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Importance of the ITF Junior Girls' Circuit in the development of women professional tennis players

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Abstract

In this study, we examined the extent to which ranking in professional women's tennis can be predicted by that in the top 20 International Tennis Federation's Junior Circuit. The names, nationalities, and birth dates of all players who achieved a top-20 girls' year-end ranking from 1995 to 2002 were recorded, with their progress through the professional ranks tracked to March 2008. Ninety-nine percent of top-20 ranked girls achieved a professional women's ranking. Stepwise regression analysis revealed peak junior ranking and the age at which that rank was achieved to be predictors of future professional ranking ($r^2 = 0.133$, $P < 0.05$). The following regression equation showed the achievement of a top-20 junior rank as a reasonable benchmark in the development of professional women players: $\log\text{-transformed predicted professional rank} = -0.552 + (0.032 \times \text{junior rank} + 0.116 \times \text{age at junior rank})$. The predominant court surface on which junior players honed their skills was also implicated in professional ranking success, with clay-court play linked to the development of higher-ranked players ($P \leq 0.01$).

Keywords: *Tennis, player development, competition*

Introduction

In professional women's tennis, the mean age of the current top 100 players is 22 years ($s = 4$) (Women's Tennis Association, 2008). Unlike in some other professional sports, female tennis players can experience notable professional success at early ages (Galenson, 1995). The recent retirement of a seven-time Grand Slam winner and world number one at the age of 25 is an illustration. The development of such early and high standards of sports expertise requires extensive deliberate practice in training (Ericsson, Krampe, & Tesch-Römer, 1993; Williams & Hodges, 2005). Whether this expertise is "expressed or developed" through competition is unclear, yet match-play is generally regarded to be an essential ingredient of successful player development (MacCurdy, 1999).

Recently, the merit of the International Tennis Federation's Junior Circuit as a competitive forum for male junior player preparation and means to progression as professional players has been established (Reid, Crespo, Santilli, Miley, & Dimmock, 2007b). The Circuit comprises more than 300 tournaments worldwide and has a hierarchical structure similar to professional tennis. Nine grades

of tournament lie immediately below the four Grand Slam (Australian Open, French Open, Wimbledon, and US Open) and Grade A (e.g. Copa Gerdau and Trofeo Bonfiglio) competitions (Reid et al., 2007b). This work identified that 91% of top-20 ranked boys on the Circuit achieved a professional men's ranking, while 45% of the sampled 106 players reached the game's top 100 (Reid, Crespo, Santilli, & Miley, 2006). This compared favourably with other pathways in men's tennis, such as the US college system that sees about 18% of its top 10 male players reach a top 100 professional rank (M. Reid, unpublished data). Whether the achievement of a top-20 Circuit ranking in the female game provides a similarly meaningful gauge of later professional success is unclear.

In women's tennis, regulations govern the participation of adolescent females in professional tennis tournaments. Conscious of player welfare and the earlier biological maturation of females than males (Galenson, 1995; Philippaerts et al., 2006), the age-eligibility criterion of the Women's Tennis Association limits the annual number of professional tennis tournaments that can be entered by female players aged 17 years or under (Women's Tennis Association, 2008). The age-eligibility rule of the

International Tennis Federation (2008) adopts a similar approach to player welfare, albeit specific to the junior tour. The Women's Tennis Association initiative might encourage elite female junior players, or more specifically the game's future highest-standard performers, to follow the Junior Circuit pathway, thereby altering the competitive balance of women's tennis (Du Bois & Heyndels, 2007). Therefore, the purpose of this study was to identify the extent to which the Junior Circuit's top 20 female competitors progress to Women's Tennis Association professional rankings.

Methods

The method described in Reid et al. (2007b) for male players was applied in the current investigation. Data were obtained from the International Tennis Federation, which were available in the public domain (www.itftennis.com). For the period 1995–2006, the 240 names, countries, and birth dates of the players to achieve a top-20 year-end ranking in the girls' Junior Circuit were recorded. The subsequent progress of these players in the professional ranks was tracked to March 2008. Preliminary analysis of the ranking data of the top-20 ranked girls, between 1995 and 1999, showed that 4.3 years ($s = 2.1$) separated female players' ranking peaks in the junior and professional lists (M. Reid & M. Crespo, unpublished data). Consequently, our sample was restricted to the top-20 ranked Junior Circuit players from 1995 to 2002.

Thirty players were twice ranked inside the Junior Circuit top 20, while a further five players achieved that ranking status on three occasions during the 8 years to 2002. The data of these players were considered only in the year of their highest year-end junior ranking (i.e. defined as junior ranking), delimiting the actual sample to 124 players. Birth dates were rounded down or up to years and months (e.g. 12/03/1981 would be 1981.17, while 24/08/1984 equated to 1984.67), and ranking landmarks were determined with respect to 31 December of the year in which players achieved their junior ranking.

Descriptive statistics for the countries represented (by their players) in the Junior Circuit girls' top 20, the players' ages at their junior ranking, and their highest professional ranks were recorded. Analysis of subsets of the top 20 (i.e. ranking bands 1–5, 6–10, 11–15, and 16–20) allowed further comparison.

Statistical analyses

The link between junior ranking or the age at which this ranking occurred and a player's future, high-professional rank was examined through a step-wise linear regression procedure. Log-transformation

of the population's high-professional rank removed positive skewness and kurtosis of the raw data. Results of the regression prompted analysis of the relationship between a country's predominant court surface and the professional ranking success of its Junior Circuit top-20 ranked players, facilitating further comparison with boys (Reid et al., 2007b). Three members of the International Tennis Federation's Coaches' and Sport Science and Medical Commissions unanimously agreed the predominant court surface among the countries that produced a top-20 female player on the Junior Circuit between 1995 and 2002. Players from the respective countries were then categorized as 1 (predominantly hard, acrylic or medium/fast court play), 2 (predominantly clay or slow court play), or 3 (comparable amounts of clay and hard court play) in line with the Federation's classification of surface according to pace characteristics (Coe, 1999). A one-way analysis of variance (ANOVA) with *post-hoc* Tukey analysis was used subsequently used to examine differences in the professional ranks achieved by female top-20 Junior Circuit players who developed on the three categories of court surface. All analyses were undertaken with SPSS 15 for Windows.

Results

One hundred and twenty four girls from 40 countries achieved a top-20 junior ranking in the 8 years from 1995 to 2002. As aforementioned, thirty players were ranked inside the top 20 on two occasions, while a further five achieved a top-20 junior ranking three times. Four countries (the USA, Russia, the Czech Republic, and the Slovak Republic) had more than one top-20 junior player per year, while 25 nations had no more than two top-20 ranked juniors in this 8-year period (Table I).

Only 21 of the 40 countries with players ranked from 1995 to 2002 saw their players reach a top-20 junior ranking in the ensuing four years (i.e. 2003–2006) (Table II). In this period, the USA, Russia, and the Czech Republic remained the most represented countries in the top-20 junior ranking lists.

Mean age of the top-20 ranked girls from 1995 to 2002 was 17.0 years ($s = 1.0$) (Table III). All but one of these female juniors attained a Women's Tennis Association ranking (i.e. at least one professional ranking point), with 61.3% of the population later reaching the professional top 100 (Table IV).

Both junior ranking and the age at which this ranking was achieved predicted a player's future (log-transformed) professional ranking (Table V). The model's prediction equation – log-transformed predicted professional rank = $-0.552 + (0.032 \times \text{junior rank} + 0.116 \times \text{age at junior rank})$ – accounted for approximately 13% of professional ranking variance.

Table I. Countries that had three or more female players ranked in the ITF Junior Ranking top 20 from 1995 to 2002.

Country	ITF Junior Ranking				Total top 20
	1-5	6-10	11-15	16-20	
USA	3	4	3	5	15
Russia	8	1	2	-	11
Czech Republic	4	5	1	-	10
Slovak Republic	2	3	2	3	10
France	3	1	2	-	6
Argentina	2	2	1	1	6
Croatia	1	2	1	1	5
Germany	1	1	1	1	4
Hungary	1	2	-	1	4
Spain	-	1	2	1	4
Australia	1	1	-	2	4
Japan	1	-	2	1	4
Serbia	1	1	-	1	3
Canada	-	1	1	1	3
Slovenia	2	1	-	-	3

Table II. Countries that had two or more female players ranked in the ITF Junior Ranking top 20 from 2003 to 2006.

Country	ITF Junior Ranking				Total top 20
	1-5	6-10	11-15	16-20	
Romania	-	5	2	-	7
USA	-	2	2	2	6
Czech Republic	-	4	1	-	5
Russia	2	1	-	2	5
Belarus	2	1	-	-	3
Japan	1	-	1	-	2
Canada	1	-	1	-	2
Ukraine	1	1	-	-	2
Austria	-	1	1	-	2
Netherlands	1	-	1	-	2
Taipei	-	1	1	-	2
New Zealand	-	1	1	-	2

Table III. Means and standard deviations of junior “peak” ages of top-20 ranked junior girls from 1995 to 2002.

ITF Junior Ranking	Age	
	Mean	s
1-5	16.9	1.0
6-10	16.8	1.0
11-15	17.2	1.1
16-20	17.2	1.0
All	17.0	1.0

With other factors explaining the remaining 87% of players’ professional rankings, the multifactorial nature of successful player development is supported. Differences in professional ranking ($F_{2,122} = 3.32, P < 0.05$) between the top-20 ranked

Junior Circuit female players who developed their games on hard (mean 122.3, $s = 91.3$) rather than clay courts (mean 93.1, $s = 104.2$) highlights court surface (1 = hard court, 2 = clay court, 3 = combination of clay and hard) as one factor that influences player development (see Tables VI and VII).

Discussion

In the 8 years from 1995, 15 countries had at least three female players in the International Tennis Federation’s top-20 girls’ rankings. Ten of these 15 countries competed in the 2008 Federation Cup World Group or World Group II, with Australia, Canada, Hungary, Italy, and Serbia participating in zonal qualifying. In combination with similar data for men’s rankings (Reid et al., 2007b), countries like the USA, the Czech Republic, France, and Argentina stand out as nations that foster elite junior talent in both sexes. Of note is the high percentage of female players from Russia – and to a lesser extent, the Czech Republic – who filled the upper echelons of the junior top 20. This is consistent with the previously observed ability of these nations to produce high proportions of elite female players from the total number of professional female players ranked (Reid, Crespo, Atienza, & Dimmock, 2007a).

A similar analysis performed over the 4 years to December 2006 highlighted that only the USA, Russia, the Czech Republic, Japan, and Canada produced similar proportions of top-20 ranked junior players (Table II). Notable absentees from Table II include the Slovak Republic and France, both of which produced only one top-20 junior female throughout this period. Argentine tennis, however, has experienced a more marked slide, with no female Argentinians finishing a year inside the Junior Circuit’s top 20. With no recent sizeable fall in the number of professional Argentinian female players ranked, this could represent a change in the nation’s developmental focus/philosophy (i.e. greater emphasis placed on participation in professional entry-level events). Alternatively, this might simply demonstrate the cyclical nature of player development or a wider problem of declining domestic tennis participation in the adolescent population (Fédération Française de Tennis, 2001).

The continued robust performance of Czech and Russian junior players coupled with the emergence of Romanian and Belarussian females supports the widely chronicled view of Eastern European nations as modern tennis powers (Zlesak, 2006). These nations’ immature calendar of International Tennis Federation junior and professional events (Reid et al., 2007a) has led Alvarino (2006) to attribute the success of many of these players to good role

Table IV. Number and percentage of top-20 junior girls to attain a professional ranking.

ITF Junior Ranking	Total junior players	Players pro ranked (%)	Players reaching WTA top 100 (%)	Players reaching WTA top 50 (%)	WTA top 51–100 (% (mean \pm s))	WTA top 50 (% (mean \pm s))
1–5	37	100	81.1	64.9	6 (60.8 \pm 7.0)	24 (22.8 \pm 15.9)
6–10	35	97.1	62.9	37.1	9 (72.4 \pm 12.8)	13 (20.8 \pm 14.7)
11–15	26	100	57.7	34.6	6 (66.8 \pm 12.6)	9 (26.6 \pm 16.8)
16–20	26	100	33.3	25.9	2 (86.5 \pm 3.5)	7 (26.3 \pm 14.3)

Table V. Results of stepwise regression on highest junior rank (JR) and age at which Junior Ranking was achieved for the log-transformed highest professional ranking.

Independent Variable	Regression coefficient	Beta weight	Multiple correlation	Adjusted R^2 value
High Junior Rank*	0.032	0.307	0.111	0.103
Age at Junior Rank *	0.116	0.191	0.146	0.132
Constant	-0.552			

* $P < 0.05$.

Table VI. Court surface (hard, clay, or combination of clay and hard) upon which players from different nations predominantly play.

Predominantly hard	Type of surface	
	Predominantly clay	Hard-clay combination
United States	Argentina	Sweden
Australia	Spain	France
Korea	Italy	Germany
Japan	Austria	Netherlands
Indonesia	Venezuela	Romania
Zimbabwe	Colombia	Switzerland
South Africa	Slovenia	Belarus
China	Belgium	
Great Britain	Serbia	
Taipei	Croatia	
Canada	Czech Republic	
	Slovak Republic	
	Russia	
	Hungary	
	Ukraine	
	Poland	
	Luxembourg	
	Estonia	
	Greece	
	Kazakhstan	
	Uzbekistan	

models, a strong work ethic, group competition, and an intangible desire to succeed.

The mean age of 17.0 years ($s = 1.0$) at which all top-20 ranked female players achieved their junior ranking suggests that most female juniors embrace and use international age-group-based competition.

Table VII. Differences between the log-transformed highest professional rankings achieved by players from countries characterised by different predominant court surfaces.

Court surface	Number of players	Highest pro ranking	
		mean	s
Hard*	31	122.3	91.3
Clay	76	93.1	104.2
Combination	16	142.1	190.8

* $P < 0.05$.

Comparison with male juniors, for whom the mean age at ranking was 18.1 years ($s = 0.7$), notionally supports the view that female players shift their competitive focus towards professional tennis earlier than male players (Galenson, 1995). In their 18th year (i.e. at 17 years of age), as determined by the age-eligibility criterion of the Women's Tennis Association (2008), female players can participate in up to 17 professional events. These data appear to affirm this criterion that determines a gradual introduction to professional tennis and which encourages players to compete in Junior Circuit events.

This complementary relationship between the Junior Circuit and Women's Tennis Association tour is underlined by the fact that virtually all female players who reach a year-end top-20 Junior Circuit ranking also earn an Association rank. The high percentage of these top-20 junior players who enter the senior top 100 (61.4%) or top 50 (43.3%) (Table IV), coupled with data showing that 73% of the current senior top 100 graduated from the Junior Circuit top 100 (M. Reid, unpublished data), consolidates the appropriateness of the Circuit as a developmental pathway.

The outcome of the prediction equation from this study's regression analysis, which saw junior ranking and the age at which this junior ranking was achieved share positive relationships with that of the Women's Tennis Association, supports the role of the Junior Circuit. However, because the two variables explained only 13% of the variance in professional ranking, the regression procedure also highlights the capriciousness (and multifactorial) nature of

tennis player development; whereby other factors such as parental and coaching support likely contribute to the prediction of professional ranking. A similar result characterized the relationship between boys' ranking in the Junior Circuit top 20 and their progression to the professional ranks. This provided the impetus to examine another factor that might shape player development and ranking success: court surface.

As emphasized by Reid et al. (2007b), generalization of court surface to country and then to player needs to be done with caution. The assumption that all domestic players develop their games on the same court surface, or that characteristics of play are consistent across surface, probably simplifies the role of court surface in player development. Furthermore, De Bosscher and colleagues (De Bosscher, De Knop, & Heynelds, 2003) indicated several political and socio-economic influences that affect success in tennis, while research in other sports has apportioned success to a variety of micro (deliberate practice: Ericsson et al., 1993; Ward, Hodges, Williams, & Starkes, 2004) and macro factors (gross domestic product, population, area, urbanization and money spent: Hogan & Norton, 2000; Van Bottenburg, 1994). Nonetheless, the fact that top-20 ranked Junior Circuit female players who developed on clay courts achieved higher future professional rankings than top-ranked juniors who developed their games on faster courts underlines the influence of court surface. Indeed, coaches tend to favour developing their players' games on slower-paced courts in the belief that it promotes the acquisition of tactical and technical skills that are more readily transferred to hard-court play, than vice versa (*Sydney Morning Herald*, 2005).

Notably, in Australia, one of the leading tennis nations, court surface and its perceived implications for player development has been vigorously debated, in particular in 2008 with the introduction of a new national surface at the Australian Open. The results of this study support previous work that has linked the development of male players on clay courts to higher professional rankings, and can aid the formulation of court surface-related policies that affect player development.

Conclusion

The ages of 15–18 represent a period when motivated young tennis players begin seriously to gauge the prospects of later professional success (Reid et al., 2007b). For females, several generations of young players have undergone the transition to professional tennis as early as 14, yet contemporary policies have encouraged more gradual progression. For female players, like their male counterparts,

who aspire to senior professional success, participation in the Junior Circuit and more particularly the achievement of a top-20 junior ranking is an appropriate early-career goal or benchmark. Support is provided for national associations that have programmes and policies that attempt to enable players to reach these goals in at least their 17th year. Moreover, the type of court surface on which junior female players develop influences their progression in the professional ranks, with exposure to clay-court play appearing key.

References

- Alvariño, J. F. (2006). Rutinas practicas de entrenamiento con jugadoras de alto nivel. In M. Crespo (Ed.), *Proceedings of the ITF-COSAT South American Coaches Conference* (p. 22). London: ITF.
- Coe, A. (1999). Engineering the future of tennis: Amendment to Rule 3. In M. Crespo, D. Miley, & M. Reid (Eds.), *Top Tennis Coaching: Proceedings of the 11th ITF Worldwide Coaches' Workshop* (pp. 25–27). London: ITF.
- De Bosscher, V., De Knop, P., & Heynelds, B. (2003). Comparing tennis success among countries. *International Sports Studies*, 25, 49–68.
- Du Bois, C., & Heynelds, B. (2007). It's a different game you go to watch: Competitive balance in men's and women's tennis. *European Sport Management Quarterly*, 7, 167–185.
- Ericsson, K. A., Krampe, R. T., & Tesch-Römer, C. (1993). The role of deliberate practice in the acquisition of expert performance. *Psychological Review*, 100, 363–406.
- Fédération Française de Tennis. (2001). *Politique Sportive 2002–2005*. Paris: FFT.
- Galenson, D. W. (1995). Does youth rule? Trends in the ages of American women tennis players, 1960–1992. *Journal of Sport History*, 22 (1), 46–59.
- Hogan, K., & Norton, K. (2000). The "price" of Olympic Gold. *Journal of Science and Medicine in Sport*, 3, 203–218.
- International Tennis Federation. (2008). *Junior Circuit regulations*. London: ITF.
- MacCurdy, D. (1999). Key elements for player development: Challenges to American tennis. In M. Crespo, D. Miley, & M. Reid (Eds.), *Top Tennis Coaching: Proceedings of the 11th ITF Worldwide Coaches' Workshop* (pp. 10–12). London: ITF.
- Philippaerts, R. M., Vaeyens, R., Janssens, M., Van Renterghem, B., Matthys, D., Craen, R., et al. (2006). The relationship between peak height velocity and physical performance in youth soccer players. *Journal of Sports Sciences*, 24, 221–230.
- Reid, M., Crespo, M., Santilli, L., & Miley, D. (2006). The ITF Junior Boys' Circuit and its role in professional player development. *Coaching and Sport Science Review*, 35, 2–3.
- Reid, M., Crespo, M., Atienza, F., & Dimmock, J. (2007a). Tournament structure and nations' success in women's professional tennis. *Journal of Sports Sciences*, 25, 1221–1228.
- Reid, M., Crespo, M., Santilli, L., Miley, D., & Dimmock, J. (2007b). The importance of the International Tennis Federation's junior boys' circuit in the development of professional tennis players. *Journal of Sports Sciences*, 25, 667–672.
- Sydney Morning Herald (2005). "We need more clay courts". *Sydney Morning Herald*, 5 July.
- Van Bottenburg, M. (1994). *Verborgen competitie, over de uiteenlopende populariteit van sporten*. Amsterdam: Bert Bakker.

- Ward, P., Hodges, N. J., Williams, A. M., & Starkes, J. L. (2004). Deliberate practice and expert performance: Defining the path to excellence. In A. M. Williams & N. J. Hodges (Eds.), *Skill acquisition in sport: Research, theory and practice* (pp. 231–258). London: Routledge.
- Williams, A. M., & Hodges, N. J. (2005). Practice, instruction and skill acquisition in soccer: Challenging tradition. *Journal of Sports Sciences*, 23, 637–650.
- Women's Tennis Association. (2008). *WTA Age Eligibility Rule*. Saint Petersburg, FL: WTA.
- Zlesak, F. (2006). How a tennis coach can identify talents. In M. Crespo (Ed.), *Proceedings of the ITF-CAT African Coaches Conference* (p. 9). London: ITF.