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Editorial

The ITF Coaching department is proud to welcome you to the 56th issue of Coaching and Sport Science Review, in this the 20th anniversary of its launch. The articles in this monographic tactics issue cover a number of topics, including how to train clay court strategy, modern doubles tactics and patterns, common flaws in strategy, and 'game theory'. The articles within this special issue come from a number of contributors, including Javier Piles- the ATP touring coach of David Ferrer, four- time Grand Slam doubles champion Wayne Black, Carlos Rodriguez- coach of former world number 1 Justine Henin and leading tennis researchers from around the world. We hope that this collection of articles will form a comprehensive coaching resource on tactics of the modern game of tennis.

Since its launch as a biannual publication in English in 1992, the ITF has published over 560 articles from contributors of more than 35 different nationalities. Today the review is produced 3 times per year in the 3 official ITF languages of English, Spanish and French and made available free of charge on the ITF coaching weblet at <http://www.itftennis.com/coaching/sportsscience>

In 2012, the ITF will again once again be organizing Regional Coaches Conferences. The ITF Regional Coaches Conferences are conducted every 2 years in partnership with Olympic Solidarity and the relevant Regional Associations (ATF, COSAT, COTECC, and CAT).



Robert Ballard presenting at the previous 2010 edition of the Asian Regional Coaches Conference in Subic Bay, Philippines.

The tentative dates for the ITF Regional Coaches Conferences are as follows:

19 - 22 September

7th Central American and Caribbean Regional Coaches Conference – Guanajuato, Mexico

22 - 25 September

8th Southern African Regional Coaches Conference - Pretoria, South Africa

10 - 13 October

1st North African & West Asian Regional Coaches Conference - Hammamet, Tunisia

16 - 19 October

14th South American Regional Coaches Conference- Santa Cruz, Bolivia

7 - 10 November

16th Asian Regional Coaches Conference - Bangkok, Thailand

Coaches who are interested in attending the conference in their region should approach their National Associations who will shortly be receiving detailed information regarding the conferences. Relevant information will also be available on www.itftennis.com/coaching over the coming months.

The European Coaches Symposium will also take place in Helsinki, Finland from 24th -28th October and coaches interested in attending should contact Tennis Europe.

Another exciting event this year is the re-launch with a new appearance and structure of the ITF Coaching weblet which we hope will improve the ease of navigation and enhance the user experience for visitors to the site. The coaching weblet will continue to provide and disseminate the most important tennis specific information and resources such as the CSSR, as well as keep coaches up-date on important international coaching matters.

Finally, as the CSSR heads into its 20th year, we would like to thank you as one of our valued readers, and hope that you enjoy edition 56 of the ITF Coaching and Sport Science Review.

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How to train aggressive clay court strategy and tactics

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ABSTRACT

This article outlines a successful school of thought for developing clay court players with a more aggressive game style than traditionally used on clay. Some underlying strategic principles for effective clay court play are discussed, as well as the use of drills that develop tactical awareness and competence. The article aims to provide coaches with principles that successfully foster clay court competence within their players.

Key words: Tactics, clay, aggressive

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INTRODUCTION

A successful clay court player usually has the following characteristics; a more consistent game, very strong groundstrokes, patience and good physical endurance. However, clay court specialists often have their disadvantages, primarily including less focus placed on the development of their serve and net game (Martinez, 2002). During a career working with players including Jim Courier, Monica Seles, Andres Gomez, Mary Pierce, Eva Majoli and Andre Agassi- all of whom were more all-round players than clay court specialists, but who have won the French Open- the key factor for their success on clay, was that these players all understood the importance of being very familiar with the surface. They knew how to move on it, they tailored their training to clay, and most interestingly, they approached the game tactically in a very aggressive way.

The traditional and stereotype clay court player, is one who stays much further back and often reacts to their opponents more so than dictating play. It is also commonly agreed now however, that the existence of this counter- puncher game style is relatively extinct (Martinez, 2002). The modern player is now able to hit and dictate aggressively from all areas of the court whilst using a number of sound clay court principles (Kopsic & Segal, 1995). Players such as Andre Agassi achieved great success using a very aggressive style of play when compared to traditional clay court play. When working with these players during the clay season, they were not encouraged to back up and it was instructed that they stayed close to the base line. Numerous coaches have suggested that with an aggressive style like this it was impossible to win on clay. This was proved wrong many times by the list of successful players above.

PRINCIPLES FOR EFFECTIVE CLAY COURT PLAY

Movement

Players should move by sliding and use the court to their advantage with a 'slide, hit, recover' sequence. They have to be able to move side to side with equal dexterity, forward and backwards, with an emphasis on keeping their balance while they execute the stroke. On clay, it is particularly important to keep a low center of gravity and use wider stances.

Close to the baseline

We make sure that our students play as close to the base line as possible, backing up deep to defend is not an option.

Physical shape

To win on clay the players have to be in great physical shape, the points on this surface are longer. That is why it is important to work daily on movement with tennis specific exercises; this is done on clay courts, with the racket, executing shots.

Patience

They have to be consistent and patient, it is very difficult to hit straight out winners; the bounce of the ball is slower and higher, therefore heavy

topspin is very useful in this surface when compared to attempting flat winners. Especially on clay, players have to follow a very disciplined sequence while building the point: control, hurt, finish.

Attack a player's movement

Attack movement, the players must work on opening the court, this is done by hitting side to side and then behind, also attack movement with angles, slices and drop shots. The idea is to hit the ball to all areas of the court, deep with high heavy spin, middle of the court with angles and the short court with drop shots. Keep the opponent off balance.

Control the centre of the court

On clay more than any surface it is imperative to control the center of the court; the player that controls the center has the upper hand. The first serve should be wide 70% of the time, to take control of the center right away, the next shot the server hits should be a forehand to the open court and once in a while behind the opponent. Once the opponent is on the run keep attacking movement (control), once you have him out of position and off- balance (hurt), then take advantage of the short ball and finish the point being aggressive (finish).



Neutralizing returns

The return should be high and deep to the middle of the court to neutralize the serve, when returner has time and the score in his favor he should go down the line.

Mental toughness

Another vital part to be able to win on clay is the mental part, the players have to be smart and aggressive, but also tough, relentless and very disciplined to endure the longer physical battles.

TRAINING STRATEGY FOR THE CLAY SEASON

At least one month before the clay court season starts, the player and team should move from hard to clay in order to provide time to adjust their game. The following drills and principles were adopted during this preparatory training period with Monica Seles, Mary Pierce, Eva Majoli, Andre Agassi, Marcelo Rios, Jim Courier and many more players who reached the latter stages of Roland Garros.

HIGH NET

Objectives:

- To hit the ball high over the net with enough margin for error, no mistakes
- By hitting the ball high it will also travel deep, high and deep. No balls in the net, no short balls
- Getting used to hitting and receiving high and heavy balls starting with the topspin serve
- Use the high net during the entire season, including playing matches



Execution:

- Use two sticks with a rope, place them at the net posts on each side, the rope will be 2 feet high over the net
- Start with balls down the middle working on consistency, make sure the balls are high, deep and heavy, no pushing
- Hit cross courts first and then down the line
- Do the same exercise applying movement, for example one player hits down the line, the other player hits cross court
- It is very important to place the emphasis in the use of the legs to execute each shot
- Lots of repetitions to create muscle endurance, build aerobic capacity, concentration, discipline and more than anything else confidence.

ANGLE SHOTS OUT OF THE BASKET

Objectives:

- Feel confident hitting angles from anywhere in the court
- Hit angles from both sides forehand and backhand



- Hitting angles on the run
- Attacking the middle court

Execution:

- The coach places the basket closed to the net
- The first drill, feed ball close to the net, player has to hit a very short angles
- Second drill, feed ball a little further back and closer to the service line
- Third drill, feed ball between service line and base line
- Fourth drill, feed ball to base line
- These four drills should be executed using all forehands, 20 balls per set
- Second basket, all backhands, 20 balls at the time from all the different positions on the court
- Third basket, applying movement, side to side from the different zones

SERVE AND RETURN

Objectives:

- Opening the court with the serve. The objective of the server is to control the center of the court from the first shot and then continue attacking movement
- Attacking movement with the forehand after the serve
- Returner neutralizing the middle of the court taking away the advantage of the server



Execution:

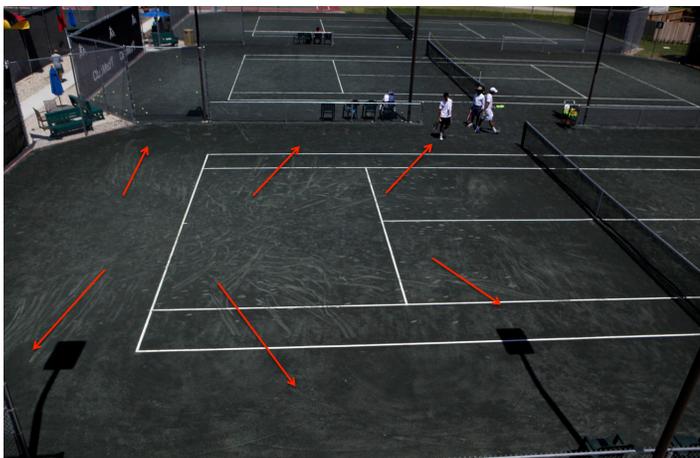
- Using the high rope over the net, but just two feet higher
- Players play the points keeping score
- Server places the serve wide and then hits a forehand to the open court. The server always looks to hit the "forehand" after returner hits the ball back.
- Returner hits the return deep and to the middle of the court pushing the server back, the goal of the returner is to have enough discipline to neutralize the return playing high percentage tennis
- Play sets making sure the players are following this basic pattern.

USING THE COURT AS A PHOTOGRAPH

Objectives:

- To visually study the way the players are using the court
- Analyse the markings on the court from the ball impressions, as well slide marks- it will be easy to see the patterns of play
- Using these marks on the court, the players can see if they are attacking all three zones of the opponents court: deep, middle (use of angles), and short (use of drop-shots)

d) Easy to see the placement of the serves, and to make out the depth of balls.



Execution:

- a) Make sure the court is swept before the exercise starts, so there are not markings on the court
- b) Players should play points without changing sides

c) After one set, take the players out of the court and if possible from a high position study the marking on each side, look for the depth, middle (angles), and short sliding. Also look for the markings on the serves, these marks on the court don't lie, it will be easy to spot what the players are doing well and the areas they need to improve.

d) After the first analysis, sweep the court again and play a second set, make sure the players improve their ball placement and the way they utilize the entire court to attack the opponent's movement.

CONCLUSION

This article has outlined some key principles and strategies that can and should be used on the game of clay, whilst also proposing the adoption of a more aggressive game style for success at the highest level. Modern tactics are continually evolving (see Crespo and Reid, 2002) and the coach must develop a player to be tactically smart in order to have success at any level. Principles and drills for preparing a player for the clay season were outlined, in the hope that coaches can begin to develop their players into clay court tacticians.

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Be aware of potential traps in strategy

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ABSTRACT

To develop and implement an effective strategy is an on-going challenge for tennis players each time they compete. This article reviews common traps and key elements in strategy, including lack of ownership, over-confidence and inflexibility. Suggestions for coaches to help guide players to develop sound strategic skills are offered.

Key words: Strategy, traps, coach

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"I had gone into the match with strong mental preparation. I knew what I wanted to happen and what I wanted to prevent from happening...When things were getting desperate I had a mental compass that kept me on course and gave me a way to get back in the match. Instead of rolling over and accepting defeat, I believed there was a way to win." - Brad Gilbert.

INTRODUCTION

To develop, and implement, an effective strategy is an on-going challenge for tennis players each time they compete. In his book, *Winning Ugly*, Gilbert (1993) suggests that the best players in the world come to matches armed with a strategy that starts when the first point is played. Given the critical importance attributed to strategy in the tennis literature (e.g., Crespo, Reid and Quinn, 2006; Young, 2008), it is no surprise that players who play well are frequently praised for exercising good judgment and making the right decisions. But developing strategy is not an easy process and there are many potential pitfalls.



The purpose of this article is to review common potential traps or flaws in strategy, and in doing so, to identify key elements of good strategy and the role a coach might play in guiding a player to develop sound strategic skills. For the purpose of this review, 'strategy' is defined as "the overall game plan for a certain match" (Crespo & Reid, 2009, p.87). In this context 'tactics' are how exactly a strategy will be executed. Accordingly, a 'tactic' refers to "the practical application of the strategy during the match" (Crespo & Reid, 2009, p.87). It is noted that, in the tennis literature, the terms 'strategy', 'game plan' and 'tactics' are frequently used interchangeably. So, what are the common traps in strategy? Some of these will now be briefly described.

COMMON TRAPS IN STRATEGY

The lack of ownership trap

Here the player does not genuinely believe in, or is not committed, to a strategy that has given to him/her by a coach, parent, friend or others. With little or no input in the planning process, the player has simply adopted the strategy. In these circumstances, the strategy can quickly start to unravel when things do not go to script!

The too complex trap

While the human mind is a marvel, it can only process a certain amount of information at any one time. Accordingly, when strategy is overly detailed with things the player must be aware of, and attend to, it can be simply a case of 'overload'. A strategy that is too complex will generally fail.

The 'It worked before' trap

It is wrong to assume that, because a strategy worked before, it will always continue to do so. Circumstances may well be quite different (e.g., different court surface, opponent has improved) from the time when the strategy was previously successful. Players who are complacent and do not assess current conditions and factors may well be surprised in their next encounter with an opponent if no modifications to strategy are made.

The overconfidence trap

It is great to feel confident going into a match, but too much of this positive feeling can be detrimental to effective decision making. Being overly confident can lead to a lack of planning, errors in judgment and/or taking one's opponent too lightly. As a result, a lack of attention to detail and appreciation of the actual situation can be costly.

The 'Too little too late' trap

Leaving strategy until the warm-up, or early games and first set, is a ploy fraught with danger. Granted there are times when a player does not know anything about his/her opponent, and must leave strategy to the match itself, but these circumstances are relatively rare (given a player's coach can scout an opponent, enquiries can be made etc). Delaying strategy to the match is often a recipe for rushed and scrambled decision making.

The inflexibility trap

This occurs when players fail to factor uncertainty into strategy. Not everything can be accurately predicted, anticipated or known before a match. Failing to adopt a flexible strategy, where uncertainty is the norm, often leaves a player floundering when things change in a match. Where was Plan B or Plan C?

The eternal hope trap

Sticking with a strategy, believing it will eventually work, can be a risk. Players are sometimes mistaken in their unflinching commitment to a

strategy, even when facing defeat. In doing so, they fail to remember that the phrase, 'change a losing game' was coined for good reason!

The lack of insight trap

A player who lacks a sound understanding of his/her game and what he/she wants to achieve will find it difficult to plan strategy. Like a house, strategy without strong foundations or building blocks (i.e., knowing one's strengths, weaknesses, goals) is likely to crumble under pressure.

The false consensus trap

Sometimes there is a general view shared amongst players and coaches as to how to play a certain opponent. Simply adopting this, without undertaking one's own due diligence, can be a mistake. Just because it is a widely held opinion does not necessarily make it a correct or appropriate one for everyone. Yes, it may represent a safe option, but there are risks this strategy may not be right.

What are the implications of these common traps in strategy and what can be gleaned about good strategy?

ELEMENTS OF GOOD STRATEGY

A review of the common traps in strategy (described above) provides clues as to what constitutes good strategy. These clues suggest good strategy contains a number of inter-related elements including:

- Owned by player – player is actively involved in developing strategy
- Well researched – accurate information underpins the strategy selected
- Comprehensible – player clearly understands what the strategy entails
- Robust but flexible – strategy suitable for entire match but, if need be, can be adapted or changed to Plan B.
- Feasible – 'doable' given player's game and capabilities
- Appropriate – there is a fit between player's game and desired outcome
- Simple – contains up to 4-5 key points (that could be written on one piece of paper for player to take onto court)
- Individualised – relates to player, his/her opponent and match conditions

Not only are these elements of good strategy, they also are a set of criteria to assess strategy. Is the strategy owned by the player, is it well researched, comprehensible etc. This is a valuable checklist but it should be remembered that the real and ultimate test of any strategy is whether it worked. Was it successful? Did the player achieve his/her goals? The right strategy is therefore one that is judged in hindsight to have been effective in facilitating a desired outcome. Does this necessarily mean the player won his/her match? No, effectiveness must be assessed in light of the desired outcome, and in some instances, this is not about winning but rather developing a player's game and playing as well as a player can against a much higher ranked and more experienced opponent. So, how can a coach assist a player in planning strategy?

ROLE OF THE COACH

Coaches can play a vital role in guiding a player to develop sound strategic skills. Here is a couple of suggestions for coaches to consider.

Integrate strategy into teaching the game

Time scheduled to discuss a player's strategy before and after matches is time well spent. Before a match, a coach can check to see if a player has a strategy and whether its premises and assumptions are sound. Has the player correctly analysed his/her opponent's game? Are the player's desired outcomes realistic? Is the planned strategy easy to execute? What problems might occur? In reviewing strategy after a match, a

coach can assist a player to understand the value, or otherwise, in the strategy adopted. Did it work? If so, why did it? If not, why not?

When a coach integrates discussion of strategy into teaching the game, it encourages a player to develop good match habits. Strategy is a key part of match preparation and review. It can also provide both coach and player with important information about how that player can continue to improve his/her game. Much can be learnt when both winning and losing strategies are reviewed from two perspectives, being the player and coach. It is also very valuable, when reviewing strategy, if the coach has had the opportunity to see a player's match first hand.



Challenge player with 'What if' scenarios

A coach can help a player develop sound planning strategy skills by providing 'what if' scenarios. Here the coach challenges a player to develop strategy when playing certain players or under varying conditions. For example, the coach may ask the player, "Suppose you were to play someone who has a two-handed backhand, loves clay etc, what strategy might work?" Or, "What strategy would you adopt if playing your closest tennis friend whom you have never beaten?" This activity can be a useful tool for coaches to help build a player's decision making skills.

Practise strategy

A coach can organise simulated match play when a player practises a set strategy. This can give a player tremendous confidence to use a new or different strategy under match conditions. For example, if aggressive play is required against an opponent, it is best to trial this in practice rather than waiting for a match when fear of losing may act as a deterrent for using this strategy. A practice or trial run can also give a player the chance to 'iron out any kinks' or difficulties in strategy before a match is played.

Learn from champions

Accounts of matches played by champions in major events are relatively easy to access in today's computer age. Such accounts often provide valuable insights into the minds of champions. Recorded match interviews can be particularly insightful when a champion discusses the strategy he/she adopted in a match and why it worked (or did not work). Coaches can share these accounts with a player to learn from champions who obviously have considerable first-hand credentials in planning and executing effective strategy.

Confront possible traps in strategy

Rather than pretending difficulties in strategy do not exist, a coach can tackle potential traps 'head-on' with a player. Discussions between coach and player of possible pitfalls in strategy can enhance awareness for the latter. Being aware of traps can be an important step in preventing mistakes or errors from occurring.

Offer to gather information

A coach can provide a player with relevant information in the strategy process. For example, a coach may know details about an opponent's game. Alternatively, a coach can find out such details by various means including scouting matches and practice sessions, video analysis of matches played, analysing match statistics and/or making enquiries with other coaches. While ownership of a strategy belongs with a player, a coach can bring relevant information to the table for consideration by the player.

CONCLUSIONS

Strategy can be very simple. Just ask Serena Williams who recently said, "I know if I play my game I can beat anyone on the other side of the net". What however is critical is that a player has a strategy. Strategy provides a 'blueprint' or means for a positive outcome and instils a sense of purpose into a player's game. This article highlights common potential traps in strategy, and in doing so, suggests key characteristics of good

strategy and a role for coaches to play. What is wanted at the end of matches is for a player and his/her coach to say, "Everything went to plan". For this to happen, a good strategy is essential. It is hoped this article provides clues as to how a player and coach can work together to effectively plan what needs to be done to fulfill a player's potential. Well, at least that's the strategy!

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Tactics for elite level men's tennis - Part 1

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ABSTRACT

This article discusses some ideas on top level men's tennis tactics; it is a combination of the experience of the first author as the coach of David Ferrer and the theoretical contribution of the second author. It presents some of the main characteristics of top level modern tactics and discusses the need to adapt strategy when changing surfaces, as well as the importance of the correct planning of matches, both in general and when planning to play against the world's best players. Finally, it provides practical examples of the work done with David Ferrer.

Key words: Tactics, men, top level, juniors

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INTRODUCTION

The evolution of top level tennis has reached a consensus across the perceptions of players, coaches and amateurs, as well as the findings of sport science research (Cross & Pollard, 2009; 2011). Several characteristics define this evolution. On the one hand there is the **greater speed of the ball**. It is played much faster, there is less time to think, and the tennis player must anticipate the actions of his opponent or react to them very fast. The negative consequence of this is the increase in the injuries tennis players are subject to, due to the greater speed of the game.

On the other hand, it is worth mentioning that the great players have **technically improved their groundstrokes** a great deal. Both the forehand, as well as the backhand, have become almost equal. There are no "holes" in a player's stroke repertoire. When playing Djokovic, Nadal, Federer or Murray, to mention just a few examples, all these players are solid on both sides from the back, with relatively no weakness to exploit.

From a tactical perspective, when we talk about modern tactics (Crespo & Reid, 2002) we notice that top level players have a much **more defined playing pattern** than juniors or lower level professionals. What are the consequences of this? These are analysed below:

Top level players must learn to play in a **more automatic** way, they play practically "without thinking" since it is important to act and to react fast. This makes top level tennis **less creative**. There is less room for improvisation or to try new or high risk strokes.

An advantage of this is that when the playing pattern is more defined, it is a great help from the psychological point of view. If the player suffers from lack of confidence during phases in his/her game, during a match or during some time in the season, to re-adopt that defined playing pattern which he has mastered perfectly will **help him to restore that lost confidence**.

The following part of the article can be summarised by a formula that will define top level performance in tennis. It is suggested as follows:

Playing pattern + Leg speed + Mental speed = Top performance

If we analyze the game of the great players of today: Djokovic, Nadal, Federer, Murray, Tsonga, Ferrer, etc., we notice that they all have a clearly defined and individual playing pattern. They all have excellent leg speed on court, both to reach the ball and to get away from it. Finally, they are extremely fast from a mental point of view, since they know how to "read" matches appropriately and to make the right decisions under pressure. Therefore, we can conclude that the world ranking is fair since, in the long run, the best players are the ones in the top positions who hold the three aforementioned elements.

PLAYING TACTICS AND SURFACES

Tactical work and preparation for the different playing surfaces has changed along the career of a player such as David Ferrer.

At the beginning of his professional career some aspects like **staying low** or playing flatter, were emphasized when preparing for the fast or grass court season. But now, not too many changes need to be made. The real objective is for the player to make certain **adjustments** to better adapt to the new surface (Over & O'Donoghue, 2008).

It has been noted that it is apparently more difficult to change from fast to clay courts than it is to change from clay to fast courts. When working on the transition from one surface to another one, in the case of David Ferrer, the exercises done are very similar. (Martínez, 2002).

GENERAL MATCH PLANNING FOR TOP LEVEL TENNIS

Each player-coach team has its own personal method to prepare the matches. Some prefer to talk just before the match, or, in some cases, it is the player who starts the conversation, or it is the coach who sets the general outline for how to face the match.

As in the case of David Ferrer, the coach usually initiates the discussion, which usually takes place in an informal setting, the evening prior to the match. Several fundamental aspects are usually discussed during this conversation before the match:

- Reinforce what the player does well:** Remind him of his strong points and the things he has been doing well recently: from the tactical, technical, physical or mental point of view.
- Remind him to play "with the score":** For David, there are aspects like knowing how to be more cautious at "break" points, or when the score is 30 - 0 or 0 - 30.
- Emphasize some specific tactical aspects:** These may include details like, after a good service, be careful with the opponent's return to the backhand, avoid moving to the right so as not to hit an inside-



out under pressure and while in movement. In this case, it is better to hit a backhand.

d. Emphasize some specific technical aspects: Particularly during service, toss the ball up high and on the right side to allow the optimum and appropriate execution (Elliott, 2001).

e. Emphasize some specific psychological aspects: Following up on the example of the service, bear in mind how important it is not to hurry, not to "rush" too much to serve, but be calm and stick to the most convenient routines in order to perform a top quality service.

MATCH-SPECIFIC PLANNING FOR ELITE LEVEL TENNIS

This part will discuss some fundamental aspects when planning to play against players in the top 10. There are often differences with the procedure as mentioned above. The specific aspects are:

a. Analyse the videos of the great champions: It is important to study the game patterns of the great players. There are often relevant aspects like the direction of the serve depending on the service side, or the score, to try to anticipate the intention of the opponent.



b. Plan a strategy... even if it may not work later: There is a clear example of this in the quarter finals of the 2012 Australian Open. David Ferrer was playing Novak Djokovic. The initial strategy for the first set was to pay attention to the sliced service to the forehand so as to avoid being taken out of the court. But, during the match, during the first set, Djokovic served to the backhand the majority of the time- catching David totally unaware. Then, in the second set, Djokovic changed his strategy altogether and started slicing his serve to the forehand. Here is an example of where great champions like Djokovic vary their strategy and tactics regularly, and therefore it is necessary to react in real time (Brody, 2003).

c. Provide confidence when the player is playing against a top player: A fundamental aspect of the specific tactical planning in a tennis match against players in the heights of the top 10 is the importance of providing confidence. If the player has no confidence in his game, he will not believe in his/her game and success will be much more difficult.

d. "Pay attention to the ball, not to the person hitting it": A practical example applied with David Ferrer is this sentence that describes the need to pay attention to the ball and not the player who sent it. This way, the coach makes the player concentrate on what is relevant, i.e. the ball, and not on what could negatively affect him from the psychological point of view, i.e. the level of the player who has hit it.

CONCLUSIONS

One of the most important tasks for the coach of a top level player is to facilitate the player's work. An appropriate preparation for matches, both from a specific as well as from a more general point of view, when playing against great players, is key. Not only will it impact on the tactical aspect of the performance of the player, but also on the psychological component that is so vital in performance tennis at the highest level. Finally, it is hoped that this article has contributed to clear up some tactics related concepts in top level tennis.

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Tactics for elite level men's tennis - Part 2

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ABSTRACT

This article follows from part one within this issue and continues to discuss more topics on top level men's tennis tactics. Discussions relate to the experience of the primary author, as the coach of David Ferrer, and the theoretical contribution of the second author. In part two, the authors stress the importance of physical and psychological aspects to get a better tactical performance at the highest level, as well as the best tactics from junior to professional tennis and to top champions. The article provides practical examples of the work done with David Ferrer.

Key words: Tactics, men, top level, juniors

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EVOLUTION, PROGRESSION AND TACTICAL IMPROVEMENT FROM JUNIOR TO PROFESSIONAL

It is obvious that in comparison to previous years the game has seen a considerable evolution in tennis tactics both in juniors and at the highest level. David Ferrer is an example of a player who has improved many tactical aspects during his progression from junior to professional. The following paragraphs discuss the key principles for this tactical progression.

Ferrer has tactically progressed on a crucial aspect of his game: automation. What does this mean when it is applied to tactics? It is the capacity of the player to make appropriate decisions under time pressure in an immediate and involuntary fashion.

From the tennis coaching point of view, **automation** has been generally applied to learning the technical aspects of tennis (Schonborn, 2002) but, in this case, we are particularly interested in the process by which the tennis player can make almost automatic decisions, that is to say, the way in which tactical thinking becomes a tremendously efficient process.



It is a well-known concept that tactics are mainly characterized by its variability, thus, a tactic is never the same because all situations are different, since we never hit the same ball twice, in the same place and with the same intention. Therefore the tactical process: perception - decision - action - feedback is constantly different during a tennis match.

Although certain authors state that a tactic cannot be automated (Solá, 2005), in the case of professional tennis tactics, in top performance tennis, the rhythm is so fast that the player has no time for a decision making process to choose between different options (Crespo y Reid, 2002). Instead, the player has incorporated the right decision through

extended practise, in such a way that when facing that situation during a match, the tactical response is immediate and can, therefore, be called "automatic".

What are the advantages of tactical automation? There are probably many, but, it is worth mentioning how important it is to define the **tactical pattern** of the game of a tennis player accurately. Top level players have a more defined, clear, solid and consistent game pattern than lower level players.

This is so because they have managed to achieve a "tactical automation" or a more efficient decision making, they can react tactically with greater speed and efficiency than others, and as a consequence, their tactical options are well consolidated.

But apart from the purely tactical benefits, and as far as Ferrer is concerned, achieving great "tactical automation" has helped him to improve not only tactical, but also a key mental aspect: his **confidence**.

The following paragraphs will now describe the close relationship that, in the opinion of the authors, exists between tactical and mental aspects in tennis, particularly at top level.

TACTIC AND MIND

Just as we have seen above, tactics have a great impact on the mental component. When the player can automate his tactical decisions after having worked endlessly during training, the main consequence is that the player achieves confidence in his tactical patterns and how he plays.

What does having confidence in your own tactical patterns imply? First, that the player has a clear idea of what to do in each

"When the player can automate his tactical decisions after having worked endlessly during training, the main consequence is that the player achieves confidence in his tactical patterns and how he plays"

match situation: **clear ideas** provide a **tactically defined objective**, i.e.: "When the ball comes to this area, at this height and with this speed and spin, I have to play an open, deep, high forehand with top spin."

A clear objective provides **calmness and control** at a time of great time pressure. The mental dialogue is the following: "I have trained this situation many times before, and in worse conditions, (being more tired, a faster ball, a greater effort...) and I have made the right decision, therefore... I know what to do".

Those players who are ranked among the top 10 in the world, have faith and confidence in their game. They are mentally tough tennis players. They give 200% effort in each point. They are, we might say, **mentally consistent** (Gallwey, 2006).

In top level tennis, technique and tactics are very important but the aspect that really makes the difference has to do with mental skills. We even know that **better fitness has a great impact on tennis players to reach and maintain that mental consistency** mentioned above.

We can now state, and in order to finish this section, that there may be slight tactical differences among professional tennis players, but experience shows that the difference between an 300 ATP rated player and a top 10, as David Ferrer, cannot be summarized in just one single aspect, there are a number of factors that make a top 10 player perform at his best under great pressure and, therefore, much better than the rest of the lower ranked professional tennis players.

TACTICS, TALENT AND EASE TO LEARN

In general, talent is considered an necessary asset for top performance in tennis (Solanelas, 1999). But sometimes, we find that some players have "too much" talent.

In the case of tactics, those players who are too talented can find that their talent is an obstacle and not a benefit for their tactical development. During a game situation, under time pressure, when players have to make a decision, those who are too talented, have "too

"Players who are too talented can find that their talent is an obstacle and not a benefit for their tactical development"

many" options to choose from. They can do so many things, they have the skill to hit so many different strokes, with so many variations and to so many areas on court that they find themselves unable to choose and decide on the most appropriate option.

With reference to ease of learning- some think that great champions are unable to learn new aspects of the game once they have reached the top of their game. This statement is not totally true. What really happens is just the opposite, players do learn and sometimes, they learn very fast. Great champions are tennis players who have the ability to continually learn and adapt their game as their career develops.

In the specific case of David Ferrer, his tactical development at the net is worth mentioning, particularly his volleys and the way he covers the court when at the net. Some years ago, David was not really good at the net and even though it was not the essence of his game, he decided to work on it consistently during specific sessions, so he consistently and quickly improved his game on this part of the court.

PERIODIZATION OF THE SEASON FOR A TOP LEVEL TENNIS PLAYER: TACTICAL ASPECTS

The periodization of the professional tennis player season varies considerably depending on whether the player is ranked among the top 10, the top 100 or even among those who are beginning to get ATP points. Amongst tactical or technical considerations, there are also financially important factors (Porta & Sanz, 2005).

In general, the first year in the ATP Tour can be a bit tough since neither the player nor the coach know exactly what tournaments or what level to play and which characteristics to choose. The second year in the circuit can also bring unique challenges, and is tough since the players want to continue progressing, defend points and maintain a good position in the rankings.

With reference to Ferrer, he tries to organise his calendar in order to travel 2 weeks in a row and then return home to train and recover. However, this is not always possible due to the way the American tour is organized early in the year- for example the combination of Buenos Aires, Acapulco, Indian Wells and Miami is a four week block. Whilst this is beyond his two week optimum competition cycle, the idea is never to play more than 6 tournament weeks in a row.

David Ferrer and Javier Piles, his coach, agree on the competition calendar. David Ferrer tries to repeat the calendar of the previous year if he did well. David always plays a tournament the week before the Australian Open and Roland Garros, although the rest of the players of his level would rather rest before a Grand Slam. On the other hand, and as far as possible, David prefers tournaments at sea level. Regarding surface change, which is very closely related to the tactical aspect of the game, this is an aspect that has some influence especially across grass, clay and hard court. However there are often times where little surface adaptation is necessary, for example on hard courts. Their experience has shown that nowadays the fast court surfaces are much more similar and therefore much less tactical adaptation is necessary.

CONCLUSIONS

In this second article on top level men's tennis tactics, we wanted to describe some ideas on the tactical evolution, progression and improvement from junior to professional tennis, stressing the importance of "automation" of the decision making processes as key aspects for the tactical efficiency in top level tennis. It also describes the relationship that exists between tactical and mental aspects in top performance, and the key role of confidence in top level tennis.



We have also stressed the need to help talented players to make the right decision so as to be tactically efficient. Finally, we have discussed some ideas on periodization for top level players presenting practical examples from David Ferrer's experience, which we expect, will be useful for all coaches working with elite players.

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The modern game of doubles: A tactical perspective

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ABSTRACT

This article focuses on the game of doubles from a tactical perspective. The primary author, a four-time doubles Grand Slam Champion, outlines some observations of how the game of modern doubles has evolved, whilst still retaining some of the core aspects that the game is unique for. The article then focuses specifically on the long-term development of the doubles player, and emphasises not only tactics, but the physical and mental requirements that are demanded of a player on route to the highest levels of the game.

Key words: Tactics, strategy, doubles, long-term development

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INTRODUCTION- MODERN DOUBLES

The modern game of doubles is undoubtedly very different to the game of previous eras. Along with the evolution of the singles game, doubles nowadays has changed predominantly due the presence of much greater power. The speed of the modern day groundstroke has made poaching, interception and general net play much more risky and a more difficult endeavour. A knock on effect of this has therefore seen a reduction in dominance of the net player when compared to the game in previous generations.

Power versus touch in the modern game of doubles

In tennis, the optimal execution of any given stroke, at any level, requires different adaptations of learned skills in coordination with the requirements of strength, speed and power (Faccioni, Pierce & Fisher, 2004). Within doubles, both power and touch are important at the highest level. One cannot win a slam with one of these elements missing, but touch certainly plays a relatively smaller role nowadays in relation to the importance of power. With the game having such an emphasis on power, winning at the highest level has become more about the big serve and hard return, as opposed to a focus on getting a first serve in and making the first volley. In previous generations, making first serves and placement was paramount, whereas nowadays, spin, power and groundstrokes appear to be key. There is of course still room for touch, but only when combined with power. Indeed nowadays, combining touch with power through varying the pace of your shots is becoming more and more successful, due to the majority of players being so used to constantly receiving the ball at a rapid pace. Therefore the use of a simple variation of pace is now more effective than ever for breaking the opponents' rhythm.

LONG-TERM DEVELOPMENT OF A DOUBLES PLAYER

Singles as an apprenticeship for doubles

Singles is a great apprenticeship for doubles for a number of reasons. Firstly, it allows you to develop a well-rounded game-style. Singles can complement doubles because it allows you to practice all your shots, whereas just specializing in doubles means that you often work so much on serve and first volley, that you forget more about your second shots and follow up groundstrokes (which today are needed in a doubles player's repertoire). Good serving, returning and groundstrokes should therefore be learnt out on the singles court. To prepare a doubles player for success, singles can really benefit. Players should work a lot on the basic singles drills such as cross courts, and line exercises, and inside out forehand work for example, that will contribute to developing an overall game. It is important also to remember that practising the whole court, and not just to focus on playing half court helps doubles development. For example, when practising net play for doubles, a

"A good recommendation is to practice singles serve and volley on full court, as it stretches the comfort zone of the doubles player"

good recommendation is to practice singles serve and volley on full court, as it stretches the comfort zone of the doubles player whereas only working on a half court can hinder your movement, and a player won't learn to stretch out for the wider balls as effectively. Singles is also beneficial due to the athleticism required to drill in singles, which makes doubles easier when you come back to being responsible for just half the court.

Tactical progressions from junior to professional

Develop the net game: As stated earlier, at the Grand Slam level, the baseline game is more important than before. Whilst this is true, it is important not to over emphasise this at the junior level, largely due to the fact that at this level, the net game of juniors is largely underdeveloped when compared with the baseline game. Juniors should work on their net play more, and learn to take charge of the net better throughout their development. Learning to dominate the net more should be seen as a 'bread and butter' skill, with the introduction of heavy and powerful baseline play brought in at a later stage of development as the player matures physically. Coaches should therefore look to spend more time working on the net game with juniors, and incorporate more drills that develop the player's tactical awareness at the net.



Develop tactical awareness: A second key difference tactically between the junior and senior game relates to the fact that at junior levels, tactical awareness in doubles is underdeveloped. In explanation, juniors trying to make it on the doubles tour need to do the 'little things' more often within the match environment. This can include elements such as poaching more regularly, getting into the opponents head, and effectively assessing opponents' strengths and then taking them

away, e.g. when playing a certain top ten team, a useful tactic was to use the "I formation" and swing a serve into the backhand body of the player on the deuce side. This would then ensure the returners natural up the line return, which the net player could cover confidently and therefore really impose. Another example of a smart play would again be the I formation serving to a left handed player on the advantage side. Serving a slider up the T with the net player covering the middle to left side of the court. With the serve swinging away from the player, it is very difficult for the returner to pull the return up the line if the serve is executed well, which again gives the net player confidence to impose on the return and apply pressure.

Assessing players to this degree is very rare at the junior level. With juniors, often if they play well they win, and if they play bad they lose-making the transition to the senior game is often down to tactical awareness, and trying to develop some of the characteristics mentioned above, so that a player can win matches on any day.

GAINING A DOUBLES WORLD RANKING- THE FIRST RANKING POINT

Keeping it simple

One of the main reasons players struggle at this level is simply not doing the basics that well. Even at entry level, if you have weaknesses in your game you have to go back to the drawing board and work on them. The vast majority of players making their first points on the doubles tour are singles specialists. This can often mean that their net game and tactical patterns are not as well developed for doubles as it is in singles. Whilst strong singles players can 'get away' with being singles specialists in doubles, to continue onwards up the rankings, a key component for players is to simply work more on exercises that develop their net game and tactical awareness in doubles. Drills that focus on serve and volley, approaching, passing and the smash are key here.



Your partner

A second key aspect for making your first points on tour, is for players at this level to consider carefully the partner they choose. This consideration is key on two levels; both game style and personality.

Playing with the wrong partner can make success on the double tour very difficult. A good partner needs to compliment your game. For example, if a player is a good returner, they should pair up with a good server. One left and one right hander is also often favoured, due to having better options to position a player according to where their strengths are, opposites attract basically.

Personality of the pairings is also a critical factor. Doubles partnerships should be harmonious and without major conflict. Players should share similar work ethic, ideals and should of course respect each other on and off the tennis court.

MAKING THE TOP 100

A mental challenge

Tactically, the game is very similar between a top 100 player and a top 300 player. The difference merely being a jump in the level of play. Of course everything a player does has to get better to reach the top 100- you must be physically, technically and mentally stronger, but tactically, the game is very similar.

To progress into the top 100 is often more of a mental challenge for players. Research in singles transition has shown that players, who progress to the Top 100, take on average 4.8 years (and up to 9 years) to do so from the time of making their first point (McCraw, 2011). This lengthy time span can often test players' discipline. More maturity on the court is required at this level. A player must throw away the bad habits they have. Concentration must improve and a player must be able to remain focused for up to five sets and across lengthy tournament blocks. In addition, frustration tolerance should improve at this level, so that a player can experience repeated adversity and still remain calm and collected. When entering the top 100, a 'bottle neck' often occurs, making it very difficult to defend previously gained points, and constantly accumulate more from bigger tournaments: often, a player must and return to lower tournaments to get more points and hold their position, which takes humility, grit and determination.

"Frustration tolerance should improve at this level, so that a player can experience repeated adversity and still remain calm and collected"

Physicality- power, speed, agility and endurance

Doubles players must be able to apply tactics that rely on a powerful serve and big groundstrokes, like in singles. Therefore it can be argued that the physical demands from a power, speed and agility perspective are similar. Secondly, and again as in the singles game, to execute a successful game strategy requires an emphasis on staying sharp and fresh physically when playing tournaments. However, when comparing the endurance requirements of a top ten singles to a top ten doubles player, one can argue that there is no comparison. The 2012 Australian Open final between Novak Djokovic and Rafael Nadal was an example of where the endurance requirements of the singles game do not map onto a doubles court, from a court geometry perspective if nothing else.

One contrast however between singles and doubles, is the longevity of a doubles player's career compared to a singles player - a good example being the 2012 doubles champion of the Australian open, Leander Paes, winning another grand slam title at the age of 38. This longevity of the career is not seen in the singles game. This therefore alludes to the different physical nature of doubles, when compared to singles.

CONCLUSION

This article has outlined some of the key developments in doubles, specifically regarding how power has adapted the game of today, as well as the role of touch. Using singles as an apprenticeship for doubles, as well as general long term development of a doubles player has been discussed. The second part of this two article series will continue to discuss the game of modern doubles through a tactical lens. Part two will specifically discuss tactical preparation for a grand slam, as well as giving on-court exercises and successful patterns for training high level doubles players.

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Game theoretic solutions to tennis serving strategies

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ABSTRACT

This paper analyzes risk-taking on serve to maximize a player's chances of winning a point on the second serve by either serving a common low risk second serve (with a high second serve percentage) or a high risk second serve by decreasing the second serve percentage but increasing the proportion of points won if the second serve goes in. The notion of "importance" of points is defined and there is evidence to suggest that servers could be encouraged to take more risk on the more "important" points. The results could be used by coaches to help determine how much risk their players should take on the second serve. A working example between Andy Roddick and Rafael Nadal is given to support the results.

Key words: Analysis, risk, serve and return

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INTRODUCTION

Analyzing risk-taking strategies in tennis is complicated. There has been a tendency to analyze risk-taking on the serve more often than other shots. This seems reasonable as the serve is the first shot to be played and therefore simplifies the analysis by not having to consider previous shots in the rally. Barnett et al. (2008) analyzed the situation where players may choose to serve two fast serves by taking into account the type of court surface, and the serving and receiving capabilities of both players. Pollard et al. (2009) extend on this model by allowing for the possibility of players changing serving strategies throughout the match in progress. Consideration of the ideal that a continuum amount of risk is available to players on their serve has further revealed a higher risk first serve and a lower risk second serve strategy as being optimal in most practical situations (Pollard et al., 2007). Pollard (2008) also analyzed the situation in which a medium risk serve (somewhere between a player's 'typical' high risk first serve and low risk second serve) has a quadratic rather than linear outcome; one which gives greater weighting to the outcome of serving a high risk serve rather than the outcome of a low risk serve.



All of the above articles analyze the situation where the server is the only decision maker and therefore the optimal strategy will be a single strategy with certainty e.g. a player should always serve a 'typical' high risk first serve on both the first and second serves. When analyzing risk taking on serve by also taking into account whether the receiver is expecting a low or high risk second serve (known more generally as game theory), the optimal strategy can be a mixed strategy e.g. a player should serve a 'typical' high risk first serve 20% of the time on

the second serve and a 'typical' low risk second serve 80% of the time on the second serve. This game theory scenario will be analyzed in this article and extended to include the 'importance' of points; where it is suggested for the server to take more risk on the more 'important' points i.e. 30-40 is shown to be the most 'important' point in a game.

DATA COLLECTION AND ANALYSIS

Match statistics from OnCourt (www.oncourt.info) can be obtained for the majority of ATP and WTA matches dating back to 2003. Using a customized program, the average serving and receiving statistics for each player on each surface were calculated, as well as the average head-to-head serving and receiving statistics between any two players. Bedford et al. (2010) show how a range of statistics (such as the percentage of points won on serve and the 2nd Serve %) can be obtained from the broadcasted match statistics. Table 1 gives the match statistics broadcast from The Artois Championships in 2008 (played on grass) where Rafael Nadal defeated Andy Roddick in two straight sets. Notice that the Serving Points Won is not given directly in the table. This statistic can be derived from the Receiving Points Won such that Serving Points Won for Nadal and Roddick are $1-14/61=77.0\%$ and $1-24/71=66.2\%$ respectively. Note that the Winning % on 1st Serve is conditional on the 1st Serve going in whereas the Winning % on the 2nd Serve is unconditional on the 2nd Serve going in. The Serving Points Won for Nadal and Roddick along with the Winning % on 1st Serve (uncond.), Winning % on 2nd Serve (cond.) and 2nd Serve % are given in table 2.

	RAFAEL NADAL	ANDY RODDICK
1st Serve %	45 of 61 = 73%	46 of 71 = 64%
Aces	7	14
Double Faults	0	3
Winning % on 1st Serve (cond.)	35 of 45 = 77%	34 of 46 = 73%
Winning % on 2nd Serve (uncond.)	12 of 16 = 75%	13 of 25 = 52%
Break Point Conversions	2 of 7 = 28%	0 of 4 = 0%
Receiving Points Won	24 of 71 = 33%	14 of 61 = 22%
Total Points Won	71	61

Table 1. Match statistics between Rafael Nadal and Andy Roddick at The Artois Championships in 2008.

	RAFAEL NADAL	ANDY RODDICK
Serving Points Won	1-14/61=77.0%	1-24/71 =66.2%
Winning % on 1st Serve (uncond.)	(45/61)*(35/45)=57.4%	(46/71)*(34/46)=47.9%
Winning % on 2nd Serve (cond.)	(12/16)/(1-0/61)=75.0%	(13/25)/(1-3/71)=54.3%
2nd Serve %	1-0/61=100.0%	1-3/71=95.8%

Table 2. Calculated statistics between Rafael Nadal and Andy Roddick at The Artois Championships in 2008.

RESULTS

Scenario a)

The model developed in Barnett et al. (2008) is used to determine if the server can increase their chances of winning a point by serving high risk on the second serve. As outlined in the introduction this scenario is such that the server is the only decision maker and therefore the optimal strategy will be a single strategy with certainty.

The following definitions are given to obtain a high and low risk serve for each player:

- A high risk serve is a 'typical' first serve by a player and calculations are obtained by a player's averaged percentage of points won on the first serve for a particular surface
- A low risk serve is a 'typical' second serve by a player and calculations are obtained by a player's averaged percentage of points won on the second serve for a particular surface



Note the limitations in these definitions of a high and low risk serve in that to obtain a reasonable sample size a player's serving statistics is across all players (rather than just head-to-head against the opponent). Also a 'typical' first and second serve by each player may not be consistent across each match, but rather a player may be taking more 'risk' on the second serve on particular matches for example.

Let:

d_{hij} = percentage of points won on high risk serves (unconditional) for player i, for when player i meets player j on surface s

d_{lij} = percentage of points won on low risk serves (unconditional) for player i, for when player i meets player j on surface s

The following two serving strategies are defined:

Strategy 1 – high risk serve followed by a high risk serve

Strategy 2 – high risk serve followed by a low risk serve

Thus, player i should use Strategy 1 (two high risk serves) rather than Strategy 2 if $d_{hij} > d_{lij}$

An example of such a case is given in Barnett et al. (2008) between Andy Roddick (recognized as a 'strong' server) and Rafael Nadal (recognized as a 'strong' receiver), where the results from table 3 indicate that Roddick might be encouraged to serve high risk on both the first and second serve when playing Nadal on grass (since $0.535 > 0.512$). However he should use a high risk first serve and low risk second serve when playing Nadal on both hard court (since $0.528 < 0.551$) and clay (since $0.364 < 0.458$). This example illustrates the fact that it can be important for players to identify the match statistics for themselves and their opponents – specific to court surfaces.

	ANDY RODDICK			RAFAEL NADAL		
Statistic	Grass	Hard	Clay	Grass	Hard	Clay
d_{hij}	0.512	0.551	0.458	0.582	0.571	0.608
d_{lij}	0.535	0.528	0.364	0.510	0.495	0.546
Matches	37	99	17	24	72	72

Table 3. Serving and receiving statistics for Andy Roddick and Rafael Nadal.

Scenario b)

The model developed in scenario a) is now extended by taking into account strategies on whether the receiver is expecting a low or high risk second serve. From table 3, where Roddick is serving against Nadal on hard court, Roddick is expected to win 55.1% of points on the second serve when serving low risk on the second serve and expected to win 52.8% of points on the second serve when serving high risk on the second serve. Suppose these percentages are based on whether Nadal on the return of serve is expecting a high or low risk second serve. For example, if Roddick was serving a low risk second serve and Nadal was expecting a low risk second serve, then the percentage won on the second serve for Roddick would likely be less than 55.1%. This is represented in table 4 below in a game theory matrix with the following observation. If Nadal was expecting a low risk second serve 50% of the time and a high risk second serve 50% of the time (indifferent between strategies), then Roddick should always serve a low risk second serve since $\frac{1}{2} * 0.53 + \frac{1}{2} * 0.57 = 0.55$ and $\frac{1}{2} * 0.55 + \frac{1}{2} * 0.51 = 0.53$. These results are in agreement with the earlier model from scenario a) where decisions of the opponent were not taken into account.

Using standard game theory techniques to solve this two-person zero-sum game; gives mixed strategies for Roddick of 50% low risk serve, 50% high risk serve and for Nadal of 75% expecting a low risk serve, 25% expecting a high risk serve. The outcome of the game with both players' adopting these mixed strategies is such that Roddick will win 54% of points on the second serve. If either player deviated from these strategies then the other player could capitalize by changing strategies accordingly. For example, if Roddick changed strategies to 80% low risk serve, 20% high risk serve, then Nadal could choose the strategy of 100% expecting low risk serve, for an outcome of Roddick to win $0.53 * 0.8 + 0.55 * 0.2 = 53.4\%$ of points on the second serve.

		NADAL	
		expecting low risk serve	expecting high risk serve
RODDICK	low risk serve	0.53	0.57
	high risk serve	0.55	0.51

Table 4. Game theory matrix of how much risk to take on the second serve in tennis.

Scenario c)

The model developed in scenario a) is now extended to include the 'importance' of points. The results obtained also extend to the model developed in scenario b). Morris (1977) defines the 'importance' of a point for winning a game as the probability that the server wins the game given he wins the next point minus the probability that the

server wins the game given he loses the next point. Table 5 gives the 'importance' of points to winning the game when the server has a 0.62 probability of winning a point on serve, and shows that 30-40 and Ad-Out are the most 'important' points in the game.

		RECEIVER'S SCORE				
		0	15	30	40	Ad
SERVER'S SCORE	0	0.25	0.34	0.38	0.28	
	15	0.19	0.31	0.45	0.45	
	30	0.11	0.23	0.45	0.73	
	40	0.04	0.10	0.27	0.45	0.73
	Ad				0.27	

Table 5. 'Importance' of points to winning a game when the server has a 0.62 probability of winning a point on serve.

The following result follows from Klaassen and Magnus (2001), where it was established that a server's probability of winning a point decreases with the more 'important' points.

Player *i* should use Strategy 1 (two high risk serves) rather than Strategy 2 if $d_{hij_s} > d_{lij_s}^{\wedge}$. The superscript \wedge is used as the server's probability of winning a point on a low risk serve is now conditional on the 'importance' of the point.

This is evidence to suggest that the server would be encouraged to take more risk on the more 'important' points.

CONCLUSION

The results obtained in this paper could be used by coaches to help determine how much risk their players should take on the second serve. By using the definitions of a high risk serve as a 'typical' first serve by each player and a low risk serve as a 'typical' second serve by each player, a model where the server was the only decision maker (does not take into account strategies on whether the receiver is expecting a low or high risk second serve) was formulated to determine how much risk a player should take on the second serve. An example was provided between Roddick and Nadal, where it was shown that Roddick might

do slightly better when playing Nadal on grass by using two high risk serves rather than using a high risk first serve and a low risk second serve. By establishing a game theory model (by taking into account strategies on whether the receiver is expecting a low or high risk second serve) it was then shown that Roddick against Nadal on hard court could use mixed strategies on serving low and high risk on the second serve, even though the earlier model (that does not take into account strategies on whether the receiver is expecting a low or high risk second serve) indicates that Roddick should be serving low risk on every second serve with certainty for the entire match. Finally, consideration was given to the 'importance' of points which then pointed to the server being encouraged to take more risk on the more 'important' points.

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Strategy and tactics in preparation for a doubles Grand Slam

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ABSTRACT

This article discusses some important strategic and planning elements in the preparation stages of a doubles Grand Slam event. Surface specific strategy is broadly discussed in terms of the changing role and importance of the serve and volley. Finally, examples of tactical doubles patterns are offered that were used successfully against world class pairings such as the Bryan Brothers.

Key words: Strategy, doubles, surface specific tactics, patterns

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PREPARATION

When leading up to a Grand Slam, by far the most important preparation is not what is done during the event, but what is done the weeks and months prior to the event. By far the most important aspect of preparation is to become 'match tight'. It is paramount in the weeks leading to a slam to get enough matches in, so that a player is very sharp. Leading up to the tournament players should play enough events, but also factor in enough rest time - although not too many days off (see Miley, 1998). To reach the latter stages of a Slam, or compete with partnerships such as the Bryans, a doubles pair needs to be super sharp, well rested, and have effective strategy and tactics planned.

STRATEGY

Disrupt the opponent's rhythm

Playing big favourites can be intimidating. It is important to show them as a player that you are not scared or intimidated by the challenge- that you are going to take the match to them, and not let them dictate the points. Really try to break their service in the first game. Strong favourites like to come in to the match very confident. Coming out with a quick break of serve can put the opponents on the back heel. When playing a top ten partnership, it is imperative to work on the weaker player, and study their partnership well. For example, plan to hit up the line if one player likes to poach, and just generally try to get into their heads early on in the match.

Risk taking and variation

Whoever takes the most risks, especially near the end can often gain the upper hand. However, playing low percentage and erratic tennis is not what is meant by this. Instead, partnerships need to keep poaching and trying different things on key points. It is important not to stay only with steady habits. Keep the opponents guessing and do not just hit to weakness every time on a big point.

PLAYER POSITIONING- WHICH SIDE SHOULD YOU TAKE?

There are no hard rules to which side you should take. A good example of this is the Bryan brothers- during their career they have switched sides when they were initially the other way, so there are no rules.

Generally speaking, returning is an important factor when making this decision- right handers on the deuce side can cut off wide serves better and the same can be said for left handers on the advantage side. This is a good reason to position left- handers on the left side and right- handers on the right. However, there are other important factors in this decision which include:

- One player's preference to a particular side
- Who has more experience on one particular side
- Who is better returning from a certain side
- Try to avoid both back hand volleys in the middle court.

SURFACE SPECIFIC STRATEGY

Grass

Grass court doubles can definitely be considered more 'old fashioned' and holds more characteristics of the previous era- particularly in terms of the dominance of serve and volley. The first two players at the net on grass are most likely to win. It is so essential for your first serve to be in because when it does go in, it really goes. Therefore a good strategy is to slow the serve down a little, go more for the corners, and give yourself that little bit more time to get into net. The second serve, which is usually a kick, can sit up on grass and therefore be punished.

Clay

On clay, going for more on the first serve to hurt the returner is much more lucrative. Why? Because if it is missed, the second serve is much more of an asset on clay as it grips the surface better. This means that the second serve can actually become more of a weapon on clay, whereas on grass it can be a liability. Furthermore, a kick serve has the added benefits of giving you more time to get into net if you wish or just to stay back (which is more acceptable on clay than grass). It is therefore advised to adopt a very aggressive first serve strategy on clay, more so than on grass.

On grass, a deep volley is very effective and doesn't allow the opponent to do virtually anything with the ball, whereas on clay, deep volleys can sit up and give the baseline player the opportunity to wind up and punish the ball. The regular use of short volleys on clay are therefore a very effective strategic variation. Move the opponent up and back instead of trying to keep them camped on the baseline. It is difficult to do and can be risky because a badly hit short volley really sits up and invites the opponent to drill you, but it is a strategy that will bring success if executed well.

Hard court

With the wide variation in hard court surface speed, it is difficult to outline specific strategy that can be applied. As a general rule, if the



court speed is fast, the strategy should be more similar to grass court style doubles. If the court speed is slower, the strategy should resemble that of clay.



SERVING TEAM TACTICAL PLAYS

The following are examples of two successful tactics and patterns used when playing against the Bryan brothers.

Pattern 1- Deuce side, first serve

Adopt the 'i' formation. Proceed with a serve into the body/forehand of the left-handed player. In this example the player is Bob Bryan, who is returning. If the serve is good enough, it restricts the returner so that they can only hit up the line (moving over to hit an inside out forehand that is swinging into your body is very difficult!). This allows the net player (in 'i' formation) to move to the left and put away the volley with a high level of confidence and conviction.

Pattern 2- Advantage side, second serve

Adopt the standard 'one-up one back formation'. Proceed with a big kick out wide. The serve should be 'slowish' but with decent kick. The net player should put in a big fake while serve passes by the ear, and then go back and cover the line. The slow wide serve, in combination with the fake should hopefully induce the returner to hit the ball down the line. The net player will be there for the volley and can place it safely in the gap created by the wide serve. The server should follow in as normal.

CONCLUSION

Strategic principles of doubles are arguably quite similar across all levels of play, and across all surfaces - serve and volley for example is appropriate at all levels, all surfaces and against any opponent. However, in order to elicit success on a continual basis and at the highest level in the modern game (Crespo & Reid, 2002), these common strategic principles must be tailored to suit the surface, suit one's own game, and not suit the opponents' game. When these tactical principles are altered and adapted well, doubles can be a fascinating tactical battle. To conclude, this article has attempted to outline some of these ways in which tactics can be tailored to ensure success. It has also outlined some successful patterns, and given general advice for players aspiring to compete at the Grand Slam level.

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Women's tennis: Past, present and future

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ABSTRACT

Taking his experience in the women's professional tour, the author, former coach of Justine Henin-Hardenne, one of the great champions in female tennis history, analyses the international tennis background of professional women after the 90s. In this article the author also explains the characteristics of tennis at this stage and discusses the transition of women's tennis at the end of the 20th century and stresses the importance of speed and power in modern women's tennis. It also discusses those aspects that define professional women's tennis today and the need to pay special attention to the stage of a tennis player's development.

Key words: Tactics, women, top level, evolution

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INTRODUCTION: WOMEN'S TENNIS IN THE 90'S

This first part of the article analyses women's tennis throughout the 90's. The most striking tactical characteristic during these years among the top 10 women players was the variety of style and the different playing styles.

At that time, the tour was dominated by players like Steffi Graf, Gabriela Sabatini, Martina Navratilova, Monica Seles, Arantxa Sánchez, Jana Novotna, Mary Joe Fernandez, Conchita Martínez etc., all tennis players with different playing styles.

Most of these players, with just a few exceptions, could perform at a relatively great level in all surfaces. In the 90s, the speed of the game was a determining factor since each of these players could develop a tactical strength to apply a well defined game strategy. What was the consequence of these game patterns? Due to the diversity in the style of the different players, their level improved and evolved during many years.

At the same time, from the point of view of our sport as a popular entertainment, women's tennis was interesting and attractive for those who watched the matches not only because they identify names or nationalities but also because of the players' styles.

TRANSITION AT THE END OF THE 20TH CENTURY

In the late 90's tennis began to develop physically and started to become underpinned by the strength and the speed of the game. This process was enormously influenced by the evolution of the equipment and materials available with modern technology; faster and more elastic balls, lighter rackets that could provide more spin and speed to the ball, etc.

The main consequence of this evolution is that the new generations of players gradually began to develop a dominant playing pattern which was based more on the strength and speed of the strokes than on purely tactical aspects and understanding of the game (Van Aken, 2002).

Tennis players had to play all strokes much more quickly and with more strength, rather than thinking where to aim the ball and why. At the same time, this increased the importance of fitness and physical training. During the 2000's, it was difficult for players to end the season without injuries (Pluim, 1999). The explanation for this is relatively simple, the need to respond to the greater speed and power of the game was faster than the physical evolution of the players who had to adapt to these new demands. It was then clearly shown that a tennis player was forced to become a real athlete.

WOMEN'S TENNIS IN THE PRESENT DECADE

When we observe the playing patterns of the top tennis players after twenty years, we notice that many things have changed in women's tennis.

First, there is less tactical variety since there are less playing styles. How can we know this? If we analyse the matches, we can conclude that in "appearance" they are very similar to those of the previous period, but when we notice the violence and speed of the game, the difference between the two stages in women's tennis is huge (Morris, 2005).



The great improvement in physical quality of the players in the professional tour has transformed them into real and complete athletes. However, even though this is true, we also see that it is quite difficult for these great players to control the speed and power of the game. Why does this happen? Because today's women's professional tennis is gradually getting faster, points are shorter but at the same time, much more intense (Martens & Maes, 2005).

From the authors point of view as a professional touring coach, this process has its origin in the long-term tactical and technical training of the players. It is important to stress the fact that I believe that the best players in the world today are just as talented or even more talented than the tennis players 20 years ago.

THE IMPORTANCE OF THE TRAINING STAGE: JUSTINE HENIN'S EXAMPLE

On the basis of work with Justine Henin and the experience as a top level coach specialized on women's tennis, the great difference I notice is that tennis players today have no time or are not given the time (during the most important part of their coaching between the ages of 7 and 14) (Kopsic & Segal, 1996) to develop.

This period is fundamental for tennis players. They must develop the three most important elements, which in my opinion, all players must

strengthen during their preparation to reach their maximum tactical, technical and physical potential. They must be able to face all kinds of different playing styles and they need an adaptation skill that can only be learned during this period.



The three fundamental elements are:

- their eyes, which is necessary for perception, anticipation and understanding of the game, of utmost importance to read the game of the opponent more easily.
- their feet to move at a great speed always following the shortest trajectory of the ball between the player and the ball, so as to reach and take on the ball in the best way, and finally,
- the intelligence of the hand to materialize all the ideas of the genius that all these top level players have.

With the above principles in mind, we cannot neglect a fundamental aspect in tennis: it is a game in which technique and physical fitness are the means for a player to apply all ideas (i.e. tactics). Once these three elements have been developed during the player's coaching stage, the female player will continue her tactical, technical, physical and mental evolution the way Justine Henin did.

Justine started learning to play tennis with the mini-tennis method (also called "evolution tennis") until she was approximately 10, so she had time enough to build a good tactical and technical base thanks to the adapted material (balls, courts and rackets), and to grow physically, technically and tactically in harmony.

CONCLUSIONS: WOMEN'S TENNIS IN THE FUTURE

Finally, what we ask today is: What will women's tennis be like in the future?

Women's tennis is gradually beginning to find solutions and adaptations to play using different alternatives to strength and power, since extremes in either respect have never been and will never be good.

We all know that champions are not born, they are made. In view of this fact, the responsibility (as coaches and trainers) is to understand that whilst victory is important, it is not enough. If we want women's tennis to continue being attractive and to continue attracting collective interest, it must evolve the right way. The characteristics and processes for appropriate women's development are our responsibility and so, we must continue working with a clear understanding of the importance of the long term progressive development of the female tennis player.

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New technologies applied to tactical analysis in tennis

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ABSTRACT

The process of sports coaching aims to take a player to his/her maximum performance level. This goal - which involves a multi-disciplinary team (coach, trainer, medical doctor, physiotherapist, psychologist, family...) - must be carefully supervised and sequenced. Sport performance is determined by the optimal relationship between the physical, tactical, technical, and also the psychological components of the player (Sanz, 2011). Related to these components, a key guiding element in a player's development process is the analysis and evaluation of any or all of these areas. Technological tools should be used to access as much information as possible, which can later be interpreted by the coach or team. This article presents new technologies that are being used to analyse tennis tactics and reviews the different papers that have been published in this field.

Key words: Tactics, analysis, measurement instruments, new technologies

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INTRODUCTION

The evaluation and analysis of tennis tactics is one of the least developed disciplines of analysis when compared to physiological analysis, kinematic and technical analysis among others. The "analyst" joined professional sport some time ago and as suggested by Reid (2011), this member will become more and more involved in the multidisciplinary teams that accompany and advise both the player and the coach.

The systems that analyse tennis tactics can be divided into two main categories, direct, which are applied during the game situation and indirect, the ones that are obtained after the analysis of the actions recorded in audio-visual systems. In both cases, observational methodology, as a method to record and analyse, is one of the main pillars of the process.

As Sanz (2011) pointed out, observation is a process that provides measurable and quantifiable information about what is being evaluated. Observation must be objective, using a number of observation tools and/or techniques that provide information for diagnosis and intervention.

Usually, the observation by the technician depends on the coach's vision of what he intends to study, that is, the "clinical eye" of the coach. This system has a very important intrinsic value, given the knowledge of the coach about the situations that need to be evaluated and analysed. However, as regards accuracy in the evaluation, the sensory constraints of our capturing systems may leave information gaps in those observation processes and, therefore, the result can be biased, conditioned and not fully systematic. With regard research, as stated before, it will be the observational methodology that will provide the background to design investigations and analysis. Some research work on tennis tactics using rigorous observation methodologies includes (Gorospe, G.1999; Gorospe et al., 2005; Garay, O. 2003). Anguera, (1990; Anguera et al., 2000) describes the methodological procedure to provide scientific rigour to observation as a measurement tool.

The main systems to analyse tactics using tools or supporting instruments will be discussed below. They will be described and grouped in different blocks.

RECORDING TOOLS FOR TACTICAL ANALYSIS

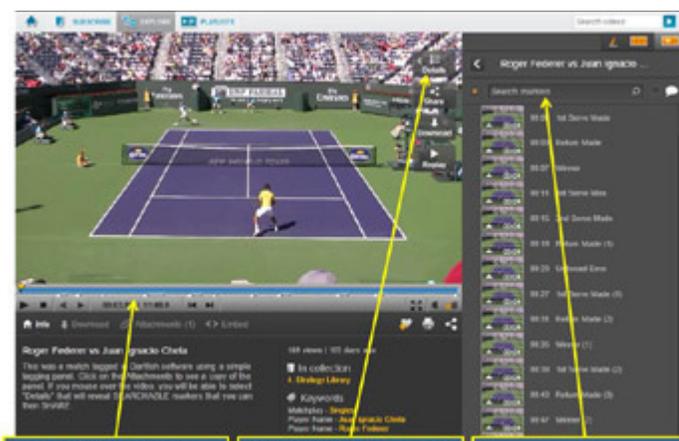
Manual recording systems

As opposed to the old 'copybook', where the coach would jot down the player's strengths and weaknesses, and analyse movement and behaviour in specific situations, there are now smartphone based applications and tools to record sets of relevant information or even just the score of a tennis match in real time. It is in this category that

we find programmes like Protracker (<http://www.fieldtown.co.uk/>) or Tennis Trakker (<http://www.tennistrakker.com/>). Even though these programmes are useful to gather global data, they are limited in that they do not associate images nor do they make any careful analysis of strokes.

Video capturing systems

Until not long ago, the main objective when analysing tennis videos was to carefully observe the players' technique and to refine minor defects in the biomechanics of the stroke. However, the currently used computer programmes to label different times or situations in a match have also begun to contribute to tactical analysis and have helped to identify behaviour patterns from those video sequences.



Screen shot image of Dartfish analysis software.

Given the difficulty to apply labels automatically, most of the programmes need an operator to organize those entries manually. This is the case of Dartfish (<http://www.dartfish.com/>), a programme that not only studies the mechanical aspect of the stroke but also permits to label for further study. So, at the end of a match, the player can see those sequences that he is interested in, without having to watch the whole match, whilst also combining qualitative and quantitative analysis of the number of repetitions of certain important actions. Over time, more and more programmes are emerging in the market that will help coaches to make these records for further analysis (InterplaySports: <http://www.interplay-sports.com/>; GPSSports: <http://www.gpssports.com/>; NACSport: <http://www.nacsport.com/>; Sportscode Gamebreaker: <http://www.sportstec.com> among others).

At the same time, the technological community has been studying different and totally automatic alternatives for several years (Almajai et al. 2010, Christmas et al. 2005). One of the advantages of these systems is that apart from allowing intelligent labelling of tennis sequences, they provide a number of kinetic data sets such as the players' average speed, acceleration, kilometres run, etc. And all this can be achieved without the player carrying a sensor, however the use of sensors will inevitably lead to much more accurate analysis. With technological advances, devices are getting smaller and smaller, and can record information about the different physiological (heart rate) and kinematic (accelerometers, GPS) variables together with spatial information.

Using statistical analysis

One of the aims of researchers and IT application developers for tactical analysis tools is to yield both precise and immediately available information in such a way that it is useful for both the coach and the player. A number of applications and records for statistical analysis have followed one another, as for example the model of Markov chains set by Schutz (1970), with a probability constant of winning a given point. Another example is the Klaassen & Magnus IT programme (2003) called TENNIS PROB, which quickly and automatically calculated the probability of winning a tennis match. There is a line of statistical and probabilistic analysis studies like those of Gale, 1971; Norman, 1985; George, 1973, y Barnett, 2005, among others.

Data mining and artificial intelligence

Data mining has long existed in other fields like biomedicine and customer relationship management to name just two. Its main objective is to discover data patterns and possible relations that can result in new knowledge. These relations can then also be used to predict future results. The sport world today sees a great number of statistics for each player, team and season etc, and the use of data mining in sport has progressively increased. The main targets are scouting new players, predicting the results and measuring performance. However, there is relatively little existing research whereby data mining is used to analyse tactical patterns (Terroba et al. 2010, Vis et al. 2010).

Paradigm shift

Regardless of the technical advances to associate manual or automatic labels and video sequences, and whether it is possible to get tactical information from huge databases with statistical information, the main issue is to set key criteria to make an analysis. Some authors point out that it is necessary to select the information that is really interesting and useful to a particular player or coach, out of the information available, (Barnett & Clarke, 2005; Barnett et al., 2008; Gillet et al., 2009; O'Donoghue, 2001; Pollard et al., 2010; Reid et al., 2010, Over, & O'Donoghue, 2008; 2010).

From this point of view, the authors can make a tactical analysis on the basis of situations where a player is off-balance, or stressed, instead of taking the standard classifications such as winners/ forced errors/ unforced errors.

This provides a much more real vision about what is happening on court and can help us to understand why a player is winning or losing. It seems reasonable to think that the regular statistics we get, or even some IT programmes provide biased information, since they lack what any measuring instrument must provide: validity, reliability, discriminability and objectivity.

It is on this aspect that tactical analysis for the future needs to shed more light, breaking down actions not when they are over but from the moment the player changes his situation from balanced or unbalanced (dominating or being dominated), so as to provide the coaches and players with the information necessary to drive the work or the strategy for future matches.

CONCLUSIONS

We believe that the near future will see an important increase in the time devoted to tactical analysis of our sport, with the help of new technologies and the increasingly portable devices (Tablets, Smartphones,...), but, no doubt, we will have to bear in mind that what really matters is not the information we get but the interpretation of really relevant and useful data that will later be applied to coaching and competition.

In this sense, and as Crespo and Sanz (2011) have remarked, we agree with Norton and Clarke (2002) who state that it is necessary to improve the way we retrieve information as well as the depth of the information to continue to make a deeper analysis. This will help us to disregard and demystify some deeply rooted tennis theories like the existence of a "momentum" in the sequence of the points won in a match. As O'Donoghue and Brown (2009) state in connection with the sequence of singles service points, they conclude that there is no momentum in the sequence of points analysed in singles and, that the belief of players, coaches, sport journalists and spectators that there is momentum in tennis is mistaken.

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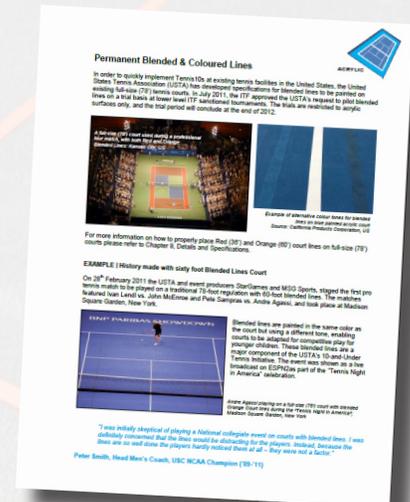


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