



HOW TO BECOME A PROFESSIONAL TENNIS PLAYER: THE SECRET TRUTH

For many years ‘Long Term Athlete Development (LTAD)’ principles have been referred to in the scientific literature in respect of youth conditioning including the now famous Balyi model (2, 3) This suggests that there are ‘critical periods’ or ‘windows of opportunity’ in an athlete’s development. The premise is that certain fitness components can be developed at an accelerated rate during these windows and that if these same fitness components are trained at another time the fitness gains will not be as pronounced. Related to this discussion is the concept of specialisation in sport (early versus late) and how this concept fits with the need to maximise a child’s long term physical development. The LTAD model recommends that in most sports (with a few exceptions such as gymnastics and diving) athletes should not specialise in a sport until late adolescence and rather should develop their overall athleticism at younger ages by playing multiple sports and experiencing multiple stimuli. However, despite the widespread promotion of this long term athlete development model it remains largely theoretical in nature, and little has been published on its application in the field. This article will take a practitioners view of the application of long-term athlete development in tennis, and is not meant to be an academic review of the topic area. Instead it aims to outline some of the contradictions between the theoretical model and the requirements of excellence demanded by the sport, and to outline the reality in which any model needs to be applied.

From theory to application

This scarcity of data on the optimal application of LTAD also extends to research publications. Most research studies looking into these development programmes are cross-sectional snapshots rather than longitudinal case studies (4). The success of any model will ultimately depend upon its application, and how well it translates into enhanced performance of players moving through the model. There are clearly a number of factors to consider when discussing the journey of a young athlete who is transitioning from high school to the collegiate or professional level. A young elite level athlete needs a programme which includes access to ‘world class’ facilities, coaching and education. In providing for an optimal development programme contemporary thinking also suggests that these resources need to be delivered with the long-term needs of the athlete in mind (1).

It should be clear to all those who are involved in high performance sports environment that a final mention should be made to the role of the competing demands of the young athlete. Excellence is demanded on many levels where academic success is required as well as the need to be placed in the ‘top’ rankings in order to open the doors to investment from the NGBs and access to the top level coaching which will no doubt secure future progress in the sport. This often leads one to question where a young athlete should prioritise their time in order to make progress in all these areas and maximise learning.

Deliberate practice

This article will briefly review some of the neuro-science which offers the most encouraging theoretical support for the application of LTAD and development of ‘repeatable actions’. However, it would not do the topic justice to try and give a full account of the theory behind LTAD models here, so the reader is respectfully referred to two excellent articles (5, 6) and one book (7) which cover LTAD principles in detail.

A common theme through much of the literature on the development of expertise is the close link with deliberate practice. Coyle (8) describes a zone of accelerated learning known as the 'deliberate practice' zone. This is suggested to be related to a process called myelination, a neurological mechanism in which certain patterns of targeted practice build skill through the action of neural insulation. This process makes the electrical impulse signal stronger and faster for the impulses that are sent most often.

Gladwell (9) refers to the concept of 'ten years and ten thousand hours' to achieve expert status. Ankersen (10) argues that if the amount of competition is high you will likely need more than 10,000 hours saying, 'My travels and research in the six Gold Mines showed that if you want to become world class in sports like tennis, golf, football and athletics you are more likely to need 20,000 hours of training than 10,00 hours- the competition is that fierce.'

Ten years and ten thousand hours amounts to approximately 2 hours and 44 minutes of daily practice.

On this matter Vern Gambetta comments, 'There is no doubt that deliberate practice is essential to excellence in any field. I think what is not being discussed is what exactly does deliberate practice consist of?' The USOC report, The Path to Excellence (11) surveyed US Olympians from 1984 through to 2000, and showed that Olympians were most often introduced to their sport through unstructured activities but once enrolled in a sport, quality coaching was important to insure acquisition of sound technique. It took the average Olympian three years to achieve success at the local level as a child, and many played multiple sports as a teenager. From this we might conclude that specific quality coaching from a young age is important, but this deliberate practice should not be limited to the actual sporting movements and includes unstructured play and general motor skill development.

However, tennis is not your 'average' Olympic sport. It has extremely high demands of skill and in the author's experience a typical tennis player will start at 5 years old and will have amassed ten thousand hours by the time they are 14, and done another ten thousand by the time they reach their peak at twenty years old.

What is happening on the ground?

Any review of player development in the sport needs to look at current trends in the playing patterns of junior players who are transitioning into the senior game as it relates to the sport of Tennis using both cross-sectional and longitudinal data. Does this data show us that in fact the best players are specialising from an early age and if so, what are the implications of doing this on their potential range of skills and athletic development? On the other hand, if indeed critical windows do exist in respect of skill acquisition for example, then if players are set on becoming a professional tennis player, then isn't it actually a requirement that they spend all of this 'critical' practice time practising Tennis.

It is the author's opinion that deliberate practice must include enough practice in a specific sport from a young age if someone has aspirations to play it at a professional level so that the motor patterns specific to that sport can be engrained. During childhood we know that myelination, or the thickening of the neurons which send impulses to the muscles, is accelerated. The neurons of the motor patterns which are used most often are the ones which are thickened most. 'We retain the ability to myelinate throughout life and there is a net gain of myelination until around the age of fifty (8).' However, myelination occurs most rapidly from childhood to the early thirties.

Unierzyski (12) reported on the relative importance of different factors affecting performance in junior tennis players (from low ranked to top ranked international level) aged 11-14 and how they changed as the children aged. As Figure 1 clearly shows, results during the first year were predominantly affected by experience i.e., for how many years the

player had played tennis. The best players in the study aged 11-12 had been practising on average 1-2 years more than their peers of a lower tennis level. Therefore their technical skills and results were better. The other factors were not that important in achieving success at this age. However, as the children became older (13-14 years) the other factors became more important

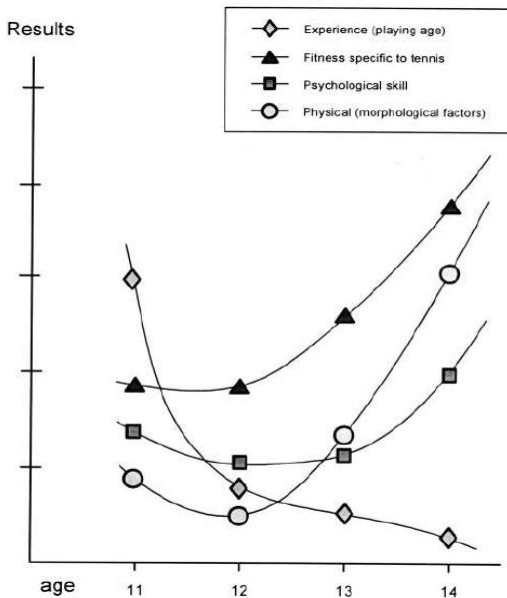


Figure 1. Relative importance of different factors affecting performance in 11-14 year old junior tennis players.

Interpretation of these findings is divisive. Those experts that believe that children should be exposed to a range of sports until early adolescence would say that this in itself is not a recommendation that young players should play tennis and only tennis from childhood to gain and then maintain a competitive advantage. Rather this is to say that specific practice in a sport is desirable and this is a different concept to specialised practise. Young children do need to practise the skills of a sport but this can be achieved while playing several complimentary sports that can develop a broad range of skills. This is as opposed to many children who specialise in one sport from a young age, which has associated problems with pattern overload, and resultant risk of overuse injury and mental burn out

(13, 14).

However, another interpretation is that this data supports the notion that the best young performers gain and then maintain an advantage by getting in their 10,000 hours early. One should abandon the illusion that a child needs to do a little of everything, and should accept that to achieve elite performance one needs a very one-dimensional focus. This singular focus is achieved it seems in one of two ways; through extremely ambitious parenting who make the decision for their child that they will become a top performer, or through amassing significant self-practice created through hardship because there is nothing else to do but play sport.

The Role of the Parent

Ankersen (10) quotes the world renowned Tennis coach Olga Mororova, 'Don't ask if your child likes it. You must present the game to them. You have to inspire them to like it. That's your responsibility. Everything depends on the parent's commitment.

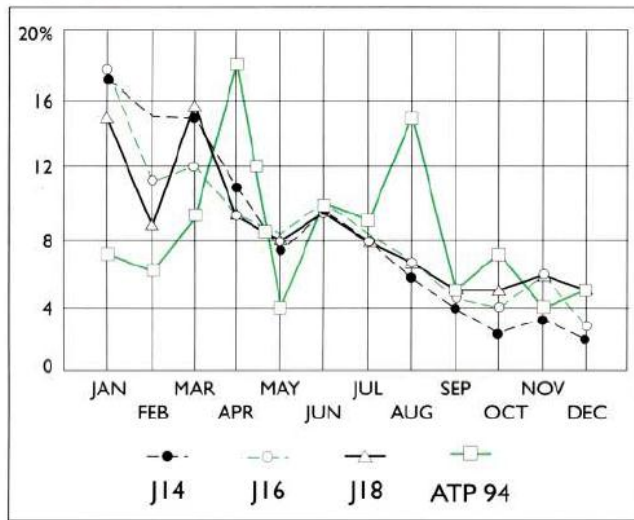
Left to their own devices a child may take a really long time to discover what they are really passionate about-or they might never. In either case all those valuable years of practise time could be wasted. A child cannot make the decision to become a top performer themselves. But that is not the same as saying that children do not eventually share the ambitions which were initially their parents. Many children come to enjoy the activities the parents chose for them because of the satisfaction inherent in mastering them.

Ambitious parents definitely challenge the conviction that children should be able to choose what they want to do. This single minded commitment of the Russian tennis parents could be looked upon as extreme but there is no doubt that it achieves results. And this single minded commitment is seen in the same Ethiopian and Kenyan runners and Brazilian footballers who practise day and night because that is their only hope of escaping poverty and giving a better life for their families. Remember that it has to be 'helpful' pressure and

there are good ways to push people and bad ways. Judy Murray, parent of professional tennis player Andy Murray said: 'there's a big difference between people who push their kids to do things and people who push to make things happen for their kids.' Get the balance. Don't push too hard and without love. But don't wrap them up in cotton wool and be dishonest to protect them.

Be born in the right month!

Figure 2. Monthly distribution of birth dates for members of the junior National teams that competed for European Junior Cups (boys under 14, under 16 and under 18 years of age from 1990 to 1995). For comparison the final ATP ranking list from 1994 is shown.



As well as the playing experience, a player's birth date has created a competitive advantage for players born earlier in the year as until recently players born in the same calendar year would play each other. Zmajic (15) carried out a study looking at whether the top tennis players were born at certain months in the year. As Figure 2 shows, more than 50% of players competing in European Junior Cups were born in the first four months of a year. Because many of these players with the 'ideal birthday' were more biologically advanced than their peers they achieved great success at the junior level because of their early development of different biomotor qualities. This

problem has now been addressed in the UK as the ruling regarding age group category has been modified to make participation a more even playing field. Interestingly, this birthday bias is somewhat removed once players reach maturation as shown by the uneven distribution at the ATP tour level. Nevertheless, biologically immature players have had to have significant physical capabilities to compete with their peers.

Show no weakness!

It is beyond the scope of this article to discuss Talent Identification but the reader is directed to an interesting case study concerning physical capabilities conducted by Unierzyski (16) who compared two biologically different female junior players who both went on to have success at the highest levels of the junior game (winning junior Grand slams). The z-score plot shows average values represented as +/- 1 standard deviation for top 50 Polish 12 and under girls. Alexandra and Magda were both biologically immature represented by factor 3.

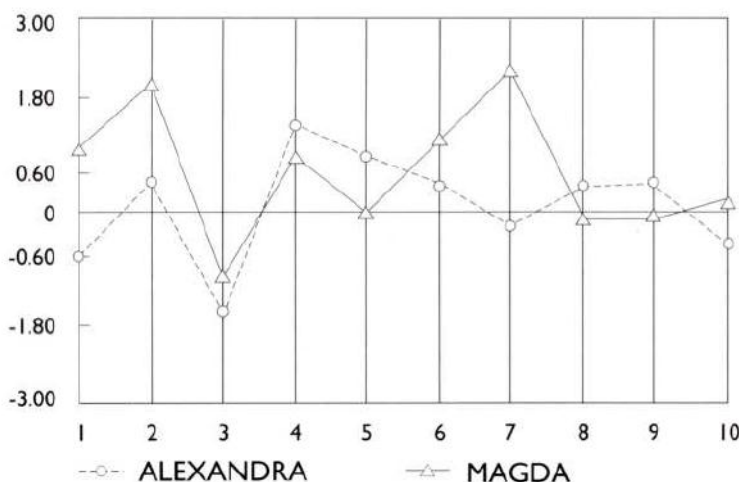


Figure 3. Profiles of Alexandra Olsza and Magda Grzybowska at the age of 12.

However, Magda was taller (factor 1), slimmer (factor 2) and more powerful (factor 7). Alexandra was small (factor 1) but very agile (factor 4) with sufficient leg power (factor 7). This case study shows that despite their apparent differences in physical traits

both girls were around the average in all tested features. Unierzyski (16) concluded that even at 10-12 years old a player should have no weaknesses (all qualities should be on a good, average or better, level).

Is being a good junior any guarantee of success at the pro level?

Thus far we have seen the affect of playing experience and birthday on the early success that junior tennis players can have. The research shows that in general the odds are pretty favourable that highly ranked juniors will make it as a pro. For example Table 1 (17) shows that a top 20 junior player has a 1 in 3 change of making it into the Top 100 as a pro compared to a greater than 1 in 2 chance as a top 5 junior. Players in the top 5 at junior level have a one in four chance of making it into the top 10 ATP tour!

Table 1. Percentage of top-20 ranked juniors reaching a top 100, 50, 20 and 10 ranking

ITF Junior Ranking	Professional Ranking			
	Top 100	Top 50	Top 20	Top 10
1-5	56%	44%	34%	25%
6-10	42%	36%	16%	10%
11-15	48%	34%	19%	15%
16-20	31%	19%	19%	8%
All	45%	34%	22%	15%

Table 2. Mean highest professional ranking for top 20 junior boys and mean age at which it was achieved

ITF Junior Ranking	Total Junior Players	Players to be ranked professionally	Highest Ranking	Age at highest ranking	
			Mean	Mean	St Dev
1-5	32	31	89.2	23.5	1.9
6-10	31	29	142.9	22.8	1.5
11-15	27	24	168.5	23.6	2.1
16-20	26	22	175.3	24.2	2.4
All	116	106	139.7	23.5	2.0

Furthermore, Table 2 (17) shows that the players who achieved the highest rankings at the junior level also went on to play at the senior level in most cases. 106 out of 116 players (91%) achieved a senior ranking indicating that most players who get to the highest level of junior tennis stay in the game.

Practical Implications

If becoming a top ranked junior player is highly correlated with transition into the senior level in tennis, what then must one do to get to that level? It has been well publicised that tennis has no clearly defined off-season and players can compete all year round if they choose to. As senior players only earn when they play (at least for those not fortunate enough to have sponsorship deals) there is understandable desire to move from one event to the next chasing the next dollar. But from a training stand point this is extremely problematic so it is extremely important that juniors get the foundational physical work done during adolescence and this cannot be done if juniors adopt the competitive schedules of senior players.

Table 3. Tournament profile of ITF Top 10 Juniors to ATP Top 100 (1996-2005)

Tournament Profile (ITF Junior & ATP / ITF Pro C) Age & Number of Events per Year Table 2.3				
Age Profile	15	16	17	18
Total Events	11	18	25	30
Junior	7	11	12	8
Senior	4	7	13	22
Junior %	64%	61%	48%	27%
Senior %	36%	39%	52%	73%
Est. %	65	60	50	25
	35	40	50	75
<i>5% shift to Seniors from Juniors at year 16. 10% shift to Seniors from Juniors at year 17. 25% shift to Seniors from Juniors at year 18.</i>				

Table 3 (17) shows the total events per year that were played on average by the ITF Top 10 juniors who went on to make it into the Top 100 Senior ATP Tour. As can be seen the total number of events increases each year from 11 to 30 and the number of senior events increases as a percentage of the total each year. All tournaments at this level are week long tournaments and if players do not progress deep into the singles tournament the remaining time is usually spent playing doubles or travelling to the next event. This

means pros will be on the road upwards of 30 weeks a year. The second aspect to stress is that it is not simply the number of tournaments that are played but the relative success that the best players achieve, based on having a healthy win to loss (W:L) ratio. Table 4 (19) shows that throughout the junior game the top 10 players are winning more than they are losing and as they reach their final years of junior tennis they actually win three matches for every one they lose.

Table 4.0

Circuit (years)	(1)	(2)	(3)	(4)	(5)
Age (years)	14	15	16	17	18
Developmental Blocks	4	4	3	2	2
Developmental Weeks	16	16	14	14	12
Pre-Competition Weeks	10	8	6	6	6
Competition Weeks	16	18	22	24	26
Rest (Active / Total) Weeks	10	10	10	8	8
Ratio Development: Competition	1:1	->	1:1.5	->	1:2
Total Tournaments	15	20	25	25	25
• National / Regional	5	5	5	-	-
• ITF Junior Circuit	10	10	10	10	5
• ITF Pro Circuit / WTA Tour	0	5	10	15	20
Benchmark W:L Ratio:					
• ITF Juniors	1.5	2.0	2.5	3.0	3.0
• ITF PC / ATP Tour	0.5	0.75	1.0	1.25	1.5+
Benchmark Rank:					
• ITF Junior Circuit	200	100	50	Top 20	Top 10
• ITF Pro Circuit / ATP Tour	-	-	-	800	450

Table 4 Guidelines for Junior Players 14-18 years old.

Interestingly the current top 4 players (Nadal, Federer, Djokovic and Murray) played the following junior/senior matches on their 17th year (0/20, 14/4, 3/16, and 3/11) and in their 18th year (0/18, 0/21, 0/13, 1/19). This shows that while all players were playing less than the recommended maximum of 25 events per year, the distribution of senior and junior events can be individualised. This amounts to a ratio of training to competition of 1:1 to 1:2 during this time. While

not included in this data analysis, the ratio for 11-14 year olds training to competition is more like 4:1 (moving to 2:1) as players mainly compete locally and regionally during weekends so training is interrupted much less. The exception here is in the girl's game where girls as young as 13-14 years old can be playing in 18 and under international events.

This training to competition ratio may not fulfil the optimum ratios as far as LTAD research suggests (2, 3) and points to a more 'early specialisation' model for tennis as players will need to be in the regional/national framework from as young as 8 years old to benefit from the extra funding and coaching opportunities that will allow them to travel extensively during the 14-18 year old period. Tennis has unique strength & conditioning and financial considerations as the route to the top is often scaled via a journey of extensive international travel. The specific strategies used to manage this time challenge are perhaps best left for reflection in another article.

Summary:

- Player success at the youngest age will be most determined by amount of tennis practice achieved and by physical maturation during adolescence
- Juniors need to be physically average or above average in all aspects to play at elite level
- Those players who start early seem to gain and maintain a competitive advantage
- The higher the rank at junior level the higher the rank at senior level
- Top 10 junior ITF players competed in between 11 and 30 events per year between 14 and 18 years old. The recommendations are 16-26 weeks per year.
- Tennis is arguably, especially for females, an early specialisation sport.

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