainers, among others.[2,3]

The training process of an athlete is long, and studies indicate that, across different sports, it takes more than 10 years of dedicated training and competitions for an athlete to achieve international success.[4,5] Tennis is no different, and the process can be even more arduous. Tennis players who reached the top 100 in the Association of Tennis Professionals (ATP) ranking started at an average age of 6 years and took an average of 15 years to reach their position in the professional ranking.[6]

In addition to the time of experience or practice, earlier success in competitions can indicate a later success in the sport. Cortela et al.[7] and Brouwers et al.[8] showed that tennis players who succeed in the International Tennis Federation (ITF) junior circuit tend to reach career milestones earlier. However, in these initial stages, the success of a tennis player is influenced by maturation and experience, practice time, number of competitions, and number of training sessions,[7] and some athletes may suffer from an early specialization process introduced to achieve good performance.

Therefore, the aim of this study was investigate the relationship between the initiation age and practice time, in training and competition, and the ranking position of youth elite tennis players.

Methods

Sample

This is a study with a cross-sectional design. Youth elite tennis players[9] were selected in a nonprobability haphazard sampling,[10] participating in two international competitions. Initially, we surveyed 155 elite athletes. We excluded athletes who did not have a ranking record at the website of the Brazilian Tennis Confederation (CBT).[11] The sample consisted of 130 youth elite tennis players (78.5% boys, 21.5% girls), aged from 13 to 18 years (boys: M = 15.12 ± 1.32; girls: 15.04 ± 1.14).

Experimental design

The present research was approved by the Committee of Ethics and Research in Human Beings of the State University of Santa Catarina (opinion: 988,292) and according to the international ethical standards (Declaration of Helsinki) of research with humans. The participants were selected by convenience and accessibility, in two international competitions held in Brazil, because they are important in the international level, involving the participation of prominent players and adding scores for ranking in the ITF Circuit. All athletes were informed about all research procedures and signed the Terms of Assent form.

A Sports Characterization Questionnaire elaborated *ad hoc,* based on previous sport research.[12,13] The instrument measured: age and sex, age of initiation and years of practice in tennis, and age of beginning in competitions and time of competitive practice. The ranking data was collected at the website of the CBT.[14] The athletes answered the questionnaires individually in a reserved place.

Statistical Analysis

The results were analyzed descriptive and inferential non parametric statistics. The players were categorized into: top 20, athletes who are between 1st and 20th in the ranking; top 50, those ranked between the 21st and 50th positions; top 100, those ranked between the 51st and 100th positions; beyond 100, those who are ranked above than 100.

The Kruskal-Wallis test with Dunn's post hoc comparisons was used to verify the differences between the athlete's rankings and the following variables: age, age of initiation in training, age of initiation in competition, years of practice, and time of competitive practice. The effect size (r) was calculated (r = 0.1, small effect; r = 0.3, medium effect; r = 0.5 large effect) in accordance with criteria established by Cohen.[15]

Binary logistic regression was performed to verify the relationships between the tennis players' ranking and the age of initiation in tennis, age of initiation in competition, years of practice, and time of competitive practice. After the raw analysis, the Wald criterion and the Hosmer-Lemeshow test were used to adjust the model. The significance level adopted for all tests was 5% ($p<0.05$). Data were analyzed with the Statistical Package for Social Sciences – SPSS® version 20.0.

Results

Most of the athletes have a ranking beyond 100 (61.5%) at the time of the study. However, 15.4% of the players are ranked among the top 20 and 23.9% are among the top 50. When comparing the average ages of the players grouped in different ranking positions, no significant differences were found ($p>0.05$) (Table 1).

Table 1. Descriptive analysis of youth elite tennis players with junior ranking.

Ranking	n (%)	Mean age, x (±)	Boys, n (%)	Girls, n (%)
Top 20	20 (15.4)	15.05 (1.05)	12 (11.8)	8 (28.6)
Top 50	11 (8.5)	14.55 (1.03)	10 (9.8)	1 (3.6)
Top 100	19 (14.6)	14.79 (1.08)	14 (13.7)	5 (17.9)
Beyond 100	80 (61.5)	15.29 (1.44)	66 (64.7)	14 (50)

n: Sample size; ± = standard desviation

Figure 1 present Age of Initiation in Tennis. Players who are ranked among the Top 20 started earlier in the sport (Median±SD=6.10±2.27 years) than the top 100 players (Median±SD=8.68±1.45 years, p<0.05, r=0.55, large) and those ranked beyond 100 (M=8.56±2.72 years, p<0.05, r=0.55, large). No difference was observed between top 20 and top 50 (M=8.45±1.75 years, p>0.05, r=0.52, large).

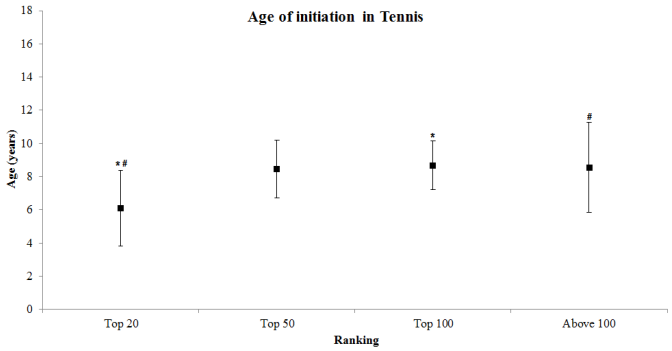

Figure 1. Age of initiation in training (years) of youth tennis players in different ranking positions.* Significant difference (p <0.05) between Top 100 and Top 20 (r = 0.53); # Significant difference (p <0.05) between Beyond 100 and Top 20 (r = 0.36).

Figure 2 show years of practice of youth tennis players in different ranking positions. Top 20 tennis players had a longer practice time (M=8.95±2.60) than the other top 100 tennis players (M=6.11±2.00, p<0.05, r=0.52, large), those ranked beyond 100 (M=6.70±2.75, p<0.05, r=0.46, medium), and top 50 (M=6.09±1.58 years, p<0.05, r=0.52, large).

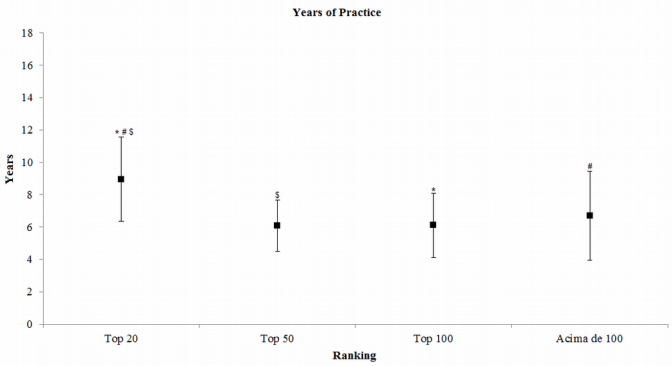

Figure 2. Years of practice (years) of youth tennis players in different ranking positions.* Significant difference (p <0.05) Top 20 and Top 100; # Significant difference (p <0.05) between Top 20 and Over 100

Top 20 players began competing earlier (M=9.55±1.85 years) than those ranked beyond 100 (M=11.43±2.17, p<0.01, r=0.34, medium), and presented more time of competitive practice (M=5.50±1.93 years) than those with a ranking beyond 100 (M=3.84±2.32, p<0.05, r=0.30, medium). No difference was observed between top 20 and Top 50 (r=0.32 and r=0.40 for age in competition and time of competitive practice, respectively), and those in Top 100 (r=0.46 for age in competition and r=0.44 for time of competitive practice).

In the crude analysis of Binary logistic regression, all variables presented significance (p<0.05). The Wald criterion in the adjusted analysis identified that the model that best explains the players' positions in the ranking is the one that contains the age of initiation in tennis training and the starting age in the competition, indicating that there is a significant relationship between the rank position and the history of training and competition.

We found that tennis players who started earlier were 28% more likely to reach the top 20 than players who started later. The Hosmer-Lemeshow adhesion test indicated that the model is adequate and can accurately predict the values (p>0.05) (Table 2).

Table 2. Logistic regression crude and adjusted odds ratio in relation to the age of initiation in tennis, years of practice, age of initiation in competitions, and time of competing.

	Crude (Exp B, 95% CI)	p	Adjusted (Exp B, 95% CI)	p
Age of initiation in tennis	0.67 (0.54–0.83)	**0.001**	0.72 (0.56–0.93)	**0.01**
Years of practice	1.43 (1.16–1.75)	**0.001**	-	
Age of initiation in competitions	0.65 (0.50-0.84)	**0.001**	0.80 (0.60–1.07)	0.14
Time of competing	1.41 (1.12–1.77)	**0.001**	-	

CI: confidence interval.

Discussion

It was observed that the top-ranked athletes started earlier in the sport and that tennis players who started earlier had better chance of reaching the top 20 ranking. For athletes of different sports, some studies have affirmed the importance of starting early in the sport in achieving better rankings and reaching the elite professional level.[4] In our study, the average start age of initiation of tennis players in the top 20 was 6.1 years. Cortela et al.[6], who investigated tennis players who reached the top 100 in the professional ranking, showed that the players also started early in the sport (average age, 5.8 years). However, our study found divergent results from Balbinotti et al.[16] study who did not find a strong correlation between the ranking position and the initiation age of Brazilian tennis players.

Caution is needed to avoid early specialization in athletes who start very early in the sport. It is important that the training is focused on long-term success, with systematic planning and goals that integrate a variety of important factors required in achieving success.[17] In addition, early specialization may engender health risks and have physical and emotional consequences to the athlete, such as injury, impairment in maturation of training, social isolation, and burnout.[18] Furthermore, early specialization cannot be established as a prognosis for future success.[19] Therefore, it is possible to start in various sports and then to specialize in one sport in late adolescence.[20] Some models of athletic development suggest that by age 13 years, the adolescent should decide whether to specialize in his favorite sport or to continue in playing sports recreationally.[21] It is not appropriate for an adolescent to engage in intense training before age 16 years, as it is after this period that athletes develop physically, cognitively, socially, and emotionally and therefore acquire the skills necessary for intense and specialized training.[22] Therefore, despite the models, possibly some of the youth tennis players investigated are not following the recommendations.

It takes an average of 10 years of practice to achieve sporting excellence in the professional level.[4,23] However, our study showed that practice time is also a determining factor for success at the junior level. Our results showed that the top 20 players had a longer practice time in the sport than did the other top 100 and beyond 100 players. In addition, our results indicated that each additional year of practice increases a player's chance to reach the top 20 by 1.43 times, regardless of the competitive category.

In relation to competitive experience, the time of competitive practice and the age of entering into competitions were also aspects related to higher positions in the junior ranking. Our results showed that with each additional year of experience in competitions, the chance of reaching the top 20 increases by 1.41 times, and that each year of earlier initiation into competitions increases a player's chance to reach the top 20 by 20%.[24] Participation in competitions is fundamental to success, as it can aid in the development of the athlete and in retaining the learning accomplished in training, pushing the athlete to higher levels of

performance. In addition, participating in competitions, in terms of both quality and quantity, is essential for long-term success in tennis.[2]

In the short term, however, participation in competitions and greater experience in the sport are factors that are related to better positions in the junior ranking. Tennis is a sport that requires great financial support. Often, the parents of athletes pay large amounts of money for transportation, food, lodging, and registration in competitions, in addition to the costs of specialized training. Achieving a good position in the ranking can be fundamental to continuity in the sport, as well-ranked players may have easier access to obtaining sponsorships and receiving gratuity benefits in some competitions, such as free lodging and/or food.[14]

High-ranking positions can also provide greater exposure in the media and enable greater opportunities to train and compete at higher levels. In countries such as Australia, for example, ranking is used as an entry criterion for the national tennis clubs.[25] For Brazilian junior tennis players, higher positions in the ranking provide some benefits such as direct entry into main events in national and international competitions. The highest ranked athletes have greater opportunities to be invited to competitions representing their states in the Inter Federations Cup or even representing the country in the Junior Davis Cup.

This study has some limitations. First, its cross-sectional design makes inferences of cause and effect impossible. It should also be emphasized that as the focus of this study are junior athletes, extrapolation of the findings to professional athletes is not possible. In addition, we did not evaluate the maturational stage of the youth tennis players. The maturational stage is an aspect that should be considered in future studies, because it may influence in athlete's strength, endurance and sports performance. In contrast, strength of the study is a confirmation of the hypothesis that greater practice time and more experience in competitions are associated with better placement in the ranking of youth elite tennis players.

In conclusion, there is a difference in the training time and competitive practice time among junior tennis players at different positions in the ranking. The initiation age of training and the experience in competitions are important factors there are related to better ranking positions of youth elite tennis players. Thus, we recommend follow-up studies on these junior athletes until they reach adulthood, to verify whether these associations remain in professional tennis.

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