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EDITORIAL

Welcome to Issue 61 of the ITF Coaching and Sport Science Review, which is the final edition for 2013 and follows the highly successful staging of the 18th ITF Worldwide Coaches Conference by BNP Paribas in Cancun, Mexico. This issue includes articles on anxiety analysis, developing women tennis players, emotional intelligence, expectations, match statistics, physical conditioning and Tennis Play and Stay.

The ITF Worldwide Coaches Conference, which had the theme of 'the long-term development of a high performance player' proved to be one of the best ever and welcomed to Mexico over 900 delegates, representing 100+ ITF member nations. Throughout the five-day event held at the Iberostar Resort Cancun, keynote speakers were of the highest calibre with notable presentations from Patrick McEnroe (USA), Beni Linder (SUI), Jim Loehr (USA), Judy Murray (GBR), Mary Pierce (France), Tom Gullikson (USA), Nick Bollettieri (USA) and Bruce Elliot (AUS).

One of the highlights of the conference included a women's panel with Britain's Fed Cup captain Judy Murray (GBR), Ashley Keber (USA), Mary Pierce (FRA), Irena Chichmarova (BLR) and Debbie Kirkwood (USA). The panel expressed their opinions and shared their experiences across a number of key issues which included the number of female coaches in tennis and the development of the women's game.

During the conference, the ITF recognised the achievements of Dr Jim Loehr, Nick Bollettieri and Alberto Riba (ESP) with ITF Services to the Game Awards. This award, presented by ITF Vice President Jon Vegosen (USA) recognised their contribution to tennis over the years and the significant impact they have made in the sport.

The majority of the presentations from the conference will shortly become available on the ITF Tennis iCoach website to all existing members. The new version of Tennis iCoach, the online coaching and sport science platform, was officially launched at the Worldwide Coaches Conference, Cancun, Mexico. The new cutting edge website offers a vibrant new look and feel, with a more user friendly interface and simplified navigation.

Other improvements include a powerful search filter functionality to easily allow coaches, parents and players to access specific content across all player ages, levels and gender - from a library of over 1500 educational articles, videos and conferences. Please click on the following link to visit this exciting new website.

Tennis iCoach

Looking forward to 2014, more courses and conferences are planned including the ITF Regional Coaches Conferences which will take place in 5 regions in the second half of 2014. Details of these will appear in the next issue and we look forward to seeing many of our readers in attendance.

2013 has seen the successful launch of the 'ITF Biomechanics for Advanced Tennis' as an eBook available in English, French and Spanish.



Due to popular demand the Coaching Department has now released 'Technique Development in Tennis Stroke Production' in eBook format. This book aims to outline the mechanical basis of stroke development from a scientific perspective. Please click on the following link for purchasing information.



Finally, we hope you continue to take advantage of the resources provided on the coaching weblet (www.itftennis.com/coaching) and that you enjoy the 61st issue of the ITF Coaching Sport Science Review.



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Empowering players to deal with expectations

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ITF Coaching and Sport Science Review 2013; 61 (21): 3 - 4

ABSTRACT

This paper reviews the concept of 'expectations'. The approaches adopted by Rafael Nadal, Novak Djokovic, Andy Murray and Roger Federer in response to expectations for them to perform well at Wimbledon are discussed. Strategies for players to deal with expectations and the role of the coach are highlighted

Key words: expectations, role of coach

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INTRODUCTION

The role of a coach extends beyond simply providing technical instruction (Crespo et al. 2006). Rather, the role of a coach is an exacting one where he/she is expected to guide players to reach goals, enjoy the game and do their best in competition and training. To this end coaches may find themselves having to work with players who are overcome with the burden of expectations of others and their own expectations of themselves. This can easily occur when players are expected to win because of their high rankings or past performances. Players feel pressured because of the expectations to perform well. This can be a most disruptive and unnerving experience for many players who find it difficult to concentrate on what really needs to be done in a match.

So what might a coach do to guide a player who feels the weight of expectations on their shoulders? This paper addresses this question by reviewing the approaches adopted by four tennis champions in response to the expectations that they would do well at the recently conducted 2012 Wimbledon Championship. But first, let's understand what expectations are and why they are important.

WHAT ARE EXPECTATIONS?

Expectations are the anticipated outcome of a situation (Vandenbos, 2009). In tennis, they reflect beliefs – of players themselves, other players, support persons, coaches and media for example - about performance and match outcomes. Expectations are thought to generally arise from a player having ability and talent and a track record of some previous success. As noted some 50 years ago, accomplishments carry the burden of expectation. "The laurel wreath has in it the prickly reminder that more is expected of the wearer" (Bronk, 1962. p.170).

Expectations can be unrealistic in some instances. Irrespective of this, what is important is how the person perceives and interprets the expectation(s). Such perceptions and interpretations can have a direct effect on a player's confidence, concentration and general health and wellbeing (Young, 2008).

LESSONS FROM CHAMPIONS

Valuable insights can be gleaned from four of our great champions who were asked to reflect on the expectations they faced in competing in the 2012 Wimbledon Championships. The players were Rafael Nadal, Novak Djokovic, Andy Murray and Roger Federer.

In the case of Nadal, he entered Wimbledon fresh from winning an historic French Open Championship and was a former Wimbledon champion. Djokovic was the reigning Wimbledon Champion and the current top world ranked player. Murray was the darling of the British crowd who desperately wanted the long drought since the last British Wimbledon champion (Fred Perry in 1936) to end. Roger Federer was a former Wimbledon Champion who was attempting to achieve an historical number of Wimbledon singles titles.



There were huge expectations of all four champions and each player has provided us with a glimpse of their strategies and mindset for dealing with the expectations. Specifically, A. Nadal's response to the expectation for him to win Wimbledon included,

"Thinking about winning another title here in Wimbledon is arrogant and crazy. That's something I cannot think about. I can just think about practice, preparing my game and being competitive to try to win each match" (Wimbledon Interviews, 2012).

B. Djokovic's response to the expectation for him to defend his Wimbledon title included,

"I am not trying to defend my title here. I'm trying to fight for it as every other player. My mindset is very positive ... It is not the first time that I am playing to win or lose a ranking. It is not something that I think about too much. I really just want to focus on the match" (Wimbledon Interviews, 2012).





C. Murray's response to his country's expectation for him to win Wimbledon included,

"There is obviously pressure there. I think if you think too much about it, and what you read in the newspapers and you watch the stuff on TV that's said about you, I think it would become too much. But if you shield yourself from it all and get into your own bubble, only listen to the people that you have around you, then it is something you can deal with" (Wimbledon Interviews, 2012).

D. Federer's response to the expectation of winning an historic number of Wimbledon singles titles included,



"Of course there's a lot on the line for me. I'm not denying that. I have a lot of pressure but I'm look forward to that. That's what I work hard for. I've worked extremely hard since I lost that match point against Novak (Djokovic) last year at the US Open. My run has been extremely good. Now I have a chance at the world No.1 so it's a big match for me and I hope I can keep my nerves. I'm sure I can"

(Wimbledon Interviews, 2012).

STRATEGIES FOR DEALING WITH EXPECTATIONS

Each of the champions – Nadal, Djokovic, Murray and Federer - faced significant and diverse expectations at the 2012 Wimbledon Championships. Each viewed such expectations as 'normal' situations that required a focused and disciplined response.

The responses from the champions highlight a number of possible strategies for players to adopt to deal with expectations including:

- Refrain from thinking, hearing or reading about expectations relating to your performance.
- Surround yourself with a positive support team who believe in you and can shield you from expectations from others and any media coverage of your matches.
- Put all your attention into preparing well for matches and being as competitive as possible in these matches.
- Divert or redirect your attention away from the expectations by focusing on playing each and every point in a match to the very best of your ability.

- View expectations as a reward for doing well. Accept that there is pressure associated with expectations but this is something you have worked for and, consequently, it is a privilege to be in a situation where there are expectations for you to perform well.

It is noted that these strategies need to be tailored to the individual player. What will work for one player might be quite different for others. The choice of strategy, or combination of strategies, will depend on 'what works' for that player. Do they feel better about their game and can they focus better on playing the points under pressure as a result of adopting one or more of these strategies?

ROLE OF THE COACH

A coach can play a critical role in guiding players to understand and, in fact, appreciate the significance of expectations. While each player is unique, and an individual approach is recommended, coaches can empower players to develop their strengths to embrace expectations as positive outcomes for hard work and success. Expectations are to be expected when a player has done well and worked hard at their game. They are a reflection of what is possible and what remains yet to be achieved. In this context, expectations can be a positive driving force in a player's development.

CONCLUSIONS

In conclusion, a coach is continually looking for ways to create opportunities for players to develop their abilities. The illustration of the four champions' responses to expectations in this paper suggests that other players may well have the resources and capabilities to effectively manage expectations. Coaches can encourage players to discuss and evaluate the expectations that the player face. Sometimes a player's own expectations about their performance can be very negative and discouraging even when others have positive expectations. Given that a player's own perception of his/her prospects and abilities is by far the most important perspective, players need this to be constructive, positive and encouraging.

Players need to be aware that their coach expects them to competently manage, and even embrace, expectations because they have previously demonstrated the ability to effectively do so. It is this expectation that can make a vital difference to a player's development and enjoyment of the game!

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RECOMMENDED ITF TENNIS ICOACH CONTENT (CLICK BELOW)

Tennis iCoach

The importance of emotional intelligence for tennis coaches

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ABSTRACT

The present paper aims to introduce readers to the concept of Emotional Intelligence (EI) and how it may apply to the field of tennis coaching. Recent research will be reviewed that illustrates how EI, within a coaching context, may hold more consequence for career satisfaction and success in comparison to other theories of intelligence such as IQ.

Key words: career success, emotional intelligence, IQ

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INTRODUCTION

The emotional intelligence concept experienced a rapid growth in the 1990's. Mayer and Salovey (1997) defined EI as: "the ability to perceive accurately, appraise and express emotion; the ability to access and/or generate feelings when they facilitate thought; the ability to understand emotion and emotional knowledge; and the ability to regulate emotions to promote emotional and intellectual growth" (p. 10). In layman's terms, EI refers to a form of social intelligence that involves the ability to monitor one's own and others feelings and emotions, to discriminate among them, and to use this information to guide one's thinking and action (Salovey and Mayer, 1990). Goleman (1995) also outlined other important facets, including EI as the ability persist in the face of frustrations, to control impulses, to regulate one's moods and keep distress from swamping the ability to think logically.

EMOTIONAL INTELLIGENCE AND CAREER SUCCESS RESEARCH

Research has also shown that academic achievement, occupational success and satisfaction, and emotional health and adjustment are related to EI (Matthews, Zeidner, & Roberts, 2002). Research by Goleman, (1995) posited that EI inclined to result in better team work skills in business settings as a result of increased communication skills. There is also evidence to suggest that increased EI leads to more positive attitudes, improved relationships, higher orientation towards positive values and greater adaptability (Akerjordet & Severinsson 2007). Studies investigating EI in athletes and sport are limited (Meyer & Fletcher 2007; Meyer & Zizzi, 2007) however tentative links have been shown to exist between athletic performance and EI (Zizzi et al., 2003). Whilst this research does not relate directly to coaching contexts, positive attitudes, improved relationships, communication and performance are arguably important attributes for successful coaching.

Emotional Intelligence- a definition (Mayer & Salovey, 1993, 1997)

The present article will the ability model of EI and its possible contribution and importance in the field of sport, specifically tennis coaching.

The overall model of EI can be broken down into four hierarchical classes of abilities that together encompass EI as an intelligence or ability. See figure 1. (Mayer, Salovey and Caruso, 2000).

The lowest level skills within the above model involve the perception and appraisal of emotion. An example of this in a coaching setting might involve perceiving when a player is experiencing certain emotions on court. A coach displaying this aspect of emotional intelligence would be better able to pick up on important cues from facial expressions or perhaps body language and recognise what they might mean.

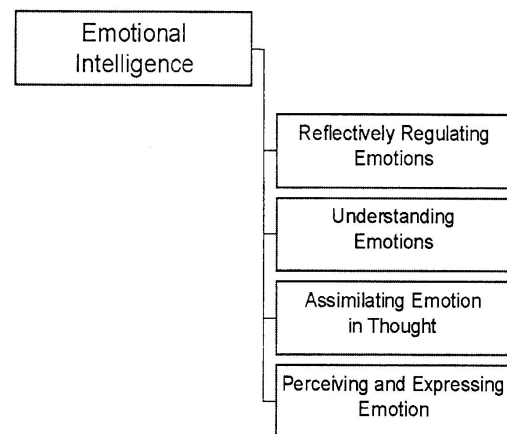


Figure 1. A four layer model of the skills involved in EI. From Mayer, Salovey and Caruso (2000).

The next level up within the model involves assimilating basic emotional experiences into mental life, including weighing emotions against one another and against other sensations and thoughts, and reflects an ability to use emotions to facilitate cognition (Stanimirovic & Hanrahan, 2010). At this level, characteristics include holding an emotional state in consciousness long enough to compare its correspondences to similar sensations in sound, colour, and taste (Mayer, Caruso and Salovey, 2000). In a coaching setting, recognition that a player seems frustrated or upset may lead to the coach to recognise and consider

the importance of adapting the session e.g. making alterations of intensity for more enjoyment. Here the coach would be demonstrating the understanding that from an emotional perspective, a stressful and intense training session may prove to be sub-optimal in this situation.

The third level within the model involves understanding emotions and how they play out in real life situations, and thus reasoning about emotions based on that



implicit knowledge. An individual that displays this ability is able to understand emotions and likely subsequent emotions and more often than not, the likely ensuing behavioural responses. Essentially, a coach with this ability can recognise that emotions will play out in different ways to others; anger, frustration and elation for example follow their own specific conventional paths. Anger rises when justice is denied. For example, a player who just came off court after being cheated out of a match will understandably follow an emotional process that the coach must recognise and react accordingly to. Similarly, a player having lost a tight but fair match will be likely to show frustration. In both these examples, a coach or even a parent must allow the player to have space and time to calm down and cool off emotionally- with only minimal input in terms of advice or feedback. Immediately after the match is not the time to start feeding your player with advice, or even worse, rebuking them for not dealing with certain situations as you would have hoped. In these difficult situations, coaches (and often parents too) who are not cognisant and understanding of the players emotions may not realise the detrimental effects of immediately reviewing and analysing the match with the player, this is the last thing they want to talk about at that moment! Coaching behaviours such as these are unfortunately more common, and often may lead to a strain in the coach-athlete relationship which can be easily ameliorated.

The fourth and most complex level within Mayer and Salovey's model involves the management and regulation of emotion, such as knowing how to calm down after feeling angry or being able to alleviate the anxiety of another person. This level of the model encompasses all the levels below it. Each skill is related to one another resulting in the individual managing their own and others' emotions as well as regulating and behaving in a way that will result in optimal functioning for both player and coach, and sometimes even parents where applicable. A relevant working example is drawn from dealing with parents to explain this level of the model. Many coaches have dealt with challenging parents, who understandably have a vested interest in their child's development which is reflected in a high level of parental engagement in all areas. Management and regulation of emotion is a key skill that can be tested when working closely with parents. Understanding, and sometimes managing their frustrations as well as your own, is a good representation of the fourth level of emotional intelligence. Here the coach must perceive accurately the parent's emotions, understanding how they are likely to react. Simultaneously, (and sometimes in the heat of a situation) the coach must also recognise and regulate how they react themselves. Perception, understanding, reaction and management of emotions are important skills that summarise the higher order level within the EI model.



HOW CAN EI BE IMPROVED? PRACTICAL APPLICATIONS FOR COACHES

As mentioned earlier, the ability model of EI suggests that it is a skill that can improve over time (Diehl, 2010; Mayer, Caruso and Salovey 2000). This suggestion is encouraging when compared with other aspects of intelligence, which have been suggested to remain more constant and unchanging throughout the lifespan. The following paragraph will now look at some practical ways in which the reader can begin to a) develop awareness of their level of EI and b) seek to improve on that level.

SWOT analysis

The first step to improving any skill lies in outlining what your strengths are, and also identifying areas where you can improve. A SWOT analysis involves a full disclosure of strengths, weaknesses and/or threats to achieving a set goal. Write down a list of strengths that you feel will help you when found in a challenging situation to regulate and behave in the best possible manner. It is also important to outline what traits may make it difficult for you e.g. short temper.

Journal Logging

Keep a written record of significant events that occur in your coaching work. For example, a dispute with a tournament official or a situation where a parent made a complaint against you. Record how you reacted in that situation, then revisit your written record at a later time and review what you could have done to improve your reactions in a given situation.

Acceptance and tolerance

More often than not, the challenges to maintain and regulate emotions will come from frustration, anger or perhaps disappointment. Try to become more accepting in frustrating circumstances, as opposed to demanding perfect scenarios at all times. By becoming more accepting, frustration levels in given situations will be reduced- the result being that you bypass many challenging emotional situations simply by adopting a different perspective. It is important to note however, that increasing your level of tolerance does not equate to a lowering of standards. As a coach, higher levels of acceptance does not mean dropping discipline levels, or allowing for inconsistent or inappropriate behaviour from you, your colleagues or your players.

Patience

When situations do arise that challenge your ability to keep calm or regulate emotion, employ the old wisdom of 'counting to ten'. Allowing your body to experience the emotion before acting will make it easier to think clearly.

CONCLUSIONS

The body of literature discussed has outlined how EI can have positive implications for personal, social, academic and work place success (Brackett, Rivers & Salovey, 2011). The tennis coaching context is certainly no exception when considering the importance of EI in day to day scenarios. Indeed, it may be feasible to suggest that EI can play an important and even critical role in relations with parents, players, fellow colleagues, officials and referees.

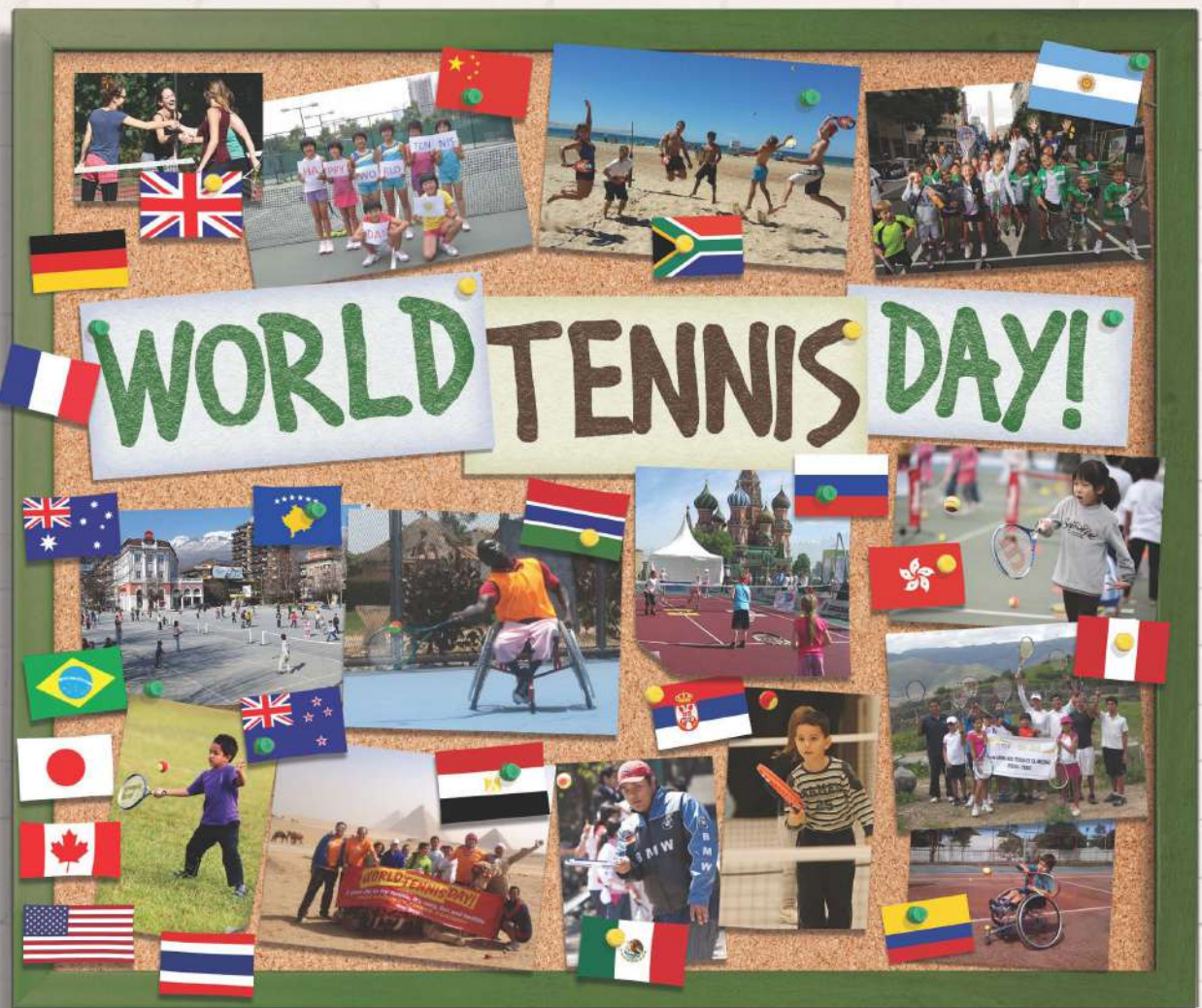
In addition to this, on a day to day basis, EI may contribute positively to the coach athlete relationship, and thus indirectly impact retention of players, as well as successful long term player development. Research has begun to investigate coaching behaviours and EI (Thelwell, Lane Weston & Greenlees, 2008) however it is hoped that future research within coaching contexts is conducted, so that the aforementioned variables may be tested empirically. Practically speaking, coaches should consider their EI as an important part of professional development, and adopt one or a number of the above recommendations.

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[RECOMMENDED ITF TENNIS ICOACH CONTENT \(CLICK BELOW\)](#)

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Benefits of single-leg exercises for the prevention of injuries in young tennis players

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Lyon, France)

ITF Coaching and Sport Science Review 2013; 61 (21): 9 - 11

ABSTRACT

The purpose of this article is to demonstrate the benefits of single-leg training for the physical preparation of tennis players resulting from simple exercises that can be incorporated in any tennis session. The goal of these exercises will be twofold: the prevention of injuries and the improvement of neuromuscular control.

Key words: postural control, physical preparation, balance, prophylaxis

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INTRODUCTION

The increased speed of the game in junior tennis has been accompanied by an increase in mechanical stress, most notably on lower limbs, with loads of 1.5 to 2.7 times the body weight on the knee during a change of direction (Kibler & Safran, 2000). In modern play, the ability to decelerate quickly has become as essential a factor as the ability to accelerate and is based on qualities of dynamic balance, eccentric strength, power and reactive strength (Kovacs et al., 2008).

Single-leg exercises have often been identified as a means of rehabilitation after a lower limb injury, but their effectiveness has also been demonstrated for prophylaxis purposes since they improve static and dynamic balance (Paterno et al., 2004; Mandelbaum et al., 2005). In combination with other types of training, such as plyometric training (Hewett, 2006), these exercises are reported to have an indirect impact on the ability to perform (Zech et al., 2010), as well as a direct impact in sports like figure skating where postural control is essential (Kovacs et al., 2004). In tennis, Barber-Westin et al. (2010) used this type of training as a tool to assess neuromuscular ability through single-leg hop tests with qualitative video analysis of landing and calculation of the symmetry index – obtained by dividing the mean distance hopped of the right leg by the mean distance hopped of the left leg, and then multiplying the result by 100 –, the value of which should be 85% or greater. Furthermore, studies have shown the relationship between balance and the risk of injury to the lower limbs in athletes (McGuine et al., 2000; Holm, 2004), as well as the correlation between muscular strength and postural control (Horlings et al., 2008).

Because they strengthen the gluteus medius and the lateral stabilising muscles of the hip, single-leg exercises contribute to the protection of the knee and the foot by preventing a lower limb collapse from the weight of the body, which would result in a series of stresses on the joints. The single-leg squat appears to be the most beneficial form of exercise to recruit these muscles (Ayotte et al., 2007). The possibilities offered by single-leg exercises are interesting since slight variations in the position of the free segments and in the execution of movements have an impact on the difficulty level of the exercises and make it possible to match the demands of tennis as closely as possible: combination of rotational movements (groundstrokes) and overhead movements (service and smash). The shifts in the centre of gravity related to body position changes will increase the activation levels of the stabilising muscles of the trunk (Hasegawa, 2004).

Therefore, it appears necessary to set up a neuromuscular training programme aimed at improving the stability of the lower limbs through squats, jumps, landings and rotations challenging the body's balance. The integration of such exercises in a warm-up routine will help develop proprioception (unconscious perception of joint position under both static and dynamic conditions).

The prescribed exercises can be general, tennis-oriented or tennis-specific exercises.

GENERAL EXERCISES

- 2 major single-leg bending exercises should be used: the squat (Figure 1) and the forward lunge with back leg at 45-degree angle (Figure 2); the set-up of these exercises should allow for increasing difficulty.



(A)



(B)



(C)

Figure 1 – Single-leg bending/extension with increasing difficulty: (A) in the air, (B) resting against a wall with a ball and (C) with the requirement to control the body weight throughout the movement.



(A) (B) (C)



(D) (E)

Figure 2 – Forward lunge with back leg at 45-degree angle for greater recruitment of the gluteus medius with increasing difficulty: (A) in the air, (B and C) with the back foot planted on the ground and a medicine-ball held with straight arms over the head, (D) with the requirement to control the body weight throughout the movement on a balance board. During the extension, the hips must return to a frontal position (C) with possibility of lifting the knee of the free leg to create axial imbalance (E).

- Multi-directional single- or two-leg drives with controlled single-leg landing: dot drill, ladder drill, compass drill, skipping rope with varied movements. During these exercises, special attention should be paid to the execution of the landing, i.e. sufficient distance between the feet and neutral alignment (no valgus movement), flexion of the knees and hips in a controlled downward movement (45 to 90 degrees).

TENNIS-ORIENTED EXERCISES

On a single leg, alternate ball and medicine-ball throws with rotation movement on a stable and then unstable surface (Figure 3).



(A and C) (B)

Figure 3 – Trunk rotation with a medicine-ball performed on an unstable board: (A) stabilisation phase, (B) external rotation to simulate the backswing phase and (C) internal rotation to simulate the hitting phase.

TENNIS-SPECIFIC EXERCISES

Single-leg hitting movements on an unstable surface (Figure 4) or single-leg ball striking after a movement, which can be followed by a vertical jump and a controlled landing on the same leg.

It is also worth noting that these tennis-oriented and tennis-specific exercises also enhance functional core strength since they require a high level of trunk stabilisation for a better control of the body's balance which is challenged by the quick rotation of the trunk (Ikeda et al., 2009).



(A) (B) (C)



(D)

Figure 4 – Single-leg forehand and backhand shadowing on a balance board: (A and C) backswinging phase, (B and D) hitting and follow-through phases.

CONCLUSION

Throughout the tennis player's development, postural control improvement should be an essential component of each training session. A neuromuscular training routine can be incorporated to all warm-up phases of tennis sessions or be part of integrated physical training sessions. Because they are easy to use, single-leg exercises should be closely monitored throughout the season and the difficulty level and specificity of exercises should be adapted accordingly.

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[RECOMMENDED ITF TENNIS ICOACH CONTENT \(CLICK BELOW\)](#)

Tennis*i*Coach

Anxiety analysis and treatment techniques for tennis players

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ABSTRACT

This paper intends to discover the level of cognitive and somatic anxiety in a sample of 78 tennis players, by means of the Inventory of Competitive Anxiety. The findings show high somatic anxiety values in tennis players and mid-high values of cognitive anxiety, which are positively related to the number of training hours per week. Finally, a set of psychological training strategies are gathered to help reduce and control the levels of anxiety in tennis players.

Key words: somatic anxiety, cognitive anxiety, tennis, psychological strategies

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INTRODUCTION

Anxiety is a psychological variable that has been deeply studied by sport psychologists, with different trends and methodologies, due to its strong relationship with performance (Cecchini et al., 2001). Thus, anxiety can be defined as a multidimensional construct in which the somatic and cognitive aspects must be distinguished, they are independent from one another and impact on behaviour in a different way (Santos-Rosa, García, Jiménez, Moya & Cervelló, 2007). Somatic anxiety reflects on physical changes, due to adrenalin production and its impact on the human body, heart and breathing rate increases, there is greater muscle tension, changes in temperature and over arousal of the nervous system occur (Peden, 2010). Besides, cognitive aspects reflect negative action perceptions raising concern, concentration problems and body control, which players express mainly during tennis matches and competition (Mellalieu, Hanton & O'Brien, 2004).

One of the situations that usually triggers more anxiety is before the match, the player can feel a psychosocial threat, for example, criticism against his/her self image for fear that performance might be poor. However, playing an opponent against whom one is expected to win or lose makes the player feel less anxious since winning expectations will be too high or too low just as Peden (2010) states. Anxiety will more probably occur in matches in which players have similar skill levels.

There is a lot of research indicating the relationship between high anxiety levels and poor performance (Atienza, Balaguer & García-Ermita, 1999; Mamassis & Doganis, 2004; Santos-Rosa et al., 2007). This way, high anxiety may lead to greater muscular tension impacting on coordination and leading to slow reactions and poor footwork. (Peden 2010). Likewise, anxiety can hinder motivation (Cervello, Santos-Rosa, Jimenez, Nerea & García, 2002), self confidence (Weinberg, 2002) or concentration (Balaguer, 1996), both during competition and training.

Therefore, the main objective of this paper is to determine the level of somatic and cognitive anxiety in tennis players and its relationship with gender and number of training hours per week, as well as to present a proposal to apply techniques in order to control and reduce anxiety in tennis players.

METHOD

The research sample consisted of 78 tennis players (45 males and 33 females, aged 13.14 ± 0.83 , children and junior who trained an average of 7.90 ± 3.05 hours per week).

The players completed the Inventory of Competitive Anxiety adapted by Andrade, Lois & Arce (2007), It consisted of 12 ítems distributed in two factors: somatic anxiety and cognitive anxiety. Finally, SPSS 21.0 for Windows programme was used for the statistic treatment of data. Figure 1 shows the descriptive results in each of the variables that make up the questionnaire.

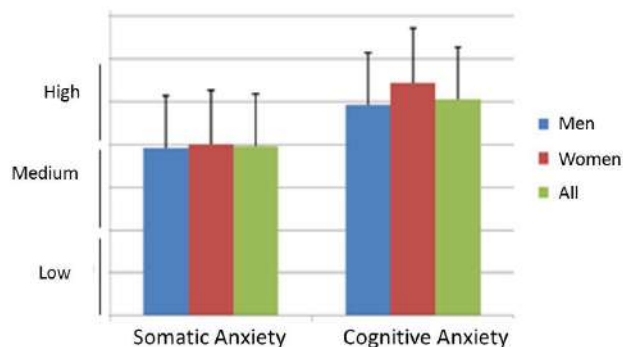


Figure 1. Anxiety media values per gender.

FINDINGS AND DISCUSSION

Players show high cognitive anxiety levels, these results coincide with the ones reached by Cevello et al. (2002) who also used a tennis player sample. Likewise, somatic anxiety which has reached the upper limit of average development range, shows similar values to those reached by tennis players studied by Covassin & Pero (2004).

As to women, their values are slightly higher in both dimensions of anxiety as compared to males, these outcomes are consistent with those registered by Covassin y Pero (2004) and Perry & Williams (1998).

Finally, it has also been proved that those players who train more hours are more prone to greater cognitive anxiety ($p = 0.005$; $r = 0.409$), just as Newton & Duda (1993) state. Similarly, greater cognitive anxiety levels follow greater somatic anxiety levels ($p = 0.002$; $r = 0.451$), consistent with the research conducted by Cervello et al. (2002).



TECHNIQUES TO CONTROL ANXIETY IN TENNIS PLAYERS

The high anxiety levels among participants show the need to be treated by a sport psychologist (Heller, 2001) by means of different strategies like the ones below:

- **Rituals:** According to Peden (2010), routines can help players manage anxiety providing more control over his/her pre-match concerns or during the match and even a certain control over the behaviour of opponents (for example changing the speed of the match).
- **Positive thinking:** On certain occasions, the so called self fulfilling prophecy -negative thinking during stressful moments- (for example fearing double fault before an important point) may cause greater muscular tension hindering coordination and leading to errors. Thus, the player must be driven towards positive thinking when facing these situations (Peden, 2007; 2010), and also towards redirecting thinking towards the appropriate stroke technique (Weinberg, 2002).
- **Focusing on an object:** Focusing on an object in moments of anxiety immediately distracts and reduces nervous or stressful feelings. For example, when the ball is in play, the player can concentrate on his/her movement at all times, even try to read the printed letters of the manufacturer's brand. It seems difficult but if the skill is developed through practice, it benefits the player's game, improving concentration and coordination and reducing anxiety (Peden, 2007).
- **Controlling training loads:** Due to the relationship between a great number of training hours and anxiety levels, as this paper also proves, the coach and the trainer must control the intensity of the sessions and the training loads, as well as training in different settings and contexts practising new and player adapted activities (Sánchez-Alcaraz, Gómez-Mármol, 2013).
- **Deep breathing:** According to Peden (2009), deep breathing is the simplest and most basic relaxation method; among its benefits is the decrease in heart rate, it makes it slower and reduces physical reaction. Deep and slow breathing can be an immediate, affordable and efficient way of reducing stress and anxiety on court during a match, since it is so easy to practice. Some examples are:
 - a) Exhale deeply, contracting your abdomen.
 - b) Inhale slowly expanding your abdomen.
 - c) Continue breathing expanding your chest.
 - d) Continue inhaling raising your shoulders to your ears.
 - e) Keep the air to the count of three.
 - f) Exhale slowly to the count of six.
 - g) Relax shoulder and chest muscles completely.
 - h) Repeat 3 or 4 times until you get a feeling of relaxation.
 - i) It is convenient to concentrate on a positive self talk at the same time.

In a nutshell, this paper highlights the urgent need for all those involved in tennis practice, sport psychologists in particular, to act concretely on anxiety, by means of the above mentioned technique.

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RECOMMENDED ITF TENNIS COACH CONTENT (CLICK BELOW)

Tennis  **Coach**

The development of top women tennis players (1968 – 2012) and the importance of well-planned coaching

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ABSTRACT

The development of the best women tennis players who won 179 Grand Slam tournaments between 1968-2012 and fought their way to the top of the WTA rankings indicates that a progressive training process based on obtaining best results when the player matures is superior to an earlier over-intensive programme, which is characterized by unnatural acceleration in training and competing with the aim of achieving immediate success at the junior level, or even before.

Key words: developing women tennis players, developmental steps, coaching

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INTRODUCTION

Women's tennis is developing in an exceptionally dynamic way, keeping pace with that of men's. This can be seen in the ever-growing pace of play, the increasing speed of balls in rallies as well as accuracy in shot placement on the tennis court and over the net. The number of shots in rallies has also dramatically increased. This is the result of consecutive generations of women players whose technical and tactical preparedness, physical fitness and efficiency are constantly growing and who have developed their tactical knowledge using the experience of preceding generations. Such dynamic change would not be possible without the knowledge and competence of training teams who have the ability to capitalize on achievements in other spheres that support development of the sport at the highest level. There is also technological advancements, particularly in tennis rackets with their exceptional stiffness and absorption of vibration, and tennis strings, which can absorb pressure and ensure greater ball speed whilst maintaining high precision.

The path to women's sporting achievement

Tennis is a highly technical sport – and players must have a full understanding of it to develop tactics against an opponent. Acquiring good technical and tactical skills, gaining high levels of physical fitness, developing the personality and character to compete as well as training and playing experience all take a long time. The complex process of learning, developing, training and playing is divided into phases with particular goals, all of which are essential (Bompa & Haff, 2009; Crespo & Miley, 2007; Krolak, 1998; Krolak, 2004; Martens & Maes, 2005; Reid, Quinlan & Morris, 2010; Sozaski, 1999; Veciana, 2012).

The best women tennis players, mostly at the age of 14 – 15 and after about ten years of tennis coaching, decide to sign a professional contract. For most of them, competing against older, more experienced, better known and better prepared professional players, tends to encourage their development of the techniques and tactics of tennis, so that they perform at a much higher mental and physical level. This is essential if success is to be achieved.

The first meaningful success of women tennis players following 10 – 15 years of training and competing. (table 1)

NAME	Age started playing tennis	Years of training preceding:			
		1st Grand Slam Win	Reached top 100 WTA	Reached top 10 WTA	Reached No. 1 WTA
V. AZARENKA	7	16	10	13	15
M. SHARAPOVA	4	14	12	13	14 (1)
S. WILLIAMS	5	13	11	13	16
A. RADWANSKA	4	-	13	15	-
A. KERBER	3	-	16	21	-
S. ERRANI	5	-	15	20	-
N. LI	9	20	12	20	-
P. KVITOVA	6	15	12	15	-
S. STOSUR	8	19	12	18	-
C. WOZNIACKI	7	-	10	12	13

Table 1. Years preceding the achievement of the greatest success in tennis competitions by women tennis players ranked 1 – 10 on the WTA list in 2012.

A promising young player must start to be prepared much earlier so that she is ready to move up to the higher level. The changes include:

- A considerable increase of the number of competitions she takes part in (even up to 35 and more annually),
- An increase in the number of singles matches (up to around 100) and doubles (to around 50) annually,
- A decisive increase in the scope and intensity of daily training that women competitors undergo with different competitors on varying surfaces and conditions,
- An increase in the number of trips and days spent away from home and family (up to 300 days annually).

The number of singles and doubles matches (table 2) and their results (table 3) and the players' rapid advancement up the WTA rankings, illustrate their successful training regime and growing maturity.

NO.	NAME	THE NUMBER OF SINGLES AND DOUBLE MATCHES WHEN THEY WERE AGE																	
		15			16			17			18			19			20		
		S	D	Σ	S	D	Σ	S	D	Σ	S	D	Σ	S	D	Σ	S	D	Σ
1	V. Azarenka	13	10	23	36	6	42	45	12	57	52	29	81	60	39	99	60	29	89
2	M. Sharapova	33	3	36	51	16	67	70	19	89	65	1	66	68	-	68	51	-	51
3	S. Williams	na	na	na	14	6	20	40	21	61	48	33	81	45	15	60	45	12	57
4	A. Radwanska	16	8	24	33	22	55	55	17	72	63	24	87	75	30	105	67	24	91
5	A. Kerber	16	-	16	30	4	34	34	7	41	45	6	51	76	23	99	61	15	76
6	S. Errani	13	8	21	17	9	26	22	7	29	46	24	70	68	31	99	69	27	96
7	N. Li	na	na	na	na	na	na	36	38	74	69	60	129	14	13	27	18	7	25
8	P. Kvitova	na	na	na	18	4	22	53	9	62	58	4	62	44	7	51	49	5	54
9	S. Stosur	4	1	5	13	5	18	47	38	85	51	68	119	44	41	85	69	41	110
10	C. Wozniacki	2	1	3	27	11	38	48	21	69	78	17	95	91	23	114	79	14	93

Table 2: The number of singles and doubles matches of players in the WTA top 10 in 2012 when they were aged 15 – 20.

		15		16		17		18		19		20		
			WTA		WTA		WTA		WTA		WTA		WTA	
1	V. Azarenka	S	8:5	506	27:9	146	30:15	92	34:18	30	40:20	15	45:15	7
		D	6:4	810	5:1	429	8:4	286	18:11	47	27:12	15	22:7	15
2	M. Sharapova	S	28:5	186	38:13	32	55:15	4	53:12	4	59:9	2	40:11	5
		D	1:2	-	11:5	79	11:8	83	0:1	-	-	-	-	-
3	S. Williams	S	-	-	9:5	96	29:11	20	41:7	4	37:8	6	38:7	6
		D	-	-	4:2	121	16:5	36	29:4	10	15:0	54	10:2	54
4	A. Radwanska	S	9:7	941	26:7	381	40:15	57	43:20	26	54:20	10	44:23	10
		D	3:5	879	17:5	293	7:10	176	12:12	75	12:18	53	14:10	37
5	A. Kerber	S	10:6	433	22:8	375	20:14	261	35:10	214	47:29	84	35:26	108
		D	-	-	3:1	-	2:5	429	3:3	-	12:11	205	10:5	190
6	S. Errani	S	6:7	742	9:8	569	11:11	521	29:17	359	42:26	171	41:28	70
		D	3:5	836	4:5	524	2:5	556	18:6	203	16:15	197	15:12	159
7	N. Li	S	-	-	-	-	29:7	363	56:13	134	11:6	303	15:3	277
		D	-	-	-	-	35:3	321	47:13	89	7:6	327	5:2	657
8	P. Kvitova	S	-	-	15:	773	41:12	157	37:21	44	23:21	62	25:24	34
		D	-	-	1:3	-	3:6	454	0:4	959	2:5	379	1:4	333
9	S. Stosur	S	-	-	6:7	682	36:11	276	24:27	265	20:24	153	41:28	65
		D	-	-	1:4	292	31:5	131	47:21	141	19:22	53	21:20	2
10	C. Wozniacki	S	-	-	17:10	237	31:17	64	58:20	12	67:24	4	62:17	1
		D	-	-	5:6	238	6:15	157	8:9	79	11:12	74	5:9	141

Table 3: The results of singles and doubles matches of players in the WTA top 10 in 2012 when they were 15 to 20 years old.

The need for higher levels of coaching and competitions – essential for the continuing development of the sport – is a considerable challenge for the young player. She must be resourceful enough to organize satisfactory training conditions, nourishing food and supplements, biological regeneration and good sparring partners during competitions. An individual training programme (content, scope, intensity and participation in competitions) must be individually optimized so that the biological and mental development of women players has priority over quick and early success. As a result, the first years of

participation in WTA competitions (beginning with ITF Circuit Events tournaments ranked \$10 000 to \$100 000+, then International Events, Premier 600, 700, Premier and Premier Mandatory to Grand Slam) force young tennis players who, not long before, were outstanding amongst their junior peers, to raise their game significantly, essential to achieve success in professional tennis.

NAME	Age of first junior Grand Slam title (ITF) and total number of titles (Σ)					Age of first Grand Slam title and total number of titles (Σ)				
	AU	RG	W	US	Σ	AU	RG	W	US	Σ
S. Graf	-	-	-	-	-	19	18	19	19	22
M. Navratilova	-	-	-	-	-	25	26	22	27	18
C. Evert	-	-	-	-	-	28	20	22	21	18
S. Williams	-	-	-	-	-	21	21	21	18	15
M. Court (2)	-	-	-	-	-	18	20	21	20	11
M. Seles	-	-	-	-	-	18	17	-	18	9
B.Jean King	-	-	-	-	-	25	29	23	24	8
V. Williams	-	-	-	-	-	-	-	20	20	7
E. Goolagong	18	-	-	-	1	23	20	20	-	7
J. Henin	-	15	-	-	1	22	21	-	21	7
M. Hingis	-	13	14	-	1	17	-	17	17	5
H. Mandlikova	-	16	-	-	-	18	19	-	23	4
K. Clijsters	-	-	-	-	-	28	-	-	22	4
A. Sanchez-V.	-	-	-	-	-	-	18	-	23	3
J. Capriati	-	17	-	13	2	25	25	-	-	3
L. Davenport	-	-	-	16	1	24	-	23	22	3
M. Sharapova	-	-	-	-	-	21	-	17	19	3
V. Wade	-	-	-	-	-	27	-	32	23	3
N. Richey	-	-	-	-	-	25	26	-	-	2
T. Austin	-	-	16	-	1	-	-	-	17	2
M. Pierce	-	-	-	-	-	20	25	-	-	2
A. Mauresmo	-	17	17	-	2	27	-	27	-	2
S. Kuznetsova	-	-	-	-	-	-	24	-	19	2
V. Azarenka	16	-	-	16	2	23	-	-	-	2
M. Jausovec	-	18	-	-	1	-	21	-	-	1
B. Jordan	-	-	-	-	-	22	-	-	-	1
S. Barker	18	-	-	-	-	-	20	-	-	1
K. Melville	18	-	-	-	-	29	-	-	-	1
C. O'Neil	17	-	-	-	-	22	-	-	-	1
V. Ruzici	-	-	-	-	-	-	23	-	-	1
G. Sabatini	-	16	-	-	-	-	-	-	20	1
C. Martinez	-	-	-	-	-	-	-	22	-	1
J. Novotna	-	-	-	-	-	-	-	30	-	1
I. Majoli	-	-	-	-	-	-	20	-	-	1
A. Myskina	-	-	-	-	-	-	23	-	-	1
A. Ivanovic	-	-	-	-	-	-	21	-	-	1
F. Schiavone	-	-	-	-	-	-	30	-	-	1
N. Li	-	-	-	-	-	-	29	-	-	1
P. Kvitova	-	-	-	-	-	-	-	21	-	1
S. Stosur	-	-	-	-	-	-	-	-	27	1

Table 4. Period of time between winning a junior single Grand Slam (ITF) and the first victory in a Grand Slam tournament from 1968 to 2012.

The essential conditions for women's tennis coaching

Tennis belongs to a highly dynamic group of sports with competitors going through many stages of learning, training and participation in competitions to allow them to master a wide range of technical and tactical skills based on physical and mental fitness and strength of character.

A comparison of the age of women tennis players who won tennis competitions in the years 1968-2012 and the length of time between that and when they won their first Grand Slam title (table 4) illustrates for coaches and young players who enter professional tennis competitions the four basic requirements of effective coaching:

1. The coach's professionalism, knowledge, experience, common sense and foresight in planning each successive period of 3-4 years training based on professional experience and participation in international competitions. Those who do not learn should not teach others!
2. Constant patience from the player herself as well as her coaches, parents, guardians, sponsors and her milieu during the ever more demanding coaching sessions and competitions.
3. The intelligent use of data from previous matches with particular emphasis on match results which are a highly informative and objective indicator of playing potential, rather than comparisons based on the number of matches played.
4. The player and her coach's joint analysis of matches, especially against opponents of about the same level – 20-30 positions in the ITF/WTA rankings above and below her own position - with the aim of establishing a precise programme of coaching and competing.

During the long-term and professionally oriented progressive, but carefully staged, training which accompanies the transition from cadet to junior competition and then to senior and the highest level of experienced professional players, the basic task of a coach is to show the young players how to become independent in all aspects of their sporting activities.

Factors which hold back a young player's development

Major factors that adversely affect the level of self-motivation in women tennis players after transition to a higher age group include:

1. Lack of success. The clear decrease in the ratio of victories to defeats.
2. A reduction in the effectiveness of tactics and technical skills in matches. A worsening of match statistics:
 - Fewer aces (often accompanied by a decisive increase in ball speed).
 - Fewer service games won.
 - Fewer breaks of serve won.
 - Lower ratio of winners to unforced errors.
 - Fewer number of points won after long (>10) and very long rallies (>16).
3. Lower mental resistance to tiredness caused by external pressure to win put on a player.
4. Lowered physical resistance to tiredness caused by frequency of competitions, journeys, stays in hotels, changes in nutrition, separation from family and friends.
5. Doubts about whether the chosen way – “tennis above all” is right, whilst taking interest in new activities.

Unfortunately, the process of training young and even the youngest women tennis players is ever more frequently speeded up. The pressing need to do so goes against the needs and capabilities of biological and intellectual development, and the proper mastering of technical and tactical skills (which will stand the test of time).

It satisfies parents' and coaches' needs by meeting simple and primitive motivation based on peer group rivalry. On one hand there is an innovative and well developed project (Tennis10s) for progressive tennis character development in young children and teenagers with the prospect of further phases of development for achieving success in adulthood. On the other is an irrational rush to achieve the most as quickly as possible regardless of the price.

The lack of common sense and patience in coaches, and pressure exerted by parents, clubs and coaches in their desire to achieve quick success is supported by the system of youth rivalry in many countries and as well as in the international arena. Besides, the International Olympic Committee has created the Youth Olympic Games. The first was held in Singapore in 2010 and consisted of 26 sports. The next summer Youth Games will be in Nanjing (China) 16 – 28 August 2014.



SUMMARY

The sporting development of women tennis players is complex. Every individual has different abilities and a different personality so that each case must be separately dealt with.

It is worth looking at the varying paths taken to the top followed by the most outstanding female tennis players of the Open era. A large majority of them never won a junior Grand Slam – 23 in total (S. Graf, M. Navratilova, M. Smith, M. Seles, Serena and Venus Williams, A. Sanchez – Vicario, Kim Clijsters, M. Sharapova, P. Kvitova, S. Stosur and others). In comparison, the number of those who dominated as juniors is 17 in total (E. Goolagong, M. Hingis, J. Henin, J. Capriati, A. Mauresmo and others).

An even greater difference can be seen when one compares the number of the Grand Slam tournaments won by the players from the former group (146 victories in total) to the one won by the players from the latter group (75 victories in total).

It would seem that it is necessary to have reliable records of training regimes, to analyse them and make them available for consecutive generations of teachers, coaches and tennis instructors with the aim of implementing practical and long-term coaching methods and to avoid steps that are aimed only at bringing short-term benefits.

Notes

1 Maria Sharapova first advanced to number 1 on the WTA list 22 Aug 2005. In total she has topped the list for 17 weeks, the last time from 19 May to 8 June 2008.

2 M. Smith – Court won 24 Grand Slam single titles 1960 – 1973. The table shows the 11 victories 1968 – 1973 (MP'69, 70, 71, 73, RG'69, 70, 73, W'70, FM'69,70, 73).

3. B.-J. King won 12 singles Grand Slam titles 1966 – 1975. The table shows the 9 victories 1968 – 1975 (RG'1972, W'68, 72, 73, 75 i FM' 71, 72, 74).

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The value of using heart rate variability for the long-term monitoring of training loads in tennis

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& Damien Saboul (University of Lyon, France)

ITF Coaching and Sport Science Review 2013; 61 (21): 19 - 20

ABSTRACT

This article discusses a new method designed for the monitoring of training, which is easily accessible to both coaches and physical trainers. Based on heart rate variability, it allows us to assess players' fitness level in a reliable and objective manner. Involving few constraints and requiring little equipment, this method is an innovative tool which may prove very useful in optimizing and customizing training loads based on future competitions, and in preventing the risk of overtraining.

Key words: heart rate monitor, fitness level, periodisation, planning, overtraining

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INTRODUCTION

Tennis is, in essence, an intermittent activity with many unpredictable factors that make it difficult to implement the periodisation process. Unlike a lot of other sports, there is no real off-season in tennis and the number of tournaments is such that players have the opportunity to compete every week. In addition, the way the ranking system works encourages players to play and win a lot of matches (Roetert & McEnroe, 2005). Because of this pressure to perform, players often neglect the recovery phase (Smith, 2012), thereby jeopardizing their health. On top of this are other factors that have an impact on the overall load and fatigue level, such as the number of matches played during a tournament, the duration of matches and rallies, the environmental conditions, the court surface, as well as the travel time and effects of jet lag (Roetert et al., 2005). Under these circumstances, it can prove very difficult for coaches and physical trainers to plan and periodise training. Indeed, it is virtually impossible to set up a clearly defined programme given that such a programme is constantly challenged by the player's results. Therefore, non-linear periodisation seems to be the most suitable periodisation model for tennis (Roetert et al., 2005). This means that a player's training programme must be adapted again and again according to the player's fitness level and future goals. More specifically, it seems that in modern tennis, recovery strategies are becoming increasingly important to achieve consistent performance levels. However, periodisation is often based on coaches' past experiences or guided by what other players do in that field (Reid et al., 2010). A good way to avoid the adverse effects of such practices is to rely on the study of heart rate variability (HRV), which allows to alternate periods of activity with periods of rest in an optimal manner on the basis of objective data. HRV, which is related to the medical field, refers to the study of the time between two heart beats (known as the R-R interval, Figure 1); the constant variations in the R-R interval provide information on the status of the autonomic nervous system. High heart rate variability is a sign of a good fitness level; on the other hand, a decrease in HRV is synonymous with a decline in the ability to adapt, thus reflecting a state of fatigue. Thanks to new, easy-to-use tools (heart rate monitors, processing software, etc.), the analysis of HRV has become accessible to athletes and can be used to monitor fitness and prevent overtraining on an individual basis. The monitoring of HRV data seems particularly suited for tennis when the goal is to build a flexible periodisation model that takes into account the unforeseen events of competition. In addition, HRV offers a comprehensive assessment of an athlete's fitness level based on physiological and psychological factors, both of which play a decisive role in tennis performance.

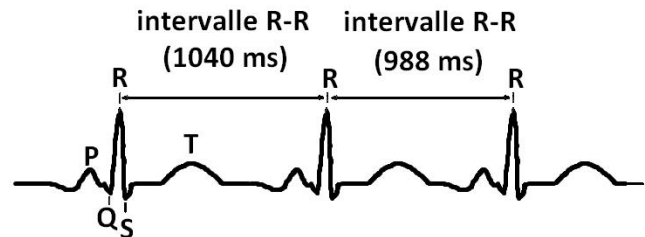


Figure 1: Illustration of R-R intervals.

METHOD

Due to the high sensitivity of HRV, the primary methodological requirement is to collect HRV measures appropriately, using a compatible heart rate monitor (Figure 2). The reason is that HRV is influenced by many parameters such as digestion, stress, physical activity, fatigue, body position and breathing (Saboul et al., in press; Aubert et al., 2003). For practical reasons, the preferred method is to measure HRV in the morning, soon after the player wakes up. To avoid unusual results, it is essential that the player strictly follows this protocol: he or she must be fasting, lying down on the bed the whole time, breathing as calmly as possible and avoiding any stress (no music, no discussion, no movement). As a precaution, it is advisable to have the player go to the toilet just before HRV is measured. The test should be performed at regular intervals, i.e. three or four times a week, during periods lasting between 5 and 8 minutes (Kiviniemi et al., 2011; Plews et al., 2012).



Figure 2. Sophisticated heart rate monitor capable of recording R-R intervals and the variations in such intervals over time.

As far as the HRV analysis is concerned, it is performed using a signal processing software, providing access to several types of data that are classified into two domains: the time domain and the frequency domain (Task Force, 1996). Although frequency-domain indices have been widely used in the past, their reliability has recently been called into question because of their interaction with the athlete's respiratory

rate. In addition, controlled respiration disrupts the results (Saboul et al., in press). The solution is to be found in the use of time-domain measures and more precisely in the use of RMSSD (root mean square of successive differences). This index better reflects the state of fatigue than frequency-domain measures and is an accurate predictor of the athlete's ability to withstand additional stresses (Plews et al., 2012).

Example of longitudinal monitoring of HRV based on the competition and preparation periods during the tennis season.

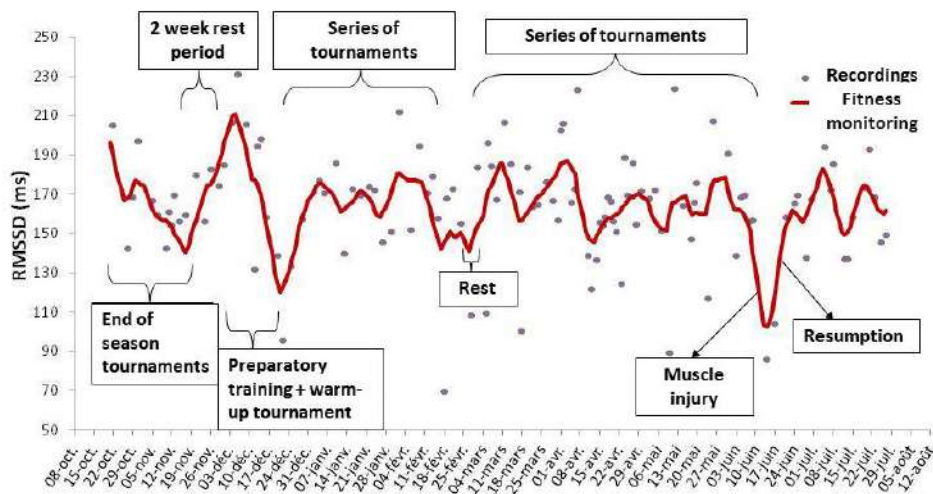


Figure 3. Each point represents the value of RMSSD on the day it was recorded. For greater readability, a trend line has been drawn to track the evolution of the player's fitness level.

In the context of longitudinal monitoring, variations in the RMSSD values are visible on a day-to-day basis depending on training sessions, tournaments or stress level (Figure 3). It is therefore important not to over-interpret each variation observed. Similarly, comparing gross values between players has no meaning from a physiological point of view. RMSSD must be interpreted as an individual measure; as such, it can only be compared with its previous values. Given that large variations can take place during the same week, it is recommended to simply observe the trends. In effect, RMSSD values will normally decrease during periods of high load, thus reflecting an accumulation of fatigue. Conversely, RMSSD should increase during preparation periods to above normal values, in the best of cases, just before the start of competition (Plews et al., 2012). The variations in RMSSD values, on a daily or weekly basis, are a sign of fitness and an indication of the ability to adapt physiologically to the different types of training performed. A long period of stagnation, even with high values, or a sustained decrease in RMSSD values generally indicate that the ratio between training load and recovery is inappropriate or that training is too monotonous. The interpretation of the results must always be done bearing in mind the content of training sessions and matches. Furthermore, it is appropriate to use RMSSD values in conjunction with other indices such as the workload or the subjective assessment of fatigue, sleep, appetite or mood.

CONCLUSION

The HRV method appears to be both effective and particularly well adapted to tennis since it allows coaches to perform long-term monitoring of their players' fitness level. Based on the variations in RMSSD values throughout the tennis season, they can adjust and optimize the training load by taking into account players' fitness level and goals at any given time. With data that is both objective and player-specific, this method allows for the planning of optimal recovery periods, thus helping players to peak at the right moment and avoid overtraining.

Given the current demands of modern tennis, it has become essential to provide coaches and players with efficient tools that can help them in their search for optimal fitness and preservation of health. Thanks to new technology, it seems that the HRV method can be used as such a tool.

INTERPRETATION OF DATA

In practical terms, HRV monitoring is very easy to implement and involves few constraints. This method is non-invasive, fast (approx. 5 minutes) and practical (upon awakening, in the bed) and can therefore be used directly by the players, independently and even when travelling.

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RECOMMENDED ITF TENNIS ICOACH CONTENT (CLICK BELOW)

Tennis*i*Coach

Summarizing tennis data to enhance elite performance

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ABSTRACT

This article provides a classification of online and commercially available data for the men's and women's singles professional tennis circuit. The various data sources are categorized by data type (e.g. ratings, point-by-point data, match statistics), tournament type (e.g. Grand Slam, Olympics, ITF Circuit) and the year commencing. The results could be used in building decision support tools allowing for accessible data information for coaches in preparation for an upcoming match.

Key words: match statistics, point-by-point data, ratings, decision support

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INTRODUCTION

The men's professional circuit has undergone several structural changes since the Open Era in 1968. The Association of Tennis Professionals or ATP was formed in September 1972. Since 1990, the association has organized the worldwide tennis tour for men and linked the title of the tour with the organization's name. In 1990 the organization was called the ATP Tour, which was renamed in 2001 as just ATP and the tour being called ATP Tour. In 2009 the name was changed again and is now known as the ATP World Tour. It is an evolution of the tour competitions previously known as Grand Prix tennis tournaments (1970 to 1989) and World Championship Tennis (1968 to 1990). The International Series (known before 2000 as the ATP World Series) and the International Series Gold were a series of professional tennis tournaments held internationally as part of the ATP from 1990 until 2008. The current structure being the ATP World Tour comprises a series of tournaments from ATP World Tour Finals, ATP World Tour Masters 1000, ATP World Tour 500 series, ATP World Tour 250 series and ATP Challenger Tour. Note that the ATP World Tour Masters 1000 had emerged from 1990; originally known as the ATP Championship Series Singles Week (1990-1993), Mercedes-Benz Super 9 (1993-1999), Tennis Masters Series (2000-2003), ATP Masters Series (2004-2008), and the present name of ATP World Tour Masters 1000 took effect in 2009. Note also that the ATP World Tour Finals was known as the ATP Tour World Championship (1990-1999) and the Tennis Masters Cup (2000-2008). The ITF Men's Circuit is a series of professional tennis tournaments held around the world that are organized by the International Tennis Federation. Originally, the ITF Men's Circuit consisted of Satellite tournaments, each of which took place over four weeks. However, in 1998, the ITF introduced Futures tournaments, allowing for greater flexibility in the organization of the tournaments for national associations, and participation in tournaments for players.

Over time, the ratio of Futures tournaments to satellites increased until 2007, when satellites were eliminated entirely.

Similar tournament structural changes have occurred on the women's professional circuit since the Open Era in 1968. The Women's Tennis Association (WTA), founded in 1973 by Billie Jean King, is the principal organizing body of women's professional tennis. Since 1983, the association has organized the worldwide tennis tour for women. Formed in 1970, the Virginia Slims Circuit eventually became the basis for the later named WTA Tour. The WTA Tier I, II, III and IV structure were a series of professional tennis tournaments held internationally as part of the WTA tour from 1988 until 2008. The current tournament structure of the WTA Tour was introduced in 2009 and comprises a series of tournaments from WTA Tour Championships, Premier, International and Challenger events. Note that the Premier tournaments consist of Premier Mandatory, Premier Five and Premier. The ITF Women's Circuit is a series of professional tennis tournaments run by the International Tennis Federation for female professional tennis players.

A vast amount of data is collected and stored in tennis either directly online or through various commercial software providers. This includes the typical set-by-set score line. For example Novak Djokovic defeated Andy Murray in the 2013 Australian Open final 6-7, 7-6, 6-3, 6-2. Match statistics may also be available after the completion of matches; particularly for grand slam events. However point-by-point data or match statistics (broken down by each set) are not as commonly available as the former. This article will outline for various data sources the coverage (by tournament type) and year commencing for each data type. To simplify the analysis the initialization of data for men's tennis will be from 1990; with the International Series tournament structure. Similarly for women's tennis the initialization of data will be from 1988; with the Tiered Series tournament structure. Summarizing data in this fashion could be useful for building decision support tools to enhance elite performance (Bedford et al, 2010). For example a coach may be interested in knowing a player's career average of points won on serve at a grand slam level as well as at an ATP World Tour Masters 1000 level. Whilst the focus is on the men's and women's professional singles circuit, similar methodology could be constructed for the men's and women's professional doubles circuits.

METHOD

Tournament classification

Table 1 provides the current tournament structure for the men's singles tour with the corresponding commencement year (with an initialization of 1990), number of tournaments played and winner's rating points in 2012. Note how the ATP World 500 series replaced the International Series Gold in 2009, and similar replacements occurred for the ATP World 250 series and ATP Challenger in 2009. Similarly, table 2 provides



the current tournament structure for the women's singles tour with the corresponding commencement year (using an initialization of 1988), number of tournaments played and winner's rating points in 2012. Table 3 provides a comparison of tournament structures between the men's and women's professional tennis circuits. Note how the tournament structure from table 2 for the women's circuit is slightly modified to align with the men's professional circuit. This consists of splitting the ITF circuit between men's tournaments where the prize money for the tournament is 10K and >10K, combining Premier Mandatory and Premier 5 events, including the WTA Tournament of Champions in International events, and combining Challenger WTA 125s and ITF >10K events. The information from table 3 in tournament classification is used below in classifying data.

CATEGORY	YEAR	NUMBER OF TOURNAMENTS (2012)	WINNER'S RATING POINTS (2012)
Grand Slams	1990 onwards	4	2000
ATP World Tour Finals	1990 onwards	1	1100 - 1500
ATP World Tour Masters 1000	1990 onwards	9	1000
Olympic Games	1990 onwards	1 (every 4 years)	750
ATP World Tour 500 series International Series Gold	2009 onwards 1990-2008	11	500
ATP World Tour 250 series ATP International Series ATP World Series	2009 onwards 2000-2008 1990-1999	40	250
ATP Challenger Tour ATP Challenger Series	2009 onwards 1990-2008	148	80 - 125
Futures Satellites	1998 onwards 1990-2006	582	18 - 35

Table 1: Tournament structure for men's singles tour.

CATEGORY	YEAR	NUMBER OF TOURNAMENTS (2012)	WINNER'S RATING POINTS (2012)
Grand Slams	1988 onwards	4	2000
WTA Tour Championships	1988 onwards	1	1050 - 1370
Premier Mandatory Tier I	2009 onwards 1988-2008	4	1000
Premier 5 Tier I	2009 onwards 1988-2008	6	900
Olympic Games	1988 onwards	1 (every 4 years)	685
Premier Tier II	2009 onwards 1988-2008	11	470
WTA Tournament of Champions	1998 onwards	1	366 - 435
International Tier III/Tier IV	2009 onwards 1988-2008	29	280
Challenger WTA 125s	2012 onwards	3	160
ITF Circuit	1988 onwards	487	12 - 150

Table 2: Tournament structure for women's singles tour.

CATEGORY		NUMBER OF TOURNAMENTS (2012)		WINNER'S RATING POINTS (2012)	
Men	Women	Men	Women	Men	Women
Grand Slams	Grand Slams	4	4	2000	2000
ATP World Tour Finals	WTA Tour Championships	1	1	1100-1500	1050-1370
ATP World Tour Masters 1000	Premier Mandatory/Premier 5	9	10	1000	900-1000
Olympic Games	Olympics Games	1	1	750	685
ATP World Tour 500	Premier	11	11	500	470
ATP World Tour 250	International/WTA Tournament of Champions	40	30	250	280-435
ATP Challenger Tour	ITF >10K/Challenger WTA 125s	148	197	80-125	50-160
Futures	ITF 10K	582	293	18-35	12

Table 3: Comparison of tournament structures between the men's and women's tour.

TYPE	TYPE BREAKDOWN	SOURCE	COVERAGE	YEAR COMMENCING
Ratings	Weekly	OnCourt	Rating Tour	2003
Ratings	Weekly	Tennis Navigator	Rating Tour	2007
Score line	Set-by-Set (incl. game score)	OnCourt	Main Tour ATP Challenger Tour Futures	1990 1998 2004
Score line	Set-by-Set (incl. game score)	Tennis Navigator	Main Tour ATP Challenger Tour	1980 2005
Score line	Set-by-Set (incl. game score)	ATP World Tour	Main Tour ATP Challenger Tour Futures	1990 1990 1998
Score line	Game-by-Game	OnCourt	Main Tour	2007
Score line	Point-by-Point	OnCourt	Grand Slams Finals Masters 1000 Olympic Games 500 series 250 series ATP Challenger Tour	2009 2009 2009 2012 2010 2010 2012
Match Statistics	Match	OnCourt	Grand Slams Finals Masters 1000 Olympic Games 500 series 250 series ATP Challenger Tour	2004 2006 2006 2012 2007 2007 2011
Match Statistics	Match	Tennis Navigator	Grand Slams* Finals Masters 1000 500 series 250 series	2003 2009 2009 2010 2010
Match Statistics	Set	Tennis Navigator	Grand Slams*	2003
Match Statistics	Set	Grand Slam sites	Grand Slams^	
Match Statistics	Set (incl. serve stats) (incl. return stats) (incl. rally stats) (incl. dir serve stats)	Grand Slam sites	Grand Slams**^	

Table 4. Data availability for men's professional circuit. * excludes qualifying matches. ^ data available online for approximately one year.

	NOVAK DJOKOVIC						ANDY MURRAY					
	Winners		Forced Errors		Unforced Errors		Winners		Forced Errors		Unforced Errors	
	FH	BH	FH	BH	FH	BH	FH	BH	FH	BH	FH	BH
Approach Shots	-	1	-	-	-	-	-	-	-	-	-	-
Drop Shots	-	1	-	-	-	-	-	-	-	-	-	1
Ground Strokes	1	2	2	3	11	10	4	-	1	2	3	7
Lobs	-	-	-	-	-	-	-	-	-	2	-	-
Overhead Shots	4	-	-	-	-	-	1	-	-	-	-	-
Passing Shots	1	1	-	-	-	-	-	-	2	1	-	-
Volleys	-	-	-	1	1	-	2	-	-	-	-	-

Table 5. Rally Statistics for the 1st Set of the 2013 Australian Open final between Novak Djokovic and Andy Murray.

TYPE	TYPE BREAKDOWN	SOURCE	COVERAGE	YEAR COMMENCING
Ratings	Weekly	OnCourt	Rating Tour	2003
Ratings	Weekly	Tennis Navigator	Rating Tour	2004
Score line	Set-by-Set (incl. game score)	OnCourt	Main Tour Challenger (125s)/ITF10K ITF 10K	1997 2002 2005
Score line	Set-by-Set (incl. game score)	Tennis Navigator	Main Tour	1995
Score line	Set-by-Set (incl. game score)	WTA	Main Tour	1988
Score line	Game-by-Game	OnCourt	Main Tour	2007
Score line	Point-by-Point	OnCourt	Main Tour	2010
Match Statistics	Match	OnCourt	Grand Slams WTA Tour Championships Premier Mandatory/5 Olympics Premier International/ WTA Tournament of Champions	2004 2005 2006 2012 2006 2007
Match Statistics	Match	Tennis Navigator	Grand Slams*	2003
Match Statistics	Set	Tennis Navigator	Grand Slams*	2003
Match Statistics	Set	Grand Slam sites	Grand Slams^	
Match Statistics	Set (incl. serve stats) (incl. return stats) (incl. rally stats) (incl. dir serve stats)	Grand Slam sites	Grand Slams*^	

Table 6. Data availability for women's professional circuit. * excludes qualifying matches. ^ data available online for approximately one year.

Data classification

Table 4 outlines data availability for the men's professional circuit. OnCourt1 and Tennis Navigator2 are commercially available software packages. The tennis ratings are given on a weekly basis for OnCourt (since 2003) and Tennis Navigator (since 2007). The Rating Tour refers to all the tournament types outlined in table 1. The Main Tour refers to tournaments in table 1 with the exclusion of the ATP Challenger Tour and Futures. OnCourt, Tennis Navigator and the ATP World Tour3 provide set-by-set (incl. game score) score lines. However the ATP World Tour provides this information for all tournament types since 1990. OnCourt provides game-by-game score lines for the Main Tour from 2007 and provides point-by-point score lines for the Main Tour as well as the ATP Challenger Tour. Match statistics are provided for both OnCourt and Tennis Navigator. However Tennis Navigator provides match statistics broken down by each set for Grand Slam matches since 2003. The various Grand Slam sites also provide match statistics broken down by each set at the completion of matches. However the Grand Slam sites are more detailed than the standard match statistics given in Tennis Navigator (and OnCourt). For example Rally Stats are given for each set consisting of Approach Shots, Drop Shots, Ground Strokes, Lobs, Overhead Shots, Passing Shots and Volleys; and each shot categorized as a Forehand or Backhand Winner, a Forehand or Backhand Forced Error, or a Forehand or Backhand Unforced Error. Table 5 gives the Rally Statistics for the 1st Set of the 2013 Australian Open final between Novak Djokovic and Andy Murray. Table 6 is given similarly to table 4 for the women's professional circuit.

CONCLUSIONS

Data availability for the women's and men's singles professional tennis circuits are given in concise tables by categorizing for the various data sources the coverage (tournament type) and year commencing. The results could be used in building decision support tools allowing for accessible data information for coaches in preparation for an upcoming match. Whilst the focus is on the men's and women's professional singles circuit, similar methodology could be constructed for the men's and women's professional doubles circuits.

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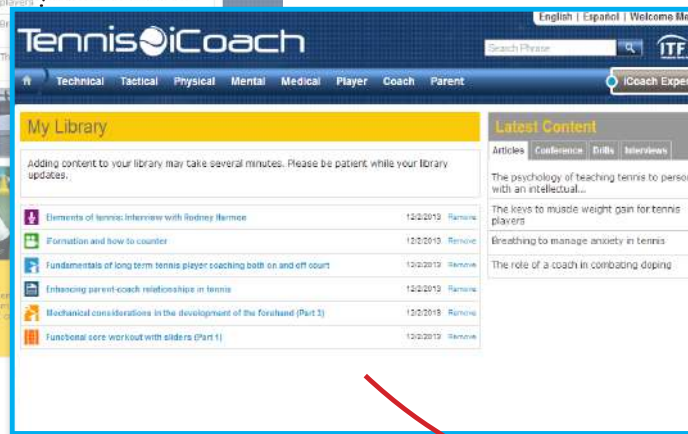
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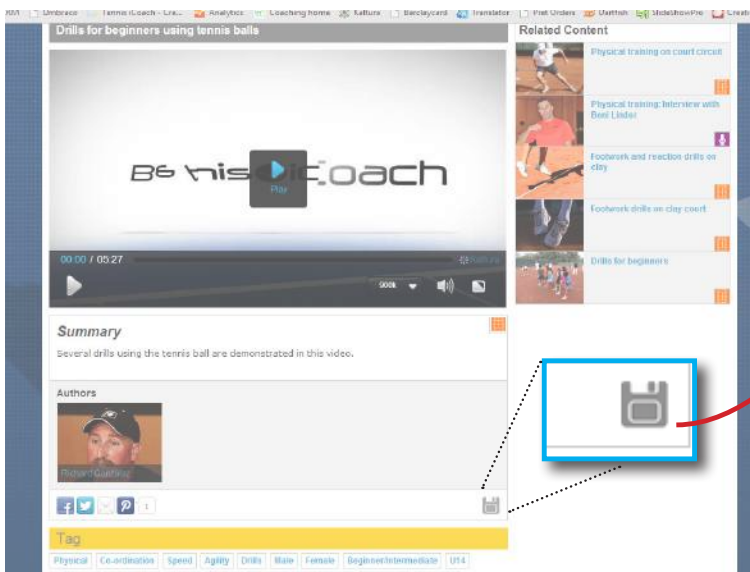


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Tennis play and stay for beginners aged 65 and over

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ABSTRACT

The purpose of this article is to discuss the educational value of the Tennis Play and Stay programme to introduce tennis to the elderly. After a brief historical presentation, I will discuss the population growth of people aged 65 and over as well as my experience of working with this age group, which has been extremely exciting and gratifying both personally and professionally.

Key words: tennis play & stay, beginner players, 65 and over

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INTRODUCTION: HISTORICAL PRESENTATION OF THE TENNIS PLAY AND STAY PROGRAMME

In 1994, the French Tennis Federation (FFT) launched mini-tennis for children aged 5 to 7, the equivalent of the Red stage or stage 3. In 1996, in an effort to structure teaching activities aimed at children aged up to 18 years, the FFT officially recognised the progressive tennis concept through the launch of its Club Junior programme.

In 2000, following the success of these new educational methods based on the idea of learning to play in a fun manner, the FFT introduced its Tennis Adultes initiative, which advocates that tennis teaching should be adapted to each stage of learning, regardless of age.

More recently, in 2009, the FFT launched “baby-tennis”, a programme specific to children aged 3-4. When working with children of this age group, it is essential to have an extensive knowledge of their behaviour patterns, learning abilities as well as their overall functioning in order to use appropriate teaching aids. The teaching methods used for the baby-tennis programme are closely related to these children’s play space, colours, imaginary as well as specific language.

The successes of progressive tennis have paved the way for many national tennis federations around the world (LTA Mini Tennis in 2001, Tennis Australia MLC Tennis Hot Shots in 2008, etc.).

In 2007, the ITF launched the Tennis Play and Stay campaign in an effort to harmonise tennis teaching and competitions for children and young people; three different stages were introduced: Red/stage 3 (service box, use of foam balls, 31.5-33” net height), Orange/stage 2 (58-60ft court, use of soft balls, 31.5-36” net height) and Green/stage 1 (full-size court, use of green balls and standard net height).

Now that efforts have been made to adapt tennis teaching to children (from the age of 3), young and adult players, what is the current situation for elderly people aged 65 and over? Are the different stages of Tennis Play and Stay appropriate for this age group? Is it possible to start playing tennis at the age of 65 and over and keep playing until the age of 99 and over?

In order to provide some answers, I will first take a look at some well-established facts and then share with you a recent experience which proved to be exciting and very rewarding.

FACTS

According to a report from the United Nations Population Division on population ageing, “As the twenty-first century began, the world population included approximately 600 million older persons, triple the number recorded 50 years earlier. By 2050, the world is expected to have some 2 billion older persons—once again, a tripling of the number in that age group within a span of 50 years.”

In comparison, in 1990, the population of France included 13.9 million people aged over 65, of which 6.8 million were over the age of 75. According to INSEE (French National Institute for Statistics and Economic Studies), it is expected that by 2015, these numbers will be 18.4 million and 9.1 million, respectively, representing a 33% increase in this population.

The audience of older people, including people aged 65 and over, is therefore increasing; these people are living longer (thanks, amongst other factors, to medical advances) and have lots of free time to spend.

The change in the number of FFT members aged 65 and over provides further confirmation of this trend, as an average increase of 5 to 7% has been recorded annually these last ten years.

The fact that the French Ministry of Sports and Ministry of Health have been merged into one entity in the past and the recent news in the media that sport could be prescribed by French doctors and reimbursed by social security in the future indicate that exercise has beneficial effects on physical and mental fitness and, more generally, is good for your health. It is also worth noting that some clinics, health care and rehabilitation centres already offer sports activities to their patients. In issue 42 of ITF Coaching & Sport Science Review, Babette M. Pluim (Royal Dutch Lawn Tennis Association) discusses the health benefits of tennis: “The health benefits of aerobic exercise are well established. Research has shown that regular moderate physical activity has a beneficial effect on health and is associated with a decreased risk of diabetes and cardiovascular disease.”



TENNIS PLAY AND STAY FOR PLAYERS AGED 65 AND OVER: IT WORKS!

Thursday, January 31, 2013 – One of the adult players I had introduced to tennis (a former professional kitesurfer) and helped improve technically using adapted Tennis Play and Stay equipment calls me to ask if I can introduce his 85-year-old mother to tennis. An appointment is made for the next day.

Friday, February 1, 2 pm – I arrive at the scheduled appointment with my modified equipment.

During the presentations, I try to learn a little about the past of my soon-to-be student, who will turn 85 two weeks later : she tells me she's never done any sport her whole life, but is quick to add that she has "green fingers"! As for her health, she is in good physical and mental shape and is completely independent. As could be expected, she looks younger than her age.

After a few rallies, it quickly appears that playing with the big Red/ stage 3 balls in the service box with two bounces allowed is the most appropriate game format for the novice player who is in front of me. We have fun playing like five- or seven-year-olds who discover and learn tennis at the stage 3 level. The day of our second session, my student arrives with a light adult racket (230 g) and a nice outfit that she got from her son for her 85th birthday.

After three one-hour weekly sessions, my student has made impressive progress (thanks to the use of appropriate equipment) and the consistency level she's achieved is such that the decision is taken to maintain this weekly schedule.

"Mémé", as her friends and family call her, is thrilled with her new weekly physical activity. Because she sometimes suffers from osteoarthritis and has 85-year-old bones, the decision is made not to have her change her grip between her forehand and her one-handed backhand and to use a continental grip to avoid all unnecessary pain. During sessions when there is no wind, we will try and play using the larger foam balls, thus reducing stress at impact. Depending on progress made, I then feel that we'll be able to move to the Orange stage (stage 2) within a few sessions.

From the 6th individual session, we begin to switch between the Red/ stage 3 format (during warm-up, starting at the net) and the Orange/ stage 2 format that "Mémé" is more and more comfortable with as the sessions progress.

After watching others play, she volunteered to serve and asked me how to do it. So we started to simply try and put the ball into play from the service line by hitting the ball over the head without worrying about the technical execution of the movement which is a bit complex (see my online video available on my Website: www.pro-tennis-coach.com).

With respect to the weight and size of the racket, depending on the morphology of the player, it can be a good idea to use lighter and smaller junior rackets. As for the surface, being slower, clay is more suitable for learning and less stressful on the joints. However, it is also more slippery.



ELDERLY PEOPLE, AN IMPORTANT SEGMENT FOR COACHES, CLUBS AND TENNIS

People aged 65 and over are an important group that the majority of tennis coaches and clubs should not overlook.

Professional tennis teachers are usually busy providing group lessons to young and adult players on Wednesdays, at weekends as well as on weekday evenings. The rest of the time is typically devoted to individual lessons, either late in the evening for people who have a job or during the day for housewives, freelancers working from home and... retired people.

With elderly people, organising groups of 3 or 4 players facilitates their introduction to tennis, as well as skill development, game situation training and doubles play. In the words of Babette Plum, "doubles play may be sufficient for the middle-aged or senior tennis player, because their maximum heart rate and VO₂max are decreased. This has the added benefit that it increases the chance that those who play tennis are likely to maintain the sport when they grow older. Hence, the positive effects are maintained. In order for exercise to exert a positive effect, one has to embrace lifelong exercise patterns."

In the United Kingdom, inter-club doubles competitions are a serious business. Speaking from experience, I can assure you that an experienced team of British senior players will give any team of young ITN 4 French players a run for their money! Fortunately, post-competition social tennis activities (afternoon tea, happy hour, dinner, etc.) usually make the process of coming to terms with defeat much easier and happier. This could give us some ideas of activities that could be organised by the French Tennis Federation or other tennis nations.

But for a professional tennis teacher, a retired person aged 65 or over is not only a student, a client or a potential team player. He or she can also be or become a club official, his or her employer as a tennis club president, an instructor, or play an educational role as a former teacher. These are some of the many important roles that retired persons can play within a tennis club, academy or federation.

It is often said that a woman adds value to any educational team, but the same can be said of any instructor or professional teacher aged 65 or over; the skills and expertise these people can offer to tennis clubs, parents or children, even very young ones, are invaluable. Madeleine Frotey, an 81-year-old woman who has been teaching mini-tennis at the La Grande-Motte Tennis Club in the South of France since 1975 is a perfect example of what elderly people can bring to a tennis organisation.

As far as activities in tennis clubs are concerned, retired persons are usually among the first people to volunteer their services to organise a meal, an evening or a trip or act as a referee or chair umpire. Because they have lots of free time and a great relationship with children, they are ideal candidates.

SOME IDEAS OF POSSIBLE ACTIVITIES WITH ELDERLY PEOPLE

- Doubles play activities using the Green/ stage 1 format.
- Friendly intergenerational events where each doubles pair is made up of a youngster teaming up with a veteran player.
- At the highest international level, the top players in the over 75 age category can be considered ITN 5 players, while the best players in the over 65 age category still have an ITN 3 playing level (such as 69-year-old Patrice Beust, Yannick Noah's very first coach). Based on this, it would be a good idea to have the top international 12 and under junior players compete against the best ranked players in the over 65 category and have players share their views and experiences at the end of the singles and doubles matches.

This idea actually reminds me of a match at the 1999 Montpellier tournament between Alain Vaysset (currently ranked 14th in the over 60 category, i.e. ITN 4) and Richard Gasquet (currently number 9 in the ATP Tour singles rankings; aged 13 and ranked ITN 3 at the time), a match that the youngster had won in two straight sets of 7/6 and 6/2.



CONCLUSION

In these difficult times of financial crisis and high unemployment, elderly retired people are likely to become a large part of our customer base in the future, leading to an increase in the number of our weekly work hours. People aged 65 and over will represent a bigger part of the population, become increasingly independent and live longer. Consequently, they will be more and more eager to devote their free time to new hobbies and activities.

As for rehabilitation centres and nursing homes, chances are that they will turn to sports instructors (i.e. people like us) more and more frequently to offer activities and sports outings and events to their patients. With the development of and increase in cultural and sports associations for the elderly, it has become clear that people aged 65 and over represent a potential market that should not be overlooked in these difficult times.

The signs are that governments, authorities as well as sports associations and organisations will increasingly support actions in favour of older retired people.

Sport is good for your health and it is never too late to start. Based on what I have experienced professionally since the beginning of the year, I can confirm that it is indeed the case. Tennis is a great way to stay healthy, both physically and mentally, while having fun, regardless of your age or level. Now is the time for us to play the game with older retired people!

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Analysis of the temporary aspects and actions of the game in performance junior players and the differences when playing with adapted material

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ABSTRACT

The main objective of this research is to find out the differences in the duration of the points and playing actions when playing on smaller courts, and with lower pressure orange balls vs yellow balls on a full court. In order to do so, 8 competition children were analysed in 16 matches played to 11 points. The results showed significant differences in the length of the points, the total number of strokes per point and the percentage of winners in favour of the adapted material, which confirms the efficacy of the adaptations of the ITF by means of the "Tennis Play & Stay" programme.

Key words: adapted material, junior players, duration of the point, number of strokes

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INTRODUCTION

Currently, early specialization is more and more frequent in tennis players, who start practising the sport at the age of 6, competing at 9 and specializing at 10 (Jayanthi, O'Boyle & Durazo, 2009). In order to facilitate learning for these young players, the ITF has recently developed different strategies through the "Play & Stay" programme, changing the pressure and the size of the balls to make them slower, bounce lower and reduce the size of the courts. Different findings from different studies state that these modifications contribute to the greater success in children tennis (Newman, 2010; Milley, 2010).

Besides, the identification of the parameters that make up the temporal structure of the action of the game, such as the duration of the points, the number of strokes per point, or the number of winning strokes and unforced errors are important indicators in the analysis of the performance of the player (Crespo, 1993; Gutiérrez, 2010). Many tennis studies have evaluated the actions of the game (O'Donoghue & Ingram, 2001; Verlinder et al., 2004), and the temporal aspects (Fernández, Sanz, Fernández & Méndez, 2008; Schonborn, 1989), at different ages and in different levels and playing surfaces, but no studies have been made on young players or on the use of adapted material.

Therefore, the aim of this research is to analyse the temporal structure and the actions of the competition game of tennis at young ages and to prove the existing differences when playing with adapted material.

METHOD

Sample

Participants in this research were eight male tennis players, average age 8.24 ± 0.74 years old, training an average of 7.38 ± 2.43 hours per week and with a minimum experience of two years competing regularly. For this purpose, 16 matches were analysed (8 matches on a small court with Orange balls and 8 on a full court with traditional yellow balls) playing to 11 points.

Procedure

All matches were recorded with a digital video Sony camera placed at the back of the court, 6 mts high. Then, they were analysed by two previously trained observers following the indications of Anguera (2003), presenting an inter observer reliability level of 97%. Finally, statistic data was analysed using an SPSS 20.0 IT pack, presenting the media values and the typical deviations of each variable. The different variables of the groups were compared with Kruskal-Wallis y Mann-Whitney tests for independent samples.

Instruments

In order to evaluate the actions of the game and the temporal aspects, and, like in similar research (Gorospe, Hernández, Anguera & Martínez, 2005), we designed an ad hoc observation tool made up of a notational system that includes the following categories: the time each point lasts, the number of strokes per point, the number of winning strokes and the number of unforced errors.

RESULTS

Table 1 shows the findings related to the analysis of the duration of the points and the number of strokes. These findings show longer points and a greater number of strokes when playing on smaller courts with lower pressure balls (adapted material), the differences were significant ($p < .05$).

	Adapted material		Traditional material		Z	SIG.
	M	TD	M	TD		
Duration of the point	6.71	4.22	4.45	2.97	-2,352	.019*
Number of strokes per point	3.92	2.55	2.71	2.29	-2,210	.027*

Table 1. The difference in the length of points and the number of strokes per point between playing with traditional material and adapted material.

NB: * $p < .05$; M = Media; TD = Typical deviation.

When we analyzed the actions of the game (Figure 1), we observed 51.28% of unforced errors, versus 48.71% in matches played with adapted material, when playing with traditional material, unforced errors reached 77.14% per 22.86% winning strokes, these differences were significant ($p = .22$).

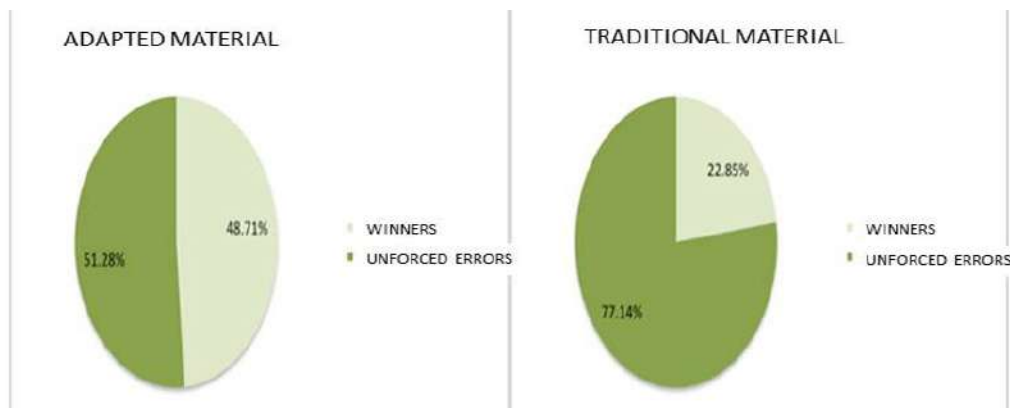


Figure 2. Differences in the number of winning strokes and unforced errors when playing with traditional and adapted material.

COMMENTS

To comply with the target of this research, great differences in temporal analysis and actions of the game were observed in matches played with traditional material and adapted material. The average duration of the points ranged between 4.45 and 6.67 seconds, less than the average of most of the authors, although considering different populations (Fernández et al., 2008; Hornery, Farrow, Mújica & Young, 2007; Relley & Palmer, 1995). The number of strokes per point ranged between 2.71 and 3.92, somewhat less than in other studies: 3 to 5 (O'Donoghe & Ingram, 2001; Smekal et al., 2001), although it might be higher depending on the surface (Verlinden et al., 2004).

CONCLUSIONS

Today, most coaches accept that the modified balls and courts are important for children under 10 since they help to increase participation and facilitate the game from the beginning, although not many studies have been made so far. The findings of this study confirm that the evolution of tennis material, when adapted to the characteristics of children under 10, is beneficial: points are longer and the total number of strokes and winning strokes is higher because of the longer reaction time and the correct impact point of the ball.

On top of that, young players can use advanced tactics like attacking from the net, or aggressive and winning groundstrokes which are only possible because of the slower and lower bouncing balls (McEnroe, 2010). These adaptations encourage the use of topspin and the use of angles to move the opponent, the only way of moving him/her out his/her position on a smaller court. The greater number of shots played during the points will encourage the use of training systems based on the students rallying on their own from an early age, thus, fostering their independence, since they can already practice different game situations without the coach. This contributes to greater participation and greater enjoyment out of tennis practice (Hammond & Smith, 2006).

Finally, it can be stated that the efficacy of the adaptations made by the ITF, by means of the Tennis 10s and Tennis Play & Stay programmes, will contribute to a better tennis player development not only at the technical but also at the physical, tactical and mental levels.

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