International Tennis Federation

COACHING & SPORT SCIENCE REVIEW

The Official Tennis Coaching and Sport Science
Publication of the International Tennis Federation
25th Year, Issue 71, April 2017

www.itftennis.com/coaching/sportsscience
ISSN: 2225-4757

CONTENTS ISSUE 71

COACHING & SPORT SCIENCE REVIEW

The Official Coaching and Sport Science Publication of the International Tennis Federation

EDITORIAL

Welcome to issue 71 of the ITF Coaching and Sport Science Review, the first issue of 2017. In this issue, the topics cover a range of aspects in the game including; current player fitness testing standards, the psychology of turning points in tennis and a case study of wheelchair tennis to name a few.

The ITF is pleased to announce that the 2017 ITF Worldwide Coaches Conference by BNP Paribas will take place in Sofia, Bulgaria from Wednesday 11 to Saturday 14 October 2017. The event is being organised by the ITF in conjunction with the Bulgarian Tennis Federation and Tennis Europe.

The ITF Worldwide Coaches Conference by BNP Paribas is an international coaching conference which regularly attracts over 650 coaches and experts from over 90 different countries around the world. The venue will be the Hotel Marinela in Sofia. Further information will follow on the Coaching website (http://en.coaching.itftennis.com/home.aspx) in the next month where interested parties can access all the relevant information and keep up-to-date with Conference news. Online registration to attend the Conference will be available via this website in May.

Confirmed keynote speakers for this year's conference include ITF President, David Haggerty, Great Britain's Davis Cup team doubles coach and LTA Head of Performance Coaching, Louis Cayer, and Tennis Australia's Innovation Catalyst, Machar Reid. More keynote speakers will be confirmed shortly and a call for submission of short presentations will be made within the next few weeks.

In February, ITF Coaching announced that the new ITF ebooks app has been released. For the first time, electronic editions of books and publications from the ITF are available to download as ebooks in English, Spanish, French and Russian. The ITF ebooks app offers an exclusive range of publications from the world of tennis, which are a must read for all those with an interest in the sport. The app now has more than 60 publications available, 32 of which are free, to download as ebooks from Google Play for Android devices and from the App Store for Apple devices. Recently available titles include The ITF's annual yearbook, the ITF Year 2016,

Tennis Xpress: Play tennis the easy way and the Tennis 10s Manual to name a few. Free ebooks currently available include 'Being a Better Tennis Parent' by Miguel Crespo and Dave Miley, 'Essential Readings for Tour Tennis Coaches (vol. 1)' with expert contributions from Nick Bolletieri, Mark Kovacs, Francis Roig, Louis Cayer, Doug MacCurdy and more as well as the '2017 Rules of Tennis'.

The ITF Tennis iCoach website now has presentations from; Machar Reid, Magdalena Maleeva - former WTA no.4, Christoph Biaggi - Swiss Tennis strength and conditioning coach and Dermot Sweeney - ITF Technical Director of Training Centres and Players at the 2016 Tennis Europe Coaches Conference available as well as an engaging on-court presentation from Allistair McCaw about key warm-up and cool-down routines from the 2016 LTA National Coaches' Conference. You can view this content and register for Tennis iCoach membership here. For just $30USD per year you can keep up to date with the most current tennis specific coaching information.

We hope that you will value the information presented in this 71st edition of the ITF Coaching and Sport Science Review. We would like to thank all the authors for their contributions and those who sent proposals. We also hope that you will continue to make use of all the other coaching resources provided by the ITF which can be viewed on the ITF Coaching webpage here.

Luca Santilli
Executive Director
Tennis Development

Miguel Crespo
Coaching and Participation Manager
Tennis Development/Coaching

Richard Sackey-Addo
Research Officer
Tennis Development/
Coaching

Professional competencies in tennis coaching

Caio Cortela, Michel Milistetd, Larissa Galatti (BRA), Miguel Crespo (ESP) and Carlos Balbinotti (BRA)

ITF Coaching and Sport Science Review 2017; 71 (25): 3 - 5

ABSTRACT

In issue 70, we published an article showing the most valued professional knowledge by Brazilian tennis coaches. Based on those findings, now we present the main competencies required for the professional intervention in tennis coaching. We expect this information can contribute to the improvement of coach education programs, focused on competency-based approaches.

Key words: Professional Competencies, Coaching, Tennis.

Article received: 27 Sep 2016

Corresponding author: caio.tenis@yahoo.com.br

Article accepted: 08 Feb 2017

INTRODUCTION

A shift from a content-based to a competency-based approach has been raising discussions in coach education research in different countries (Fraayenhoven, 2011, Milistetd, 2015). Knowing the range of competencies regarding the coaching activity in a specific context, might contribute to coach education programs by enhancing strategies to deal with the real needs of sports coaches.

Considering the divergences regarding competency definition, we assumed in this study the Kirschner et al. (1997) conceptualization: "the ability to make satisfactory and effective decisions in a specific setting or situation". For these authors, the effective decisions are associated with the knowledge, skills, situation, self-confidence, and personal values. Concerning the coaching activity, the International Council for Coaching Excellence (ICCE, 2013) describes six primary functions of sport coaches, in which sport coaches should dominate interrelated competencies: (a) Set the vision and strategy; (b) Shape the environment; (c) Build relationships; (d) Conduct practices and prepare for and manage competitions; (e) Read and react to the field; (f) Learn and reflect.

Egerland, et al. (2009a, 2009b) and Egerland et al. (2013) analyzed the importance attributed by coaches from different sports for professional competencies. The results demonstrated that the most valued competencies for coaches were planning and management and communication and integration. The professional actualization and reflection competencies were less valued by sports coaches. In a study which evaluates only tennis coaches from several countries, Campos (2015) described that the importance attributed for professional competencies varies according context and coaching domain. In summary, the tennis coaches highly valued the professional development, communication, and planning competencies.

Considering the influence of context and the coaches need to demonstrate competencies in specific areas, the purpose of this study was to describe the Brazilian tennis coaches' perceptions and the importance attributed for professional competencies.

METHODS

Participants

The participants of this study were 73 tennis coaches (32.9 ± 9 years old) from Parana State, south Brazil. The coaches' characteristics were: 93.2% male; 57.5% had more than 5 years of coaching experience; 49.4% had at least a degree in Physical Education; 79% participated in any kind of continuing education program offered by the Brazilian Tennis Confederation.

Instruments

The instruments used for data collection included: a sociodemographic questionnaire and the Self-Perception Competencies Scale (SPCS) for Sport Coaches, validated by Egerland (2009) to the Brazilian version. The Professional Competencies dimension of scale consists of 32 items, belonging to four categories: Planning and Sports Management; Evaluation; Communication and Integration; and Reflection and Professional Development. The SPCS is answered on a five-point Likert scale, where the coaches report the degree of mastery (1 = not dominate and 5 = dominate very well), and the importance attributed (1 = no important and 5 = very import).

Data analysis

Data was collected manually in 2015 during the Parana state tennis coaches meeting in 3 different regions. Descriptive statistics (average, standard variation, frequency) were performed through the software Microsoft Excel 2010.

RESULTS

Professional Competencies	Self-Perception		Atributed Importance	
	Av.	SD	Av.	SD
Sports Planning and Management – I´m able to...				
Plan and execute sports training programs	3.39	0.92	4.26	0.89
Select the most appropriate progressions, methods and coaching strategies	3.67	0.73	4.24	0.76
Coordinate technical teams	3.41	1.11	3.93	1.01
Organize and plan sports activities	3.56	0.95	4.31	0.74
TOTAL	**3.51**	**0.93**	**4.19**	**0.85**
Evaluation – I´m able to...				
Evaluate the differences in biological maturation of athletes	3.52	0.82	4.16	0.82
Establish parameters and criteria for the evaluation of sports performance and its evolution	3.44	0.95	4.25	0.86
Evaluate sports training programs	3.22	1.03	4.26	0.89
TOTAL	**3.39**	**0.93**	**422**	**0.85**
Communication and Integration – I´m able to...				
Communicating with athletes, individually and in groups	4.33	0.73	4.26	0.83
Provide first aid	3.07	1.05	4.03	1.01
Promote the integration of athletes in difficulties	3.55	0.92	4.22	0.70
Promote the integration of athletes from ethnic minorities	3.72	0.90	4.18	0.77
Transmit a rational, clear and concise information	3.67	0.86	4.31	0.76
TOTAL	**3.67**	**0.89**	**4.20**	**0.82**
Reflection and Professional Development– I´m able to...				
Adjust the professional performance based on investigative evidences and professional development	3.41	0.76	4.03	0.83
Develop research questions	3.44	1.03	3.63	0.97
Cooperate for coaches´development	3.53	1.05	4.21	0.76
Analyze professional needs and design training programs for coaches	3.23	0.91	3.96	0.87
TOTAL	**3.40**	**0.94**	**3.96**	**0.86**

Table 1 – Self-perception and importance attributed for professional competencies.

According to Table 1 and in line with results from Egerland et al. (2013), the authors have verified that the Brazilian coaches demonstrated the highest values of self-perception related to the following competencies: Communication and Integration (3.67 ± 0.89), and Sports Planning and Management (3.51 ± 0.93). As reported by Egerland et al. (2009a), the values of importance attributed for all competencies evaluated were higher than self-perception scores, mainly the Evaluation (4.22 ± 0.85), Communication / Integration (4.20 ± 0.82), and Planning / Sports Management (4.19 ± 0.85). Considering the findings in Campos (2015), all the competencies had similar coaches' evaluation scores except for Professional Development. These results suggest that the Communication and Planning competencies play a central role for tennis coaching.

The Reflection and Professional development competencies, corresponding to learn and reflect - ICCE's (2013) functional area, received the lowest attribution of importance from the participants. Considering the determinant role of reflective processes along the coaches´ career Trudel et al., (2016), this internal learning situation should be incorporate at the coaches routine Trudel et al., (2013).

CONCLUSION

The results indicated that the competencies Evaluation, Communication and Integration, and Sports Planning and Management were highly valued by the participants. Similarly, the competencies Communication and Planning were also perceived as very important by tennis coaches in literature by Campos (2015). These findings claim attention to these competencies, in which they can be recognized as a common and fundamental points for tennis coaching.

Reflection showed lower scores compared to the other competencies in reference to self-perception, as well as the importance attributed. The authors suggest that sports administrators pay attention to this competence as it can be seen as being pivotal to coaches' continuing professional development. In order to contribute to the modification of this scenario, it is necessary to provide opportunities for coaches to engage in reflection activities and to improve competency-based strategies in coach education programs.

Note: The authors are grateful to the coaches' participation and appreciate the support from the Parana Tennis Federation on development of this study.

REFERENCES

Campos, J. R. (2015). Les competències professionals de l'entrenador de tennis. La visió dels seus formadors a nivell internacional. 535 p. Tesi (Doctorati Ciències de l'Activitat Física i l'Esport) – Facultat de Psicologia, Ciències de l'Esport Blanquerna, Universitat Ramon Llull, Barcelona, Espanya.

Egerland, E. M., Salles, W. D. N., Barroso, M. L. C., Baldi, M. F. & Nascimento, J. V. (2013). Professional capabilities and needs in sport coaches training. R. bras. Ci. e Mov, 21(2), 31-38.

Egerland, E. M. (2009). Professional competecies of sports coaches. 86 p. Dissertation (Master's Degree in Physical Education) - Post-Graduation Program in Physical Education, Federal University of Santa Catarina, Florianópolis, Brazil.

Egerland, E. M., Nascimento, J. V. & Both, J. (2009a). Level of association between the importance attributed and perceived competence of sports coaches. Revista Pensar a Prática, 12(3), 1-13.

Egerland, E. M., Nascimento, J. V. & Both, J. (2009b). Professional competences of sports coaches of Santa Catarina state. Motriz, v. 15, n. 4, p. 890-899.
Fraayenhoven, F. V. (2011). Assessment in competency based courses. ITF Coaching and Sport Science Review. 54(19), 7-9.
Gilbert, W. & Côté, J. (2013). Defining coaching effectiveness: a focus on coaches' knowledge. In: P. Potrac, W. Gilbert, & J. Denison (Eds.). Routledge handbook of sports coaching (pp. 147-159). Abingdon: Routledge,
International Council For Coaching Excellence - ICCE. (2012). International Sport Coaching Framework. 1.2ª ed. Illinois. Human Kinetics Pub. Champaign.
Kirschner, P., VanVilsteren, P., Hummel, H. and Wigman, M. (1997). The design of a study environment for acquiring academic and professional competence. Studies in Higher Education, 22(2), 151-171.
Milistetd, M. (2015). The professional learning of sports coaches: Analysis of Initial Training Strategies in Physical Education. 141p. Thesis (Doctoral Degree in Physical Education) - Post-Graduation Program in Physical Education, Federal University of Santa Catarina, Florianópolis, Brazil.
Trudel, P., Gilbert, W., & Rodrigues, F. (2016). The Journey from Competent to Innovator: Using Appreciative Inquiry to Enhance High Performance Coaching. International Journal of Appreciative Inquiry, 18(2), 40-46.
Trudel, P, Culver, D, & Werthner, P. (2013). Looking at coach development from the coach-learner's perspective: considerations for coach development administrators. In: Potrac, P., Gilbert, W., Denison, J. (Eds.). (pp. 375-387). Routledge handbook of sports coaching. Abingdon: Routledge.

RECOMMENDED ITF TENNIS ICOACH CONTENT (CLICK BELOW)

Tennis iCoach

Practical implications for utilizing more approach shots in match situations

Hadi Darvishomrani (AUS)

ITF Coaching and Sport Science Review 2017; 71 (25): 6 - 7

ABSTRACT

Wanting to win a tournament increases the stress on all athletes. Ability of utilizing different strategies in sports, specially under match-situation's pressure, is important. Changing the rhythm of game (e.g. moving from baseline to service line) can be one of these strategies. Approaching to the net could be very useful among junior tennis players, although not many of junior tennis players do not use this tactic when they have to do it. This article mentions some reasons and implications for approaching to the net during a match play.

Key words: approach shot, volley, psychology, strategy

Article received: 25 Oct 2016

Article accepted: 30 Jan 2017

Corresponding author: hadidarvishomrani@yahoo.com

INTRODUCTION

One of the biggest problems of tennis coaches and psychologists is their capability to have effective communications with tennis players in order to improve their performance in specific situations. Frequently, sport psychologists have no idea about tennis and its mental requirement; neither can tennis coaches understand sport psychologists' scientific language. One of the most useful winning tactics in tennis is hitting an approach shot and taking the point with volleys or overhead. Yet, most junior tennis players do not use this tactic because of some technical, tactical, and psychological issues. This present paper describes some psychological reasons of not approaching to the net in tennis, and some implications for tennis coaches and tennis players in order to use this tactic for winning a point in a match.

All top junior players have good forehands, backhands, and technically right volleys. Some of them are not going for approach shots and hitting volleys, they are hitting deep shots and trying to force their opponents to make the error. If the opponents' passing shot is coming towards them, they are fearful of the ball that result in either just pass the ball over the net without any targets, or loosing the point by receiving a passing shot. This paper is trying to mention some reasons and solutions for this issue, and mentions some practical implication for coaches.

PSYCHOLOGICAL ISSUES

Lack of self-confidence

One of the most effective psychological factors that are associated with performance for many sports is self-confidence (Taylor, 1995). Tennis is a sport needing precise and accurate movements with a long duration and lots of short bursts. Therefore, maintaining and increasing self-confidence is one of the most important targets in tennis. The first way of acquiring self-confidence is to educate tennis players to understand their thoughts and to control it during stressful competitive situations (Mamassis & Doganis, 2010). For increasing self-confidence, using positive key words, positive self-talk, positive body language, and imagery techniques are very useful (Taylor, 1995). Mental Training Program (MTP) is one of the most useful techniques for improving self-confidence in individual's mental needs (Savoy & Beitel, 1997).

Motivational and visual imagery are predictor of self-confidence and somatic state anxiety respectively. Moreover, there is correlation between better performance and positive self-talk (Mamassis & Doganis, 2010). Mamassis and Doganis (2010), found that there is a development in the intensity of self-confidence and perceived performance for each of the MTP group athletes.

Finally, the intensity of self-confidence affects directly on the success of winner shots in approaching the net. Having high self-confidence in tennis players lead them to play aggressive when it is possible, and also ensuring that they can win the point by approach shots helps them to use this tactic for winning.

Fear of failure

Most of the noticeably counterproductive emotional reactions during tennis events are stemmed from unconscious fears of failure. Human nervous systems were not created to apply motor control under stress for long duration. There are a lot of examples of unforced errors in top tennis players, while an amateur tennis player could get the point. Experiencing missing shots of easy balls result in feeling fear of failure. Therefore, negative psychological aspects affect on tennis players to make errors when they are approaching to net.

Fear of failure usually comes from thinking about outcome-based results as against performance-based results. Fear of failure is considerably related to performance-avoidance and performance-approach achievement goals (Conroy & Elliot, 2004).

Fear of experiencing failure in approach shots is strongly related to performance-avoidance. Fear of failure seems to activate behavior and influences individuals toward the intention of avoidance achievement goals (Conroy & Elliot, 2004).

Effects of anxiety

Depending on upon different sport situations, anxiety might be a useful or useless emotion. In tennis, anxiety could motivate tennis players to practice hard in order to play better tennis. However, in some situations it might become useless that can be considered as signals of failure (van Dinther, Dochy, & Segers, 2011). In the

past studies have predominantly focused on emotions relating to achievement outcomes (e.g. test anxiety, Zeidner, 1998, 2007) as well as emotions following success and failure (e.g. Weiner, 1985). However studies have largely disregarded activity related achievement emotions (Pekrun, 2006; Pekrun, Elliot, & Maier, 2006; Pekrun, Hall, Goetz, & Perry, 2014). Pekrun (2006) argues that emotions experienced during achievement-related activities can also be seen as achievement emotions. If tennis players reach success at approach shots in their practice time, they would utilize anxiety in a positive way.

According to research, the control-value theory assumes that negative activating emotions such as anxiety and intrinsic motivation. Failure-related anxiety can reduces a player's intrinsic motivation while at the same time triggering extrinsic motivation to invest effort when success is favorable in order to prevent failure (Linnenbrink & Pintrich, 2002; Pekrun, 2006).

Finally, in order to utilize this emotion to improve tennis players' optimal performance level, it is vital to distinguish between useful and useless anxiety. Useless anxiety in the form of negative emotions and thoughts, which impede performance, should be intelligibly recognized before they become seriously hindered and opposed to change. Tennis players should increase a set of adaptable routines that they can apply in different game situations, as well as practice implements helpful thoughts to decrease anxiolytic effects.

Practical implication for coaches

- Introducing and applying mindset method to your students to get familiar with their mental abilities.
- Keep referring to match play as much as possible when practicing approach shots in close drills (Reynolds, 2013).
- Tell your students write their goals down. This crystallizes them and gives them more force (e.g., I will like approaching to the net, but only after I have hit solid groundstrokes, which have got my opponent out of the court).
- Teaching your students how to regulate their anxiety and to adopt a season-long goal setting procedure (Mamassis & Doganis, 2010).
- Help your student to trust in their abilities by underlining their strengths before an event, because of some positive effects on self-confidence and performance during the match (Mamassis & Doganis, 2010).
- Utilizing imagery techniques in practice sessions.
- Practice more approach shots in practice sessions, and apply it in game situations.

- Writing and promising some sentences give tennis players more motivation for utilizing as many approach shots as they can. Sentences such as:

1. My volleys will be easy but I will have learned how to hit the ball short down the line with them.
2. I will win 1 point at each game at least with approach shot.

CONCLUSION

Utilizing different tactics and strategies in tennis are so important. Lack of self-confidence, fear of failure, anxiety during a match, weaknesses of net play, personality of players, weaknesses of footwork, and different aspects of psychology can avoid the junior tennis players to approach to the net when they have to. In modern tennis, changing the rhythm of the game is one of the significant strategies that players can win a point with.

REFERENCES:

Conroy, D. E., & Elliot, A. J. (2004). Fear of failure and achievement goals in sport: addressing the issue of the chicken and the egg. Anxiety, stress and coping, 17(3), 271-285.

Davids, K. W., Button, C., & Bennett, S. J. (2008). Dynamics of skill acquisition: A constraints-led approach: Human Kinetics.

Dekkers, H., & Reardon, J. (2010). A guide to a new mentality: Mindset in a nutshell. ITF Coaching and sport science review, 18(52), 19-20.

Linnenbrink, E. A., & Pintrich, P. R. (2002). Achievement goal theory and affect: An asymmetrical bidirectional model. Educational Psychologist, 37(2), 69-78.

Mamassis, G., & Doganis, G. (2010). The Effects of a Mental Training Program on Juniors Pre-Competitive Anxiety, Self-Confidence, and Tennis Performance. Journal of applied sport psychology, 16(2), 118-137.

Pekrun, R. (2006). The control-value theory of achievement emotions: Assumptions, corollaries, and implications for educational research and practice. Educational psychology review, 18(4), 315-341.

Pekrun, R., Elliot, A. J., & Maier, M. A. (2006). Achievement goals and discrete achievement emotions: A theoretical model and prospective test. Journal of educational Psychology, 98(3), 583.

Pekrun, R., Hall, N. C., Goetz, T., & Perry, R. P. (2014). Boredom and academic achievement: Testing a model of reciprocal causation. Journal of educational Psychology, 106(3), 696.

Reynolds, K. (2013). Improving performance ITF Coaching & sport science review, 21(60), 19-20.

Savoy, C., & Beitel, C. (1997). The relative effect of a group and group/individualized program on state anxiety and state self-confidence. Journal of Sport Behavior, 20(3), 364-376.

Sanderson, J., Weathers, M., Snedaker, K., & Gramlich, K. (2016). "I Was Able to Still Do My Job on the Field and Keep Playing" An Investigation of Female and Male Athletes' Experiences With (Not) Reporting Concussions. Communication & Sport.

Taylor, J. (1995). Aconceptual model for integrating athletes' needs and sport demands in the development of competitive mental preparation strategies. The Sport Psychologist, 9, 339-357.

Van Dinther, M., Dochy, F., & Segers, M. (2011). Factors affecting students' self-efficacy in higher education. Educational Research Review, 6(2), 95-108.

Zeidner, M. (1998). Test anxiety: The state of the art. New York: Plenum.

RECOMMENDED ITF TENNIS ICOACH CONTENT (CLICK BELOW)

TennisiCoach

An examination of the factorial structure of the unforced-error measure in collegiate women tennis players in Japan: A comparison between players and coaches

Daisuke Hirata, Shuhei Sato, Kiso Murakami (JAP), et al.

ITF Coaching and Sport Science Review 2017; 71 (25): 8 - 10

ABSTRACT

Unforced errors are a significant issue in producing high performance in tennis. Identifying the causes of these errors in important to guide interventions to reduce unforced errors. The purpose of this study was to examine the different causes of unforced errors (UE) of Women's Collegiate tennis players from the perspectives of coaches and players. Specifically, and based on previous research (Hirata, Sato, Murakami, Sato, & Saijo, in press; Shibahara, Tamaki, Hirata, Sonobe, Morii, & Saijo, 2015), a measure was developed to collect data on UE. The factor structure was examined using data collected from 283 Collegiate women tennis players and 77 coaches of women tennis players. These participants were divided into High-Skilled (HS) and Low-Skilled (LS), where the criteria for such selection was based in the competition level played in different Competitions. In order to access the HS competition, players needed to be winners of the LS competition. Comparing and contrasting both groups are in the basis of the current research study.

Key words: Tennis, error, factor analysis,

Article received: 12 Dec 2016

Article accepted: 07 Feb 2017

Corresponding author: hiratadaisuke47@gmail.com

INTRODUCTION

There are two types of error in tennis, an unforced-error (UE) and a forced-error. The unforced-error is caused in the situation the player is able to select the shot and is in control of a point or a game. On the other hand, the forced-error is characterized as a miss caused by an opponent's superior play. It is important for coaches to assist players to reduce UE in tennis.

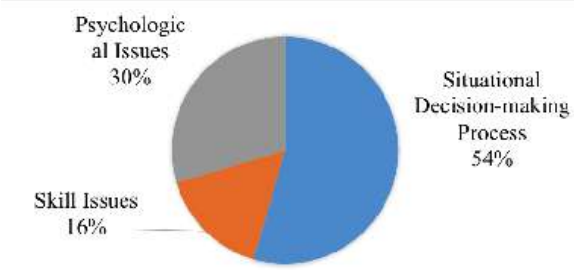


Figure 1. Results of the causes of UE from interviews by players.

Hirata et al. (2014) found several causes of UE in collegiate women tennis players: (a) situational decision-making processes, (b) skill issues, and (c) psychological issues (see Figure1).

There were differences in players' and coaches' perceptions of UE. It was considered that the cause of the UE was different when coaches thought the cause of player's UE. The cause of this as the UE is the variety, to know the cause of the UE of players and coaches are considered to be a valid information for coaching.

In the present study, several items representing the different elements of UE as identified in previous research (Hirata et al., 2017; Shibahara, Tamaki, Hirata, Sonobe, Morii, & Saijo, 2015) study were developed. Subsequently, the factor structure of a measure of UE was examined to establish validity of the tool using data from women's collegiate tennis in Japan.

METHOD

The participants included 283 of collegiate women tennis players who belonged to a university tennis team and 77 of coaches who coached women tennis players in Japan (see Table 1 for demographic details the study participants). The criteria adopted to peer up players into High skilled (HS) and low skilled (LS) was based in their participation in Japan intercollegiate tennis championship or state tennis tournament, recognizing that the access of intercollegiate tennis championship is reserved for the winners of state tennis tournament. Coaches were also organized depending on the Championship played by their athletes. Ethical approval for this study was granted by Senshu University institute of sport ethics committee.

Player

Skill Level	Number	Age(year)	Experience in Tennis (year)	Contest Result
HS Players	89	20.12±1.18	12.28±2.37	Intercollegiate Tennis Championsh
LS Players	194	19.64±1.21	10.49±3.31	State Tennis Tournament
Total	283	19.80±1.22	11.08±3.16	

Coaches

Skill Level	Number (=women	Age(year)	Coaching Experience in Tennis (year)	Contest Result of player
Coaches of HS Players	39 (9)	45.31±8.57	19.34±8.81	Intercollegiate Level
Coaches of LS Players	38 (4)	34.42 12.08	11.58±9.55	State Level
Total	77 (13)	40.04±11.61	15.49±9.92	

Table 1. Groups details of players and coaches.

Based on previous research (Hirata e al., in press; Shibahara et al., 2015), 47 items were developed representing four factors (Distraction, Delay, Hesitation, and Anxiety). Sample items from the Distraction factor were: "I played sloppy" and "I was careless". "I was too confident with my shot" and "I was uncertain with my shot selection" were sample items of the Hesitation factor. Sample items from the third factor (Delay in the ready) included: "I was slow to regain possession" and "My timing was late with my stroke". The fourth factor (Anxiety) included the following sample items: "I was unconfident with my shot" and "I was anxious to play".

In the measure, players responded to the following stem: Player answered to remember the cause of UE in singles game and coaches responded to the following stem: Coach answer about UE of player coached by coach.

For each item, players and coaches were asked to rate Likert scale 1-5 with 1 representing "not at all" and 5 representing "always".

The analysis of items was analysed using exploratory factor analysis (EFA) was conducted. After this initial EFA, a Confirmatory Factor Analysis (CFA) was conducted to examine the factor structure of the measure using Amos 23.0. A comparison of players' and coaches' scores were analysed by a one-way ANOVA using SPSS 23.0.

RESULTS

The results of the EFA identified four factors contributing to UE (see Table 2).

From the EFA, it was found that all four items for each of the four factors loaded appropriately onto their expected factor. Furthermore, the four factors did not show high inter-factor correlations, partially supporting construct validity. Therefore, a CFA was conducted on the same data set. In the CFA, the goodness of fit indices showed a satisfactory fit of the data to this model (GFI=.910, AGFI=.877, CFI=.901, RMSEA=.070). Therefore, there is partial support for the construct validity of this measure of UE in tennis.

Items	F1	F2	F3	F4
F1 : Distraction (α=.755)				
A1 I played sloppy.	**.794**	-.123	-.094	-.036
A2 I was careless.	**.678**	.000	-.088	.056
A3 I played with not enough thought.	**.652**	-.098	.201	-.004
A4 I afforded too much the time before making a hit.	**.618**	.083	-.093	-.218
F2 : Hesitation (α=.797)				
B1 I was too confident with my shot.	-.160	**.736**	.020	.003
B2 I was uncertain with my shot selection.	-.056	**.711**	.136	-.065
B3 I hesitated.	.091	**.682**	-.197	.205
B4 I made a wrong decision.	.180	**.652**	-.074	.080
F3 : Delay in the ready (α=.766)				
C1 I was slow to regain possession.	-.077	-.096	**.814**	.034
C2 My timing was late with my stroke.	-.010	.039	**.691**	-.092
C3 I was uncoordinated to make my shot.	.055	.017	**.585**	-.041
C4 I wasn't prepared before hitting (re-load the limb).	.067	.013	**.583**	.101
F4 : Anxiety (α=.748)				
D1 I was unconfident with my shot.	-.165	.006	.068	**.881**
D2 I was anxious to play.	-.026	.099	.000	**.710**
D3 I was not aggressive enough.	.160	-.069	.024	**.561**
D4 I was nervous.	.040	.130	-.079	**.415**
Factor correlation matrix				
F1 : Distraction	1.000			
F2 :Hesitation	.376	1.000		
F3 : Delay in the ready	.449	.504	1.000	
F4 : Anxiety	.323	.349	.387	1.000

Table 2. Results of Exploratory Factor analysis (EFA).

The one-way Factorial ANOVA showed there were no statistical differences between the mean scores for low versus HS players for any of the four factors of UE. (see Table 3). However, there were significant differences between mean scores for coaches of HS versus LS players on three factors: Distraction (F (75) =2.26, p.<.05), Delay in the ready (F (75) =2.71, p.<.01), and Anxiety (F (75) =2.33, p.<.05).

	HS players (n=85)		LS players (n=194)		
Factors	Mean Value	SD	Mean Value	SD	F Value
Distraction	9.42	3.38	8.78	2.99	1.58
Hesitation	14.09	3.29	13.74	2.95	0.98
Delay in the ready	13.08	3.43	13.39	3.17	0.74
Anxiety	12.91	3.19	13.21	3.04	0.75
	Coaches of HS player (n=39)		Coaches of LS player (n=38)		
Factors	Mean Value	SD	Mean Value	SD	F Value
Distraction	9.82	2.96	11.45	3.34	2.26*
Hesitation	14.08	3.22	13.92	2.57	0.23
Delay in the ready	11.95	3.72	14.00	2.85	2.71**
Anxiety	12.26	2.66	13.71	2.82	2.33*

*p<0.05 **p<0.01

Table 3. To make a comparison between HS groups and LS groups.

An examination of the data between coaches of LS players and LS players only showed statistically different results for the Distraction factor (F (230) =4.92, p.<.05) (see Figure 2).

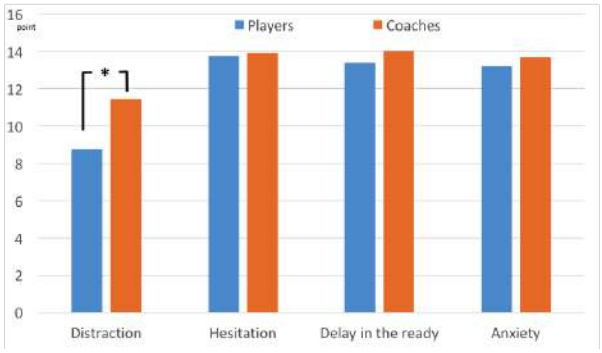


Figure 2. To make a comporson players and coaches of low skill group.

DISCUSSION

The causes of UE are considered an important issue in producing high performance in tennis. In present study, we found support for the four-factor structure of the UE measure: Distraction, Hesitation, Delay in the ready, and Anxiety. This initial examination of the psychometric structure of the UE measure has shown support for its structure, partially supporting the construct validity of UE. However, further examination of this measure is necessary to provide sufficient evidence of its reliability and validity as measure of UE.

This measure is useful for researchers and coaches because it is important for coaching that coaches identify the causes of such errors. Mainly for LS players that struggle to attribute distraction as a reason for unforced-errors. Due to the simplicity of tactics and strategies in collegiate women tennis (Hirata et al., 2005) provide

more space and opportunity for distractions. The role of coaches in such contexts must recognize the need to emphasize the importance to remain focus.

Authors: Daisuke Hirata, Shuhei Sato, Kiso Murakami, Kentaro Shibahara, Daiji Morii, Daisuke Mitsuhashi, Junichi Sato, Msayuki Sato, Masamitsu Ito, Osamitsu Saijo.

REFERENCES

Hirata, D., Tanaka, N., Suda, K., Sato, M., Saijo, O. (2005). The structure of the mental power in tennis players: Comparison by sexes, years, of experience and competitive levels. Japanese Journal of Tennis Sciences, 13,43-52.

Hirata, D., Sato, S., Sato, M., Saijo, O. (2014). A solution for collegiate women tennis players to win the games in a match: Examination based on unforced errors. Japanese Journal of Tennis Sciences, 22,1-10.

Hirata, D., Sato, S., Murakami, K., Sato, M., & Saijo, O. (in press). An explorative study of the causes for unforced errors in collegiate women tennis. Japanese Journal of Tennis Sciences, 25.

Shibahara, K., Tamaki, K., Hirata, D., Sonobe, Y., Morii, D., & Saijo, O. (2015). The research on occurrence causes and causal relationship of unforced errors in college male tennis players: NSSU Journal of Sport Sciences, 4, 10-18.

RECOMMENDED ITF TENNIS ICOACH CONTENT (CLICK BELOW)

TennisiCoach

Fitness testing and players' development: Are we going the right way?

Jaime Fernandez-Fernandez, David Sanz-Rivas (ESP) and Hrvoje Zmajic (CRO)

ITF Coaching and Sport Science Review 2017; 71 (25): 11 - 13

ABSTRACT

The aim of this study was to analyse existing testing procedures and to establish initial recommendations and guidelines based on a survey which compared and analysed the testing procedures applied in the world leading tennis nations.

Key words: Physical testing, development, performance

Article received: 25 Oct 2016

Corresponding author: jaime.fernandez@umh.es

Article accepted: 21 Feb 2017

INTRODUCTION

Tennis has evolved from a sport in which technical and tactical skills were the primary prerequisite for successful play into a sport that also requires a complex profile of physical performance (Fernandez-Fernandez, Sanz-Rivas, & Mendez-Villanueva, 2009). To achieve a maximum improvement, the training programme should be prepared based on the analysis of the most important performance factors and the individual needs. The preparation of optimal training plans requires objective information, especially in the area of the physical training, including specific goals and measurable feedback in order to direct and evaluate the training process (Svensson & Drust, 2005).

At present the tennis community generally accept that development of the player´s performance is a long-term process which includes the regular application of physical performance testing (MacDougall, Wenger, & Green, 1991; Reilly, Morris, & Whyte, 2009). Successful performance in tennis demands a complex interaction of several physical components such as strength, agility, speed as well as aerobic and anaerobic endurance (Fernandez-Fernandez et al., 2009). In this regard, the assessment of the key physical and physiological parameters of performance is an integral part of sports science support for performance-oriented athletes. Thus, complexity exists in the identification of physiological determinants of performance in tennis.

It can be distinguished between single testing procedures and complex test batteries mapping the whole structure of physical performance. All testing procedures, single tests or complex test batteries should consider the following criteria:

1. Validity, reliability and objectivity (Reilly et al., 2009).
2. The results should be assessed in relation to standardized and representative norms / profiles.
3. The frequency and dates for testing should be aligned with the training schedule (Fernandez-Fernandez, Ulbricht, & Ferrauti, 2014).

In tennis, research has been conducted with athletes of various backgrounds (e.g., age, sex, performance level), and using different testing protocols, with the aim to identify the most influencing factors on tennis performance (i.e., ranking) (Birrer, Levine, Gallippi, & Tischler, 1986; Girard & Millet, 2009; William J Kraemer et al., 1995; E. Roetert, Piorkowski, Woods, & Brown, 1995; P. Roetert & Ellenbecker, 2007).

Results are not consistent, with some studies suggesting that physical qualities are weak predictors of overall tennis performance (Birrer et al., 1986) and others suggesting that specific qualities, such as agility (E. P. Roetert, Garrett, Brown, & Camaione, 1992) or speed and vertical power , are important for predicting tennis performance. Moreover, there is not a general agreement among the scientific community about which are the most useful tests in this sport and earlier studies did not systematically investigate (i.e. using

a standardised test battery) the impact of fitness characteristics on tennis performance across a large sample of young male and female tennis players (Ulbricht, Fernandez-Fernandez, & Ferrauti, 2013). In the last few years, and in an attempt to standardize test procedures in tennis, several protocols have been documented, mainly by national tennis federations (Buckeridge et al., 2000; P. Roetert & Ellenbecker, 2007) (For more detailed information reading of (Fernandez-Fernandez et al., 2014) is recommended).

The aim of this study was to analyse existing testing procedures and to establish initial recommendations and guidelines based on a survey which compared and analysed the testing procedures applied in the world leading tennis nations.

FITNESS TESTING FOR 14&UNDER PLAYERS - SURVEY FOR NATIONAL ASSOCIATIONS

The persons responsible for strength and conditioning in 14 National Associations filled out the survey consisted on 8 main points or questions, including:

1. A description of the physical tests used in their National Federations.
2. Description of measurement tools (i.e., simple (stopwatch)) or more sophisticated (light gates).
3. If they were evaluating the testing results independently or by using group percentiles, etc.
4. The purpose of conditioning tests for the National association (i.e., Testing should focus coaches on developing particular abilities; track players' improvement; for talent identification).
5. How results are communicating (i.e., send the information to coach/player; fitness coach is creating individual training plans for conditioning; fitness coach is sending guidelines for individual training; creating a database and norms).

6. Observed benefits of applied system (i.e., Conditioning became important part of player's training; Players improved in observed abilities; Testing results are used for construction of the conditioning training plans).

7. Identified (system) challenges in applying conditioning tests.

8. Suggestions about the possible improvements of the applied system.

RESULTS

• Sixty-two percent of the Federations used simple measurement tools, while in the case of using more sophisticated tools, 62% used force platforms, all of the Federations asked used light cells, and 38% used isokinetic measurements or physiological assessments (i.e., treadmill tests with gas analyses).

• Fifty-five percent answered positively about the evaluation of the results independently or by using group percentiles, with 85% agreeing that testing should focus coaches on developing particular abilities, all of them used the tests for track player's improvement, and 62% for talent identification purposes.

• All the Federations sent the information to coaches/players and created databases and norm profiles, with 30% using the data to create individual training plans for conditioning, and 69% sending guidelines for individual training.

• Sixty-nine percent of the specialists asked felt that conditioning is an important part of player's training, and 77% reported that testing results are used for construction of the conditioning training plans and those players improved in observed abilities.

After summarizing the main physical tests used in the different National Federations, we have compared the tests depending on the physical quality analysed and if they were general (i.e., non-specific physical qualities) or tennis-specific tests (Table 1). Details of each test are not provided as some of them are confidential.

As part of the survey, there were also two "open" questions about challenges and possible improvements of the applied testing structures or systems. Below the reader will find the most interesting ideas reported by the different experts:

Identified (system) challenges in applying conditioning tests:

- Combine laboratory and on-court tests (Difficult to implement with consistency, given that laboratories are usually located far from the training centres).

- Not often able to conduct tests when players are rested due to camp/tournament scheduling. Therefore it is difficult to standardised protocols.

- The communication to the coach/player is always a challenge because there are many "truths" out there.

- Importance of test protocol.

- Difficulties in maintaining a systematic and periodic evaluation, (i.e., availability of centres and players, costs)

Possible improvements of the applied system

- Good software to analyse and evaluate results. The need of man-power to systematically collect, analyse and interpret data, as well as for creating reliable norms.

- Don't over interpret the results: growth and maturation itself can improve results.

- Players practice in what they get tested, so test what you believe is important to practice.

- To make physical trainers of the national clubs understand that a systematic evaluation of the players' training/practice through regular testing is necessary.

Physical Quality	General Tests	Specific Tests
Speed/Agility	Linear sprint (10-20 m; 20-Yard) Zig-zag sprints (10-20 m) Shuttle runs (10-12 sec; 6x8 m) Tapping Test Hexagon Test 5-0-5 Test Skipping Wingate Test	Reaction + direction Sideways Shuffle (baseline) Spider Test Tennis court speed test Speed of forward-backward movement Lateral movement (30 s) Forehand/backhand sprints Forwards/backwards sprints
Strength and Power	Vertical Jump (Vertec, CMJ; bilateral; unilateral) Standing long jump Repeated jumps (platform, 4-10 reps) Drop jump Squat Jump Isometric/Isokinetic measurements (upper/lower body) Handgrip Strength Test Push-ups Chin-ups "Brutal" crunches	Ball throw (tennis ball – 200 gr) Medicine ball throw (overhead; forehand; backhand; backwards; 1-3 Kg) Service velocity Groundstrokes velocity
Aerobic Endurance	Laboratory tests Cooper test (12 min) 1.5 mile run 20 m multistage shuttle test (i.e., multistage fitness test, beep-test or Léger test) Yo-Yo Intermittent Recovery test level 1 30:15 intermittent fitness test	Hit & Turn Tennis test
Musculoskeletal Testing	Sit & Reach Standing reach Functional Movement Screening (FMS; 7 tests) High-Performance profile (10 tests) Shoulder Range of motion (ROM) (internal/external rotation) Hip ROM	—
Coordination	Balance Eye-hand coordination Keeping ball up with a basketball	—

Table 1. Summary of the physical tests reported for the different National Tennis Federations participated in the survey.

CONCLUSIONS AND THE "WAY FORWARD"

The most important conclusion here is that although there is general agreement about the abilities that should be tested, at the same time there is a complete lack of agreement in terms of which are the most useful/recommended tests in tennis, when the physical/physiological demands of the sports have been well described in the literature (Fernandez, Mendez-Villanueva, & Pluim, 2006; Kovacs, 2007). The recommendation here would be to reach an agreement regarding test batteries which can follow the growth and maturation process.

According to the survey, self-made tests are still often used even though they lack validity (are they measure what we expect to measure?) and reliability (the results can be reproduced by repeating the tests under the same conditions), both important conditions a test must accomplish. In this regard, communication with the coach/player is a challenge, because there are many "truths" out there, and the link between the scientific knowledge and the "reality" of the sport is sometimes missing.

We believe that including sport-scientists in fitness testing and profiling of players' physical and physiological capacities would ensure optimal application and interpretation of the test results.

It would be also beneficial to create efficient databases and data analyses enabling comparison among countries, if an agreement regarding the previously mentioned issues is made.

Based on the results obtained in the study, we believe that the development and application of physical performance assessment should be integrated into a complex scientific approach, which can be used to construct a long-term individual and sport specific training optimization model (Figure 1).

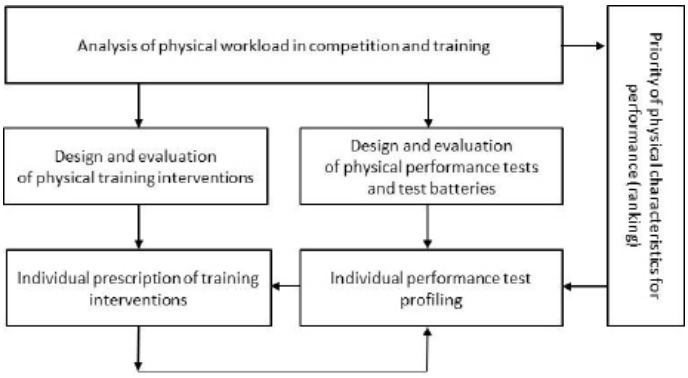


Figure 1. Schematic representation of the sport specific training optimization model (Fernandez-Fernandez et al., 2014)

In this approach, a major first step is the knowledge about the workload profile during competition (i.e., athletes' movement patterns combined with physiological responses (i.e., heart rate (HR), sources of muscular energy)) to provide a better insight into the physiological demands of the sport (Bangsbo, Mohr, Poulsen, Perez-Gomez, & Krustrup, 2006; Fernandez-Fernandez et al., 2009; Gabbett, 2005; Kovacs, 2007; Stolen, Chamari, Castagna, & Wisloff, 2005). This data can be used as external criteria for the validation (design and evaluation) of tennis specific test procedures, and standardized with representative data samples (e.g. different levels of performance, age and sex-groups) (Girard & Millet, 2009; W. J. Kraemer et al., 2003).

This is directly related to the specificity training principle, which states that to target these performance characteristics or components, and elicit specific adaptations, training must be focussed on the desired elements of performance (Reilly et al., 2009). At the final stage of the schematic representation of the sport specific training optimization model, tennis players should complete a regular test battery which allows an individual performance profiling and an individual prescription of training intervention. This process must be repeated in a regular feedback loop, while adapting training interventions to changes in physical performance.

REFERENCES

Bangsbo, J., Mohr, M., Poulsen, A., Perez-Gomez, J., & Krustrup, P. (2006). Training and testing the elite athlete. J Exerc Sci Fit, 4(1), 1-13.

Birrer, R., Levine, R., Gallippi, L., & Tischler, H. (1986). The correlation of performance variables in preadolescent tennis players. The Journal of sports medicine and physical fitness, 26(2), 137.

Buckeridge, A., Farrow, D., Gastin, P., McGrath, M., Morrow, P., Quinn, A., & Young, W. (2000). Protocols for the physiological assessment of high-performance tennis players. Physiological Tests for Elite Athletes. Australian Sports Commission. Champaign, IL: Human Kinetics.

Fernandez-Fernandez, J., Sanz-Rivas, D., & Mendez-Villanueva, A. (2009). A review of the activity profile and physiological demands of tennis match play. Strength & Conditioning Journal, 31(4), 15.

Fernandez-Fernandez, J., Ulbricht, A., & Ferrauti, A. (2014). Fitness testing of tennis players: how valuable is it? Br J Sports Med, 48 Suppl 1, i22-31. doi:10.1136/bjsports-2013-093152

Fernandez, J., Mendez-Villanueva, A., & Pluim, B. M. (2006). Intensity of tennis match play. Br J Sports Med, 40(5), 387-391; discussion 391. doi:10.1136/bjsm.2005.023168

Gabbett, T. J. (2005). Science of rugby league football: a review. Journal of Sports Sciences, 23(9), 961-976.

Girard, O., & Millet, G. P. (2009). Physical determinants of tennis performance in competitive teenage players. J Strength Cond Res, 23(6), 1867-1872. doi:10.1519/JSC.0b013e3181b3df89

Kovacs, M. S. (2007). Tennis physiology: training the competitive athlete. Sports Med, 37(3), 189-198. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/17326695

Kraemer, W. J., Hakkinen, K., Triplett-Mcbride, N. T., Fry, A. C., Koziris, L. P., Ratamess, N. A., Knuttgen, H. G. (2003). Physiological changes with periodized resistance training in women tennis players. Med Sci Sports Exerc, 35(1), 157-168. doi:10.1249/01.mss.0000043513.77296.3f

Kraemer, W. J., Triplett, N. T., Fry, A. C., Koziris, L. P., Bauer, J. E., Lynch, J. M., . . . Nelson, R. C. (1995). An in-depth sports medicine profile of women college tennis players. J Sport Rehabil, 4, 79-98.

MacDougall, J. D., Wenger, H. A., & Green, H. J. (1991). Physiological testing of the high-performance athlete: Human Kinetics Books Champaign, IL.

Reilly, T., Morris, T., & Whyte, G. (2009). The specificity of training prescription and physiological assessment: a review. J Sports Sci, 27(6), 575-589. doi:10.1080/02640410902729741

Roetert, E., Piorkowski, P., Woods, R., & Brown, S. (1995). Establishing percentiles for junior tennis players based on physical fitness testing results. Clin Sports Med, 14(1), 1.

Roetert, E. P., Garrett, G. E., Brown, S. W., & Camaione, D. N. (1992). Performance profiles of nationally ranked junior tennis players. The Journal of Strength & Conditioning Research, 6(4), 225-231.

Roetert, P., & Ellenbecker, T. S. (2007). Complete conditioning for tennis: Human Kinetics Publishers.

Stolen, T., Chamari, K., Castagna, C., & Wisloff, U. (2005). Physiology of soccer: an update. Sports Med, 35(6), 501-536.

Svensson, M., & Drust, B. (2005). Testing soccer players. Journal of Sports Sciences, 23(6), 601-618.

Ulbricht, A., Fernandez-Fernandez, J., & Ferrauti, A. (2013). Conception for Fitness Testing and individualized training programs in the German Tennis Federation. Sport-Orthopädie-Sport-Traumatologie-Sports Orthopaedics and Traumatology, 29(3), 180-192.

Wheelchair tennis – Croatian experiences

Jure Vrdoljak (CRO)

ITF Coaching and Sport Science Review 2017; 71 (25): 14 - 16

ABSTRACT

The research study included 15 participants from 22 to 50 years of age. Data collection involved the use of a semi-structured interview, with qualitative analysis used in the data processing, while for the organization of the data collected the method of open coding was used. According to the results, Difficulties encountered by tennis players with physical disabilities are found to be: spatial barriers, financial difficulties and categorization of sportsmen, namely tennis players. It is important for society as a whole to invest more in the development of this sport and to continue conducting research on wheelchair tennis.

Key words: Tennis, physical disabilities, wheelchair tennis

Article received: 19 Oct 2016

Article accepted: 30 Jan 2017

Corresponding author: jure.vrdoljak87@gmail.com

INTRODUCTION

Inclusion in sport is one of the possibilities for people with disabilities to be active and to express their talents and abilities; Sport develops fun, fellowship - it thrills, encourages and helps gain confidence; A small number of activities for people with disabilities require adaptation (Petrinovi Zekan at al., 2011). It is estimated that in the general population, the range of people with disabilities varies between 8-10%, which is around 580 million disabled people in the world and in Croatia too. (Leutar et al., 2015). In Croatia the social policy for people with disabilities is based on contemporary international standards, including the fundamental principles of human rights such as the principle of non-discrimination, the principle of interdependence and the indivisibility of all human rights; it is therefore imperative to make full civil and political as well as social, cultural and economic rights achievable for people with disabilities. (Convention on the Rights of Persons with Disabilities (2007) and National Strategy of Uniform Policy for People with Disabilities; Council of Europe's Action Plan; the Standard Rules on the Equalization of Opportunities for People with Disabilities...).

Wheelchair tennis in Croatia began to develop in 1990 at the instigation of a few amateurs - enthusiasts. A more serious approach and development began only in 1996 after the involvement of professional staff, which was to increase the quality of training (Lugonji, 2011) Every day more and more people with disabilities play tennis. Wheelchair tennis today is among the most popular of sports played in wheelchairs. The reason is that a person in a wheelchair can play tennis with people without disabilities (Gilbert & Jamison, 1994; Diaper and Goosey-Tolfrey, 2009).

In tennis, people with disabilities play by the same rules as people without disabilities - the rules specified by the international tennis federation - with just one difference: the ball can bounce twice before a person in a wheelchair returns it, and the ball can bounce on the ground just once before a person without disabilities returns it (Vrdoljak, 2013; Filipcic & Filipcic, 2009).

There is a complete lack of research on the practice of tennis by people with disabilities in Croatia, which were the difficulties for exploring the experiences of people with disabilities engaged in tennis.

OBJECTIVES

The aim of this research is to gain insight into the opinions and experiences of people in wheelchairs about their practice of tennis as a sport activity for people with disabilities.

Accordingly, the following research questions were set: What difficulties do people with disabilities face when practicing tennis?

METHODOLOGY

Design

Data were collected by semi-structured interview. The interview consisted of questions related to various general characteristics, such as age, sex or marital status, and questions based on the pursuit of tennis advantage, problems and prospects for the future. The interview consisted of a total of five questions. Interviews were conducted by the authors of this paper. We found the participants with help of the Croatian Association of Wheelchair Tennis, which provided information about the club where people with physical disabilities train. Before the research, the researchers explained to research participants the aim of the research, requested voluntary consent to participate in the research and informed participants about anonymity and confidentiality of the shared information. It was emphasized to each participant that his responses would be combined with the responses of other participants in order to analyze the phenomenon itself, because there could be no accurate nor incorrect answers, only their subjective assessment of the subject. The average duration of the interview was 30 minutes.

Participants

The data for the survey were collected and the research was carried out, as already mentioned, with the Croatian Association of Wheelchair Tennis Players. The study included 15 participants in Zagreb, Croatia, in the summer of 2014. It was not a random sample because the population selected for interviewing was exclusively made up of people with disabilities engaged in tennis. All 15 participants were male. The age of participants ranged from 22-50 years of age. Most often they had finished high school and one person had finished college. Some participants were disabled in the Homeland War of the 1990s, while most persons with paraplegia had been so affected since their childhood.

Data processing

To process the data, the process of qualitative analysis was used and for the organization of the collected data the method of open coding was used. In accordance with this method, the first step in the processing of data was the editing of empirical material by marking sentences and parts of sentences that were significant with regard to the above research questions, which was done in order to define the so-called codes of the first order. After that, the procedure of combining related terms into categories was conducted, whereby each code of the first order was associated with the relevant term at the second order and in that way the essence of each unit of text was emphasized. The last step was the assignment of related terms to categories, which was followed by their analysis (Milas, 2005).

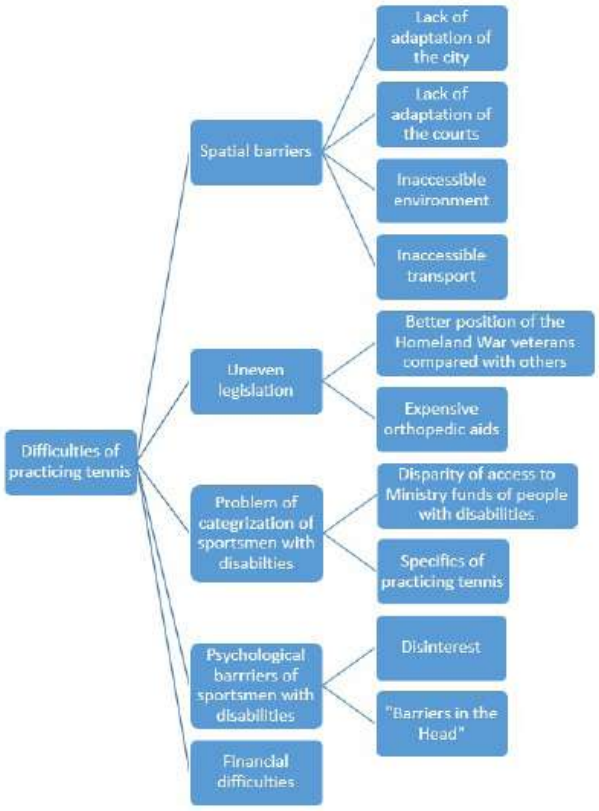


Figure 1. Space Barriers.

RESULTS AND DISCUSSION

Participants in this study most often cited the spatial barriers they face when practicing tennis, namely physical obstacles in the environment (...access to the courts is even worse, with regard to the access we as people with disabilities find around the city (1) ...in other places it is completely inaccessible for wheelchairs and nothing is adapted for people with disabilities. (2)); physical obstacles at the courts (...at [some] places there is not always a good access to the courts... (2)). The participants nevertheless pointed out that in recent years some improvements had been made regarding access to the courts and talked about improving spatial accessibility. (But the adaptation of the courts is making progress, more and more often on the courts we have a toilet (3)). It is also important to get to the tennis courts. Participants therefore stressed the difficulties with transport (...And public transport should be ordered three days in advance and you depend on it. And you have other obligations (4)).

Financial difficulties

Thus, all persons insured with the Croatian Institute for Health Insurance (NN.//2012) have the right to orthopedic aids, but for wheelchair tennis there are specific regulations which are such that appropriate aids are usually not covered and have to be funded privately and orthopedic devices are expensive: (Wheelchairs are very expensive and we have to get them on our own and they cost about 25,000 Kunas (5) ... I play in some that I got at the club and I am satisfied (5)). Survey participants cited the disparity of access to funds from the Ministry of Science and Technology (The Ministry provides incentives only to those who generate results, but as in tennis there are no categories of players, it is much harder to be successful. For example, there are 10 categories in athletics and it is a lot easier to achieve some success (3)). Ciliga et al. (2006) state that an inappropriate, non-transparent and incomplete model of funding for exercise programs, almost always subordinated to and perceived as less important than the sporting needs of the general population, had a negative influence on the current development of sport from the perspective of people with disabilities.

Psychological barriers

During the interview, participants in this study very much stressed the psychological barriers faced by people with disabilities engaged in tennis. They emphasized their lack of interest in sports in general, including tennis (...I tried to demonstrate wheelchair tennis to them. But there was no interest (3)); they also emphasized the private incentives of players themselves (For playing sports all is 'in the head', someone likes it or not. It is very difficult, the young do not want to play sports (3)). The participants pointed out that it is about "barriers in the head" (The problem is that there are no categories of players in tennis, while in athletics there are a lot of categories and it is a lot easier to win medals (4)). Therefore, Ciliga et al. (2006; Probert & Crespo, 2015) emphasize and draw attention to the need and duty of the community to care for people with disabilities and to promote their integration and reintegration into the community through kinesiological activities as well as other means.

Unequal legislation

They underline the difference between people with disabilities from the Homeland War and civilian persons with disabilities. Thus, people with disabilities from the Homeland War themselves point out that they have more favorable opportunities to practice tennis than their colleagues who have acquired a disability, for example, in a traffic accident, etc. (We disabled from the Homeland War have our cars and everything is good ... but for civilians with disabilities it is much harder, because they do not have their own cars and orthopedic aids and wheelchairs (3)). The aforementioned financial difficulties in purchasing orthopedic devices mostly concern people with disabilities who do not fall into the category of disabled persons from the Homeland War.

Specifics of practicing tennis - problems of the categorization of sportsmen with disabilities

Earlier literature was cited (Ciliga et al. 2006) that refers to the great differences in the approach between financing programs for sportsmen with disabilities and those without disabilities. And our participants – tennis players with disabilities - pointed out differences and discrimination against them as sportsmen compared to other types of sports such as athletics and swimming (The problem is the lack of investment in this sport because they value the results only, and invest based on that...just throw money on athletics and swimming. (4)), so, it is a question of results as the basic criterion for funding. They also state the following (... because to achieve results in wheelchair tennis a million things should coincide. We are all in the same category. Someone does not have legs, and plays tennis sitting in a wheelchair, but has very strong musculature, and I, for example, fall if I do not hold on to something. (3)). Ciliga et al (2000) report that "The current situation is devastating, because most leaders of sports and recreational programs do not have any point of contact with the umbrella institution for sport. They also state that there is a very small number of highly qualified staff trained and motivated to work with people with disabilities, which is another limiting factor.

CONCLUSIONS

The difficulties encountered by tennis players with disabilities are spatial barriers related to obstacles in the environment, obstacles on the courts, and difficulties with transportation. There is a little progress when it comes to infrastructure so that the mobility of wheelchair tennis players is still hampered. Financial difficulties are also expressed by players, manifested in the inability to purchase orthopedic devices, such as wheelchairs for tennis players, and the practices of financing programs when it comes to the allocation of funds to different sports. Inconsistent legislation leads to a privileged situation for people with disabilities who are disabled as a result of the Homeland War, who have a lot more benefits than other tennis players with disabilities. Finally, as the most emphasized specific need, the problem of categorizing tennis players is singled out. It is difficult to achieve sporting results, because all tennis players with disabilities are put at the same level regardless of the degree of disability. On the other hand, financial support is correlated with such results. It is therefore essential that steps be taken to work on the categorization of people with disabilities, which would contribute to the development of tennis for people with disabilities in general. The very results of this study put stress on it.

This study is the first one conducted in Croatia and could be a starting point for further research on a larger sample which could combine both qualitative and quantitative methodologies to investigate this area.

REFERENCES

Ciliga, D., & Trkulja-Petkovi, D. (2000). Prilago▪ene tjelesne aktivnosti djeci s invaliditetom. In: M. Andrijaševi▪ (ed.), Zbornik radova Znanstveno-stru▪nog savjetovanja “Slobodno vrijeme i igra”. Zagreb: Fakultet za fizi▪ku kulturu Sveu▪ilišta u Zagrebu; 24-26: 155-157.

Ciliga, D., Trkulja-Petkovic, D., & Delibašic, Z. (2006). Kvaliteta rada u podru▪ju sportske rekreacije osoba s invaliditetom. Zbornik radova 15. ljetne škole kineziologa Republike Hrvatske. Rovinj; 2006: 282-285.

Diaper, N. J., Goosey-Tolfrey, V. L. (2009). A physiological case study of a paralympic wheelchair tennis player: reflective practise. Journal of Sports Science and Medicine, 8, 300-307.

Filipcic, T., Filipcic, A. (2009). Time characteristics in wheelchair tennis played on hard surfaces. Kinesiology, 41, 67-75.

Gilbert, B. & Jamison, S. (1994) Winning Ugly: Mental Warfare in Tennis – Lessons from a Master.

Convention on the Rights of Persons with Disabilities (N.N.6/2007.)

Leutar, Z., Hlupic, S., Vladic, J. & Caljkušic, M. (2015) Metode socijalnog rada s osobama s invaliditetom, Pravni fakultet Sveucilišta u Zagrebu.

Lugonji, S. (2011) Sport osoba s invaliditetom (Graduate Thesis). Studijski centar socijalnog rada u Zagrebu.

Milas, G. (2005) Istraživacke metode u psihologiji i drugim društvenim znanostima. Jastrebarsko: Slap. The National Strategy for Equalization of Opportunities for Persons with Disabilities from 2007 to 2015. Zagreb: Vlada RH.

Petrinovic-Zekan, L., Ciliga, D., Trkulja-Petkovic, D. Research on sport activity in persons with disability in Croatia. U: D. Milanovi▪ i G. Sporiš (Ur.), Proceedings Book of the 6th International Conference on Kinesiology «Integrative Power of Kinesiology», Opatija 8-11.09. (str.67-72). Zagreb: KIF. Regulations on orthopedic aids. N.N. 7/2012.

Probert, A. Crespo, M. (2015) Sociology of tennis: research on socialisation, participation and retirement of tennis players, ITF Coaching and Sport Science Review, 65 (23), 19-20.

Vrdoljak, J. (2012) Tenis u invalidskim kolicima i njegov utjecaj na osobe s invaliditetom. Zagreb: Kineziološki fakultet Sveucilišta u Zagrebu.

Plantar pressures in simulated tennis movements at different surfaces

Christos Mourtzios (GRE)

ITF Coaching and Sport Science Review 2017; 71 (25): 17 - 19

ABSTRACT

Analysis of plantar pressures during sport movement performance can provide significant information to athletes and coaches regarding sport performance and plantar loads. Tennis is a sport that is played in different surfaces. Therefore, the terrain is a critical factor that determines both the bounce of the ball, and how the player moves on the court. The purpose of this study was to examine the plantar pressures in two different surfaces of tennis courts (greenset - synthetic grass) when performing a sequence of two basic tennis movements, service and return in combination with forehand and backhand strokes.

Key words: Tennis court surfaces, plantar pressures, return of serve, forehand, backhand

Article received: 05 May 2016

Article accepted: 30 Jan 2017

Corresponding author: christosmourtzios@hotmail.gr

INTRODUCTION

Tennis has been called the game of quick decisions and readiness. It includes moving over very short distances and frequent changes of direction. On average 3 to 5 changes of direction are necessary at each game point and 500 during a match (Fernandez et al., 2006). Great emphasis on player development training is given to the kinetic chain. This allows force transfer from one body part to another, namely from the legs to the hips and pelvis, the shoulder and, finally, the racket (Roetert & Kovacs, 2011).

Footwork in tennis is considered very important for the efficient movement of the player on the court. The forces on the muscles and joints of the foot can be much larger than the externally measurable ground reaction forces. Ground reaction forces increase rapidly as a result of the leg collision with the ground during running and changes in direction (Valiant and Cavanagh, 1983).These movements produce varying loads on the feet that are often underestimated.

To our knowledge, no data on plantar pressure distribution has been published for junior athletes. Therefore, plantar pressure distribution profiles for tennis-specific movements for both feet are unclear.

An important factor which affects tennis player performance is the type of tennis court surface. Two types of surface are the greenset and the synthetic grass. It is known that there are differences in tennis performance between the two specific types of surface (Miller, 2006). Previous authors have suggested that when playing on the greenest, the player movement patterns differ between grass, clay and acrylic tennis surfaces (O' Donoghue & Ingram (2001). The purpose of this study was to examine the pressure distribution underneath both feet while performing two sequences of tennis-specific movements at two different surfaces (greenset - synthetic grass) in junior tennis players.

METHODS

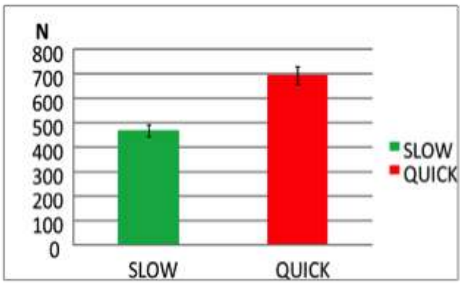
Subjects

Sixteen (8 males, 8 females) tennis players, aged 10-16 years (four under-10 years, four under-12 years, four under-14 years, four under-16 years, height 156.0 ± 0.08cm, body mass 44.60 ± 8.9 kg) participated in this study, boys and girls that are playing in tournaments of the Hellenic Tennis Federation.

Experimental set-up

Subjects performed randomly two different tennis-specific movements (Service and Return play) on synthetic grass and greenset.

RESULTS



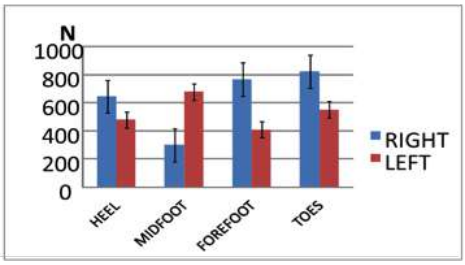
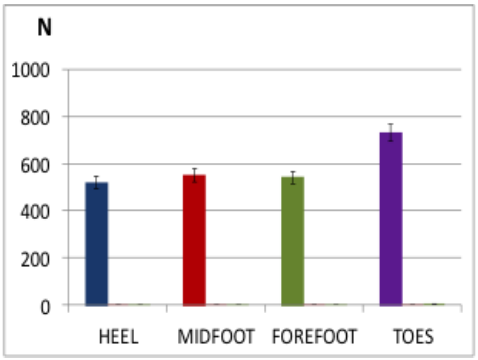


Table 1 and 2. Fmax in serve.



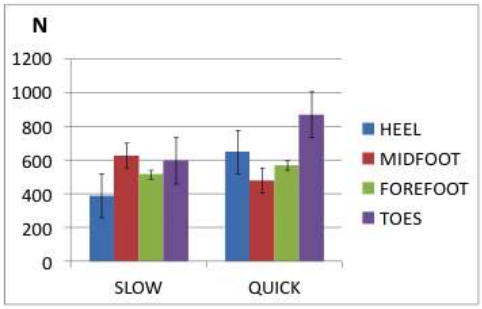
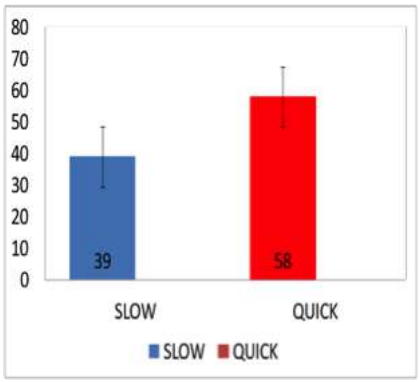


Table 2 and 3. Fmax in return.



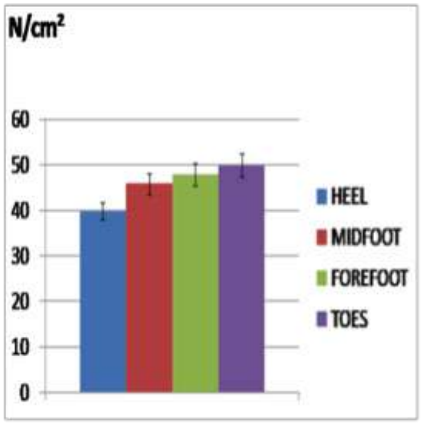


Table 5 and 6. Peak Pressure in serve.

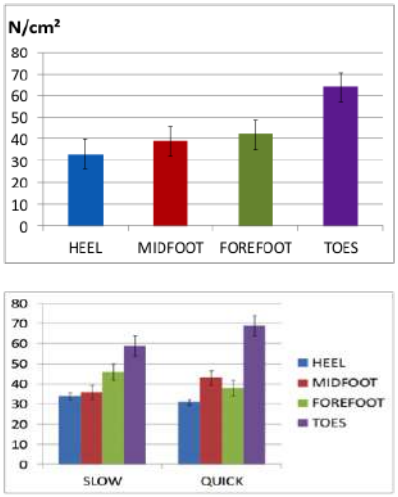


Table 7 and 8. Peak Pressure in return.

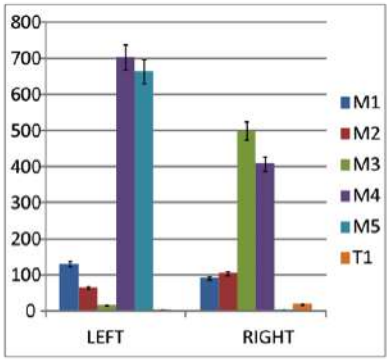


Table 9. Peak Contact Time Point in serve.

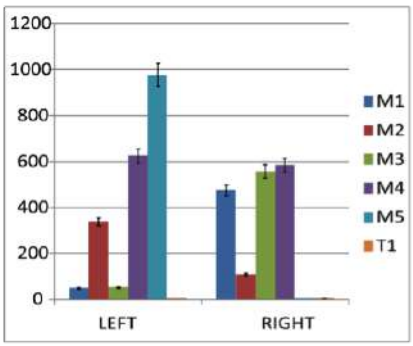


Table 10. Peak Contact Time Point in return.

DISCUSSION

The results in this study showed that the loads on the fast surface (greenset) was higher in both movements, compared to the slow surface of the synthetic grass.

The results showed that in both surfaces the loads were higher on the toes of the foot, with significant effect on the maximum pressure in the service and return of service and with significant effect on the maximum power in return.

There was no significant effect on the contact time of the two different surfaces. As measured in both the service and return movements, the contact time was longer on synthetic grass with the average contact time on the slower surface during the serve being 205ms and 190ms on the faster surface. For the return of serve the contact time was 202ms on the slower surface and 169ms on the fast. Also significant difference in contact time did not appear between left and right foot.

The average of the power was reduced on the surface of the synthetic grass against fast surface, both in the movements of service and return. This means that the risk of injury of a young athlete, because of high instantaneous vertical loads, is considerably lower at the surface of the synthetic grass. Thus, despite the fact that the fast surface imparts an advantage for a rapid movement of the athlete, the movement exhibits a higher risk. Especially in young athletes, who may not have fully developed technique and coordination skills, the choice of the synthetic grass should be preferred.

The middle of the foot had higher loadings on synthetic grass against greenset in the movement of the return of service with maximum force 629 N in the slow surface and 480 N in the fast surface. Therefore, our study for the first time shows that the differences between the two surfaces do not only concern the maximum loads but also differ in the way of loading the different regions of the foot. This has two consequences: a) that while the athlete performs the same movement sequence, the manner of execution, as it affects

the plantar pressures differs between the two surfaces b) the various loads received on the different areas of the foot between the two surfaces suggest a different risk of injury and highlight the need to use different shoes depending on the surface on which the athlete competes.

The loads were measured and allocated to the left and right foot, with the following values. The movement of service on left foot was measured to 548N in fmax and 41 N / cm² in max pressure, while the right foot was measured to 633N in fmax and 51 N / Cm² in max pressure. In serve the right foot had higher loads than the left foot. In return the left measured with 594N at maximum power and 40 N / cm² at maximum pressure, while the right to 570N at maximum power and 49N / cm² at maximum pressure. The results showed more maximum force produced in the left foot and the right producing more maximum pressure. Therefore, with the coach being able to know more clearly how the loads are distributed between the left and right foot, this can assist in enhancing technique, footwork and being more aware of the most efficient ways of transferring forces for more effective shot production.

Finally the measurements of maximum load at the point of contact from the front of the right and left foot showed in service that peak loads occurred on the right foot in the third metatarsal and on the left foot in the fourth metatarsal. In the movement of the return of service the contact time point of maximum loads, appeared on the right foot in the fourth metatarsal and on the left foot in the fifth metatarsal. The conclusion we take from these measurements for the first time in our study is that the peak plantar loads are distributed to the outside side of the foot, on both feet and to both movements with the loads maximum at the beginning of the movement. Therefore, the left leg acts as a stabilizer and the right leg as a driving force for the creation of explosiveness and the transfer of forces to the execution of the strokes. In summary, by recording and analysing data coaches can use this information and apply this practically to help optimise technical execution of shots. In addition, it can be suggested that the data gained can also assist in the correct planning and content of training sessions to specifically work on the athlete effectively increasing the transfer of forces at the beginning of their service, return and groundstroke motions.

PROPOSALS

Tennis is a sport that is played on different surfaces and terrain is a critical factor determining both the bounce of the ball, and the player movements on the court. So the technique applied, mainly to the footwork, varies when tennis is played on fast or slow surfaces. The data gained from this study can assist athletes and coaches in the selection of training programs and preparing the transition from one surface to another. Research in plantar pressures may continue in-depth, because the data supplied, is very important and can help athletes of all levels, beginner- advanced, improve their skills, in cooperation with the biomechanics in order to have higher performance, better results and fewer injuries. Data presented in this study might help shoe companies to further design tennis shoes taking into account the specific characteristics of a given playing surface. Specifically, shoes for junior tennis players should be constructed with more attention and weight to the front area of the foot, so that could help reduce impacts (shock absorption) on a particular tennis surface where excessive loading was found to be a potential danger for overloading specific areas of the foot (synthetic grass: midfoot, greenset: hallux and lesser toes areas).

CONCLUSIONS

In conclusion, the results of this investigation showed that for the athletes of young ages, it is preferable to train and play tennis in slow surfaces like synthetic grass due to lower loadings that are accepted in soles, compared with fast surfaces such as the greenset. This means fewer injuries, fewer problems in the physical development of athletes and better training.

REFERENCES

Cavanagh,PR., & LaFortune, MA.(1980). Ground reaction forces in distance running. J Biomech,13 :397–406.

Eckl, M., Kornfeind, P. and Baca, A. (2011). A comparison of plantar pressures between two different playing surfaces in tennis. Portuguese Journal of Sport Sciences 11, Biomechanics in Sports 29.

Fernandez, J., Mendez-Villanueva, A. & Pluim, B.M. (2006). Intensity of tennis match play. British Journal of Sports Medicine, 40(5), 387-391.

Girard, O., Eicher, F., Fourcher, F., Micallef, J.P. & Millet, G.P. (2007). Effects of the playing surface on plantar pressures and potential injuries in tennis. British Journal of Sports Medicine, 41, 733-738.

Miller S. (2006). Modern tennis rackets, balls and surfaces. British Journal of Sports Medicine, 40, 401.

O'Donoghue, P. and Ingram, B. (2001). A notational analysis of elite tennis strategy. Journal of Sport Sciences, 19(2), 107-115.

Roetert, P. Kovacs, M (2011). Tennis Anatomy. Human Kinetics Books.

Valiant, GA., & Cavanagh, PR. (1983). A study of landing from a jump: implications for the design of a basketball shoe. in,Winter DA, (ed.). Biomechanics IX, pp.117–122. Champaign, IL, Human Kinetic Publishers.

Teaching tennis by means of a constructivist approach

Javier Courel and Bernardino J. Sánchez-Alcaraz (ESP)

ITF Coaching and Sport Science Review 2017; 71 (25): 20 -22

ABSTRACT

This article presents a justification for the use of a constructivist model in tennis teaching, designing tasks and exercises that make up technical and tactical learning. The advantages and teaching principles of this model are presented below: (1) an organization in increasing order of difficulty, (2) basic and specific motor training, (3) significant teaching, (4) transference to real play and (5) an adaptation to the characteristics, motivation and interests of the pupil.

Key words: Methodology, teaching model, task design

Article received: 18 Sep 2016

Corresponding author: ninosam@hotmail.com

Article accepted: 16 Feb 2017

INTRODUCTION

Tennis teaching has traditionally centred around mastering technique by means of the conductivity models with which the player becomes a passive subject who mechanically registers the information he is given (Contreras, 1998). Thus, learning is based on the analytic repetition of strokes which will be later practised in a simulated competition context (Sánchez, 2003). Following the proposal set by Sánchez-Bañuelos (1986), such skills will initially break down into simple parts that learners will, little by little, incorporate until they can perform the complete technical movement. Finally, these skills will be integrated into real game situations to start tactical learning.

A clear example of this model can be found in the classic system of tennis training based on baskets or carts: the coach throws balls asking the player to repeat one or several technical movements while the latter mechanically reproduces the technical movement indicated.

Over the years, these technical models have been criticized because they leave in the background some key aspects like tactics, the creativity and autonomy of the player, the ability to solve problems and because they can be monotonous and boring (Devís & Sánchez, 1996). As a consequence, some alternatives have cropped up based on the "Teaching for Understanding Sport Games" (Bunker & Thorpe, 1982), whose characteristic is driving the teaching of tactics to technique (that is, from "knowing what to do", to "knowing how to do it") fostering understanding the game principles on the mechanical technical execution. This way, the player will get a contextual learning of the technical skills (Arnold, 1991; Famose, 1992), and will associate their executions to the corresponding decision making depending on the game situation (what technical movement to make, where and how to execute it). In order to do so, the coach will present global game situations (changing scoring systems, space, time, and number of players, etc.) offering a practice context for the player to explore solutions freely. The coach acts as a mediator of this learning, guiding the player to be successful in his task. This kind of practice has a certain degree of uncertainty and variability that will force the learner to adapt his behaviour at all times, favouring the transference to competition.

For example, if the target is to make a beginner player practise the forehand stroke, it is possible to present a global 1x1 exercise with reduced space in which the player can only hit forehand strokes.

Similarly, this could be criticised because it leaves the correct technical execution in the background, which is key in tennis. Still, far from ignoring its importance, the work of technical skills would be included in order to perfect them and be more successful in the playing environment (Griffin, Mitchell & Oslin, 1997), or, when the demands of the task are so high that they prevent the player from succeeding.

For instance, after the precious forehand exercise, it would be wise to reflect with the player on those aspects they would perfect, so as to improve their strokes. Then, these aspects should be worked upon in a more specific way, in order to finally present a global situation to transfer such learning.

ADVANTAGES OF TEACHING BY MEANS OF A CONSTRUCTIVIST MODEL

It is important to mention the potential advantages of a comprehensive and constructivist model for the development of athletes who are better prepared and in a better condition to face top level competition. This assumption is based on research on the characteristics that differentiate top level from lower level athletes (Baker, Côté & Abernethy, 2003; Castejón, 2003; Raab, Masters & Maxwell, 2005). Among other aspects, we find that expert and top level athletes are characterized by:

- A greater specific knowledge of the sport.
- A better capacity for decision making in the real game context (i.e. to decide and act in a shorter time and with a greater success rate).
- A greater perceptive skill and pattern recognition, which allows for a greater anticipation capability as regards their opponents.
- A greater adaptation capacity to the different game situations.
- A greater creativity and a greater number of technical-tactcal resources.
- A greater technical command and a greater variability of movement.

TEACHING PRINCIPLES TO DESIGN TENNIS TASKS

One of the greatest difficulties and demands of the comprehensive model is to plan and to structure the tasks during the training sessions correctly. For so doing, not only is it necessary to have a great knowledge of your own sport, (rules, technical-tactical aspects, physical demands of the competition, performance indicators, etc.) but also to have the methodological resources to maximize each task, facilitating the teaching-learning process.

According to Cárdenas (2005) and Contreras (1998), we can differentiate 5 great sport teaching principles in which task design is particularly important.

Ranking tasks in increasing order of difficulty

It is logical to think that content organization, growing from simple to complex will optimize learning (Álvarez & del Río, 1999; Famose, 1992). As Ruíz Pérez (1995, p.135), stated, we can consider that

"the player is an active problem solver", thus, the task must be a challenge that can be overcome, that is, its difficulty must be a little harder than what the learner can already do, favouring autonomy in problem solving (Castejón & López Ros, 1997). If we consider the famous Csikszentmihalyi´s (1990) "flow theory", the challenge of the exercise will be directly linked to the player´s skills (Figure 1). So, the situations we present must be complex enough to be an attractive challenge that raises the players´ maximum interest and motivation, making sure they are involved in pursuing the objective. On the contrary, it is recommended to avoid extremely easy or monotonous tasks that may cause boredom or lack of enthusiasm, and also those that are too complicated, and create anxiety and frustration.

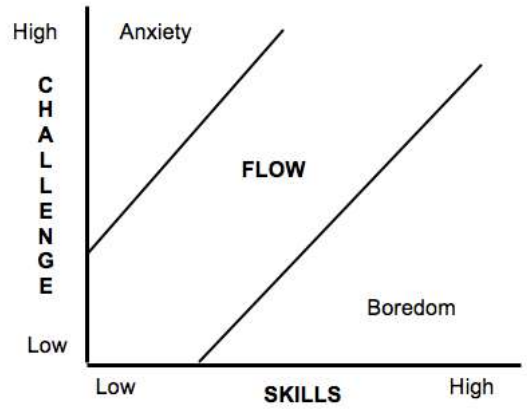


Figure 1. Flow channel between the degree of challenge of the task and the learner´s level of skills (Csikszentmihalyi, 1990).

In an attempt to classify the tasks according to the degree of difficulty, three main dimensions were set, laying emphasis on the complexity of the decision making process the player is exposed to (Table 1). In this sense, initial stages must present situations with less stimuli, requiring less accuracy, or less actions to coordinate, in order to evolve, little by little, to more complex situations. Likewise, Durand (1988) talks about the need to reduce the number of targets in a task, as well as the amount of information or feedback provided to the learner during the initial stages, in order to avoid saturation.

At initial stages, tasks should be driven to meeting simple and clear targets that the player quickly understands (i.e. passing the ball to the opposite side clearing the net, deep balls to keep the opponent near the baseline, covering the centre of the court...) Likewise, we must provide a practice context that allows them a high percentage of success, for example, reducing the speed using low pressure balls, limiting the space favouring the return of the ball, or setting big targets to facilitate hitting the right place.

Basic and specific motor training

The motor component is a fundamental pillar for the correct sport practice (Oña, Martínez, Moreno & Ruiz, 1999). So, the predominant motor skills in tennis are, hitting, moving, turning and jumping. However, it is important to highlight the importance of coordinated and perceptive-motor work for the right adaptation to the variable condition of competition in racket sports.

Teaching significantly

It is important for the player to understand and to make sense of what they are learning (López Ros, 2010; Castejón and López Ros, 2002). This way, the player understands the essence of the game, (internal logic) stimulating decision making through the search of personal responses to the repetition of motor stereotypes, thus, developing creativity (Cárdenas, 2005). In short, they can start responding: "Why am I doing this? What is it for?" Therefore, it is necessary for the contents and their sequences to be coherent and organized in a logical order, to be contextualized and to be functional (López Ros, 2010). In this sense, training tasks must include the greatest possible number of contents, assuring a cognitive involvement of the player during practice, allowing free exploration and personal resolution of the game situations that are created. On the contrary, to present analytic repetition tasks without considering a real game context, and without giving the player a cognitive implication, would not result in significant learning (Iglesias, Cárdenas & Alarcón, 2007).

For example, if the target is to work on stroke consistency, a 1x1 or 2x2 could be used counting the points once the players have interchanged "x" number of strokes. Another more complex situation to work on the direction or change of rhythm is, in a 2x2 situation, not to hit more than 2 strokes in a row in the same direction (down-the-line or cross-court).

Transference to real game play

In connection with the above, it is key for practice to reproduce competition through global situations (Bunker & Thorpe, 1982; Devís, 1992). For so doing, the coach must present tasks with opposition and/ or cooperation, including tactical and technical elements paying attention to the physical demands of the competition. This way, the player will be executing and making decisions in a context that will be similar to competition, allowing for a better transference of learning.

Complexity of skill decision making					
No. of correct decisions	None	Little	Some	Various	Many
No. of alternatives to the decision	None	Little	Some	Various	Many
Speed of decision	Not relevant	Very slow	Slow	Fast	Very fast
Sequence of decisions	One decision	Two	Three	Four	Five
Perceptive characteristics of the skill					
No. of necessary stimuli	None	Little	Some	Various	Many
No. of present stimuli	None	Little	Some	Various	Many
Duration of the stimuli	More than 20"	More than 10"	More than 5"	More than 2"	Less than 2"
Intensity of the stimuli	Very intense	Intense	Moderate	Low	Very low
Clarity of the correct stimuli	Very evident	Evident	Moderate	Subtle difference	Very subtle difference
Motor characteristics of the skill					
No. of muscular actions	1-2	3-4	5-6	7-8	9 or more
No. of coordinated actions	Minimal	Very little	Some	Various	Many
Precision and stability required	None	Minimal	Little	Considerable	Great
Fine motor skills required	None	Minimal	Little	Considerable	Great
Degree of difficulty	Very low	Low	Medium	High	Very high

Table 1. Estimating the complexity of the task, Landers & Boutcher. Taken and adapted from Famose (1992, p.146).

For example, if the objective is to improve power and direction in service, we can present a 1x1 or 2x2 situation in which the player who is serving has three service opportunities, so they can risk more and make more serves. Besides, each direct? service point will score double.

Adapting to the characteristics, motivations and interests of the pupils

Probably, one of the most important aspects when designing a session is to create attractive tasks that motivate players. For so doing, the coach must carefully select the contents and targets of each task, trying to meet the interests of the players, and to cover the targets proposed, being coherent with the level, characteristics and maturity stage of the players (Castejón & López Ros, 1997). A good tool for this is an evaluation, by means of questionnaires, that helps to know the players´ interests, with questions like: Which is your best stroke? Which is the toughest stroke for you? Or, On what aspects of the game would you like to work more? This way, the player will feel he is an active participant of his learning process, increasing his motivation and attraction to practice.

REFERENCES

Álvarez, A., y Del Río, P. (1999). Educación y Desarrollo: La teoría de Vygotsky. La Zona de Desarrollo Próximo en Desarrollo Psicológico y Educación. 11ª- reimpresión, España.

Arnold, P.J. (1991). Educación física, movimiento y currículum. Morata. Madrid.

Baker, J., Côté, J., y Abernethy, B. (2003) Learning from the experts: practice activites of expert decision makers in sport. Research Quarterly for Exercise and Sport, 74, 3, 342-347

Bunker, D., y Thorpe, R. (1982). A model for the teaching of games in the secondary school. Bulletin of Physical Education, 10, 9-16.

Cárdenas, D. (2005). Fundamentos de las habilidades de los deportes de equipo: baloncesto. Granada: Servicio de Copias de la FCCAFD.

Castejón, F.J. (2003) A vueltas con los expertos y los novatos en el deporte: lo que no hacen, lo que pueden hacer y lo que hacen. En Castejón, F.J. (Coord.) Iniciación deportiva. La enseñanza y el aprendizaje comprensivo en el deporte. Sevilla: Wanceulen

Castejón, F.J., y López Ros, V. (1997). Iniciación deportiva. En F. J. Castejón Oliva (coord.), Manual del Maestro Especialista en Educación Física (pp. 137-172). Madrid: Pila Teleña.

Castejón, F.J., y López Ros, V. (2002) Consideraciones metodológicas para la enseñanza y el aprendizaje del deporte escolar. Tándem. Didáctica de la Educación Física, 7, 42-55.

Contreras, O. (1998). Didáctica de la Educación Física. Un enfoque constructivista. Barcelona: Inde.

Csikszentmihalyi, M. (1990). Flow: The Psychology of Optimal Experience. New York: Harper-Row.

Devís, J. (1992). Bases para una propuesta de cambio en la enseñanza de los juegos deportivos. En Devís, J. y Peiró C. Nuevas perspectivas curriculares en educación física: la salud y los juegos modificados, 141-159. Barcelona:Inde.

Devís, J., y Sánchez Gómez, R. (1996). La enseñanza alternativa de los juegos deportivos: antecedentes, modelos actuales de iniciación y reflexiones finales. En Juan Antonio Moreno Murcia y Pedro Rodríguez (Comps.) Aprendizaje Deportivo. University of Murcia. Murcia, 159-181.

Durand, M. (1988). El niño y el deporte. Barcelona: Paidós-MEC:

Famose, J.P. (1992). Aprendizaje motor y dificultad de la tarea. Barcelona: Paidotribo.

Griffin, L., Mitchell, S.A., y Oslin, J.L. (1997). Teaching Sport Concepts and Skills. Champaing, Illinois: Human Kinetics.

López Ros, V. (2010) Perspectiva constructivista del aprendizaje y de la enseñanza del deporte. En Castejón, F.J. (coord.) Deporte y enseñanza comprensiva. Sevilla: Wanceulen.

Oña, A., Martínez, M., Moreno, F., y Ruiz, L.M. (1999). Control y aprendizaje motor. Madrid: Síntesis.

Raab, M., Masters, R., y Maxwell, J. (2005) Improving the «how» and «what» decisions of elite table tennis players. Human Movement Science, 24, 326-344.

Ruíz Pérez, L.M. (1994). Deporte y aprendizaje. Madrid: Gymnos

Sánchez, R. (2003). El modelo comprensivo y la enseñanza de las habilidades técnicas: ¿Dónde es necesario el debate? Actas del XXI Congreso Nacional de Educación Física. El pensamiento del profesor [CD-ROM], 18-20 de septiembre, Puerto de la Cruz, Tenerife: Universidad de la Laguna.

RECOMMENDED ITF TENNIS ICOACH CONTENT (CLICK BELOW)

TennisiCoach

Effects of lower limb position on ball speed in tennis ground strokes

Vitor Cabral (POR)

ITF Coaching and Sport Science Review 2017; 71 (25): 23 - 25

ABSTRACT

According to Schoenborn (2002) groundstrokes are 62% of all tennis strokes in competition. The forehand is considered the main "weapon" in modern tennis, along with the serve, and 74% of top 100 male players use a two handed backhand. This percentage rises to 92% in women. The forehand drive is of great importance in the male professional tennis and it is considered the most important stroke after the serve (Reid, Elliot, & Crespo, 2013).

Key words: Groundstrokes, ball speed, lower limbs

Article received: 2 Dec 2016

Article accepted: 3 Jan 2017

Corresponding author: vitor.cabral@netcabo.pt

INTRODUCTION

The placing of the lower limbs (more exactly of the feet), relative to the direction of the ball, during the preparation phase of a groundstroke in Tennis, as always been somewhat controversial. With the game getting much faster, players need to be able to react more quickly, adopting more frontal positions (Bahamonde, 2001). Elliott (2007) refers that modern tennis is more based on open stances, high rotation strokes and effective use of elastic energy can increase ball acceleration by 20%. However, most of the top players seem to assume a more closed position to look for a winner. Although there seems to a clear shift in the latter years towards the open stance position, the debate goes on.

The more closed stances seem to be linked to more power and precision. Bahamonde & Knudson (2003) found that closed stance players produce larger moments of force and consequently more power and joint loading. Analyzing the stances, Knudsen (2004) affirms that square (or closed) stances promote larger hitting zones. Also, the open stances produce lower (-6%) racquet speeds in college level players, than closed stances. Main advantages of open stance are considered to be quick reaction after the stroke and the use of more elastic energy. The shoulder rotation over the hips, and the position of the upper limbs when related to the trunk and core muscles on the preparation phase, creates the perfect condition for pre stretching (Elliot, 2006).

As these are aspects that influence the way the technique is taught and are quite important in advanced players, it is of the foremost importance to accurately measure the two techniques (open and closed stance) and determine their characteristics.

METHODOLOGY

A group of 5 male players, all with a best ranking within the top 100 ATP where selected for the study. All were right handed and used a two handed backhand except one left-handed with a one hand backhand.

	Height	Weight	Age
Mean	1,834	78,6	31,2
SD	0,07893	6,0663	7,328028

Table 1. Group characterization, height in meters, weight in kg and age in years.

The test protocol included the execution of a series of 4 sets of 5 shots at maximum speed, with the players instructed to execute forehands and backhands both in closed stance and open stance. For each stroke a full series was executed. The 10 best shots were selected, eliminating the inaccurate shots (in foot placement, racket impact and precision), according to preliminary trial studies.

Two preparation tests were conducted with each player, ensuring adequate learning of the test protocol and environment.

Each series was captured using a QualisysTM motion capture system, with 1100 frames per second, 3 megapixel resolution and full field of view. Impact point was captured with Photron Fastcam SA4, at 12000 frames per second, at 1080p (Full HD) resolution. A Stalker ATS 2 radar gun was used as a redundancy speed measurement.

Paired samples T-Test was used for comparison and Pearson correlation coefficient for reliability, as well as average and standard deviation for characterization of results. Confidence level was maintained at 0,05.

RESULTS

Data seems to indicate a small speed advantage for the closed position in both strokes. The small difference (3,06km/h for the forehand and 3,38km/h for the backhand) is statistically significant ($p \leq 0,01$). The results also reflect the expected difference in ball speed between the forehand and the backhand (13,2km/h for the open stance and 12,88km/h for the closed stance, $p \leq 0,001$).

Stroke	Forehand		Backhand	
Stance	Open	Closed	Open	Closed
Mean	117,16	120,22	103,96	107,34
SD	3,649769	4,067240	2,71774	3,12076

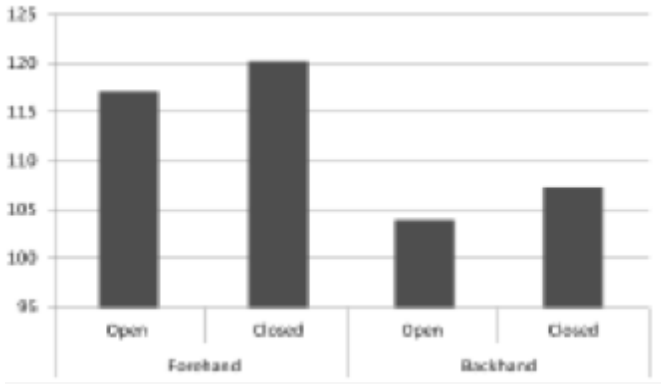
Table 2. Ball speed scores for the forehand and backhand in both stances, in km/h.

Kinematic analysis permitted to evaluate the angle of shoulder rotation during the backswing for both strokes in each stance. We verify that there is statistically significant difference ($p \leq 0,001$) in shoulder rotation in favor of the forehand and the closed stances. Although small, the higher rotation of the shoulder probably promotes a longer acceleration path for the racket during the acceleration phase on to the impact point.

	Forehand		Backhand	
	Open	Closed	Open	Closed
Mean	100,68	105,15	78,14	83,54
SD	5,443363	5,994257	9,458847	8,259095

Table 3. Angle of the shoulder rotation for the forehand and backhand in both stances, in degrees.

In the graphical representation seems to be clear the consistency of the scores, inferring a possible relationship between the two variables.



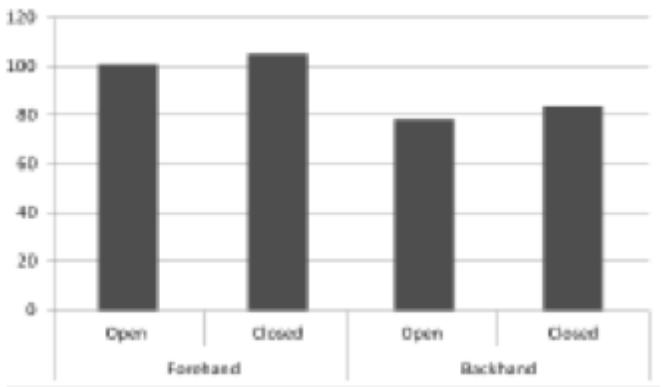


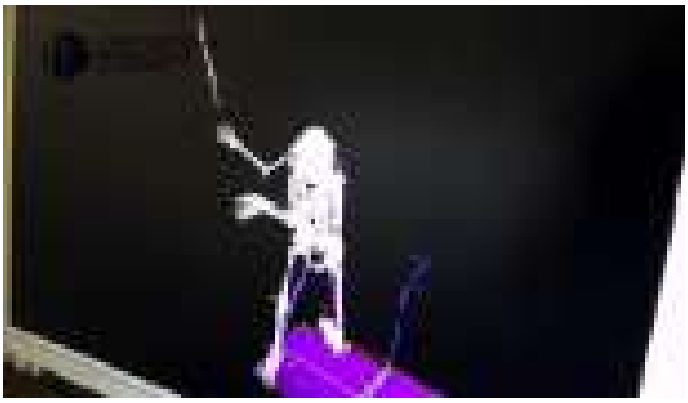
Table 3 & 4.Graphical representation of the ball speed scores (km/h) and the angle of the shoulder rotation (degrees).

DISCUSSION

The scores seem to indicate a slight advantage in speed of the closed stances in both the backhand and the forehand. There are a few differences in the two techniques that can probably explain these results.

It has been mentioned that the leg drive and probable weight transfer in the closed stance can be a determining factor, and also a slightly better balance can affect both speed and precision. However the clear preference for the open stance cannot be underestimated. The movement advantage is great and the difference is speed is slight, which probably explains why most players prefer the open stance in most situations.

In any case, it's important to remember that match play speeds can be different (lower) because of precision, mental pressure and opponent constraints. Hawkeye data from Australian Open 2012 to 2014 as show that average shot speed from top level players was 95,6km/h (Whiteside, Bane & Reid, 2015).



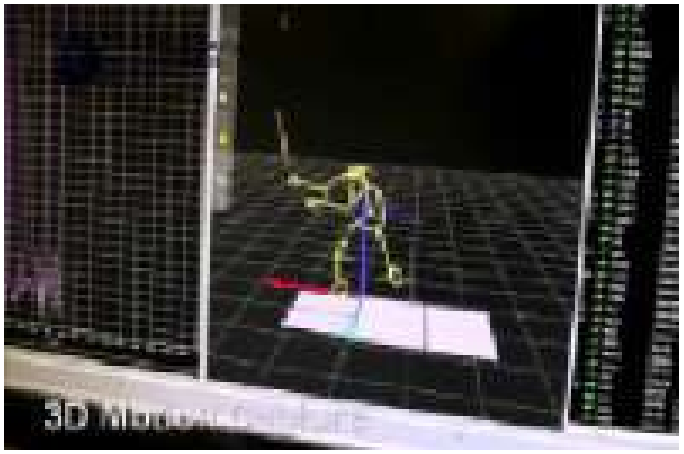


Image 1 & 2. Motion capture renderings using skeletal joints calculation algorithms, with force plate data.

Closed stances also seem to promote a higher shoulder rotation during the backswing. The difference is also slight (4,47° for the forehand and 5,4°, p≤0,001) but can also be an important factor to explain the speed difference. The higher shoulder rotation will probably promote a longer acceleration path for the racket, resulting in higher racket speed at impact point and consequently a higher ball speed. One of the main reasons for performing the backswing in tennis is to increase the distance at which acceleration can develop during the forward swing (Aleksovski, 2015).

The results of shoulder rotation seem to be close the literature findings. It is although interesting to verify that, for this group, the rotation was higher for the closed stances in both strokes and much higher for the forehand (21,61° for the closed stance strokes and 22,54° for the open stance strokes, p≤0,001).

Image 3 & 4. High speed impact point tracking, showing clearly the deformation on the ball and strings, at 10000 fps.

We can also see clearly the limitation imposed by open stance on trunk rotation in the backhand, with a average score of 78,14°, significantly lower than the other strokes.

The higher degree of shoulder rotation can be a determining factor in the increased speed observed in closed stance however other factors can be in play. Other probable advantage for the closed stance in forehands and backhands is precision. Muhamad, Golestani & Razak (2015) demonstrated a higher accuracy for closed stance strokes with intermediate players.

This probably explains why normally top players use more often open stance during rally but seem to prefer the use of closed stance, especially in the forehand, to go for the winner shot. However we can also argue that the winner shot appears in response to shorter balls with the necessity to "step in" for the shot.

It is very important to continue the debate and research on this topic, to provide the best possible information to coaches and assist them to better develop performance players.

CONCLUSIONS

With this study we aim to contribute for the characterization of the open and closed stance position in the groundstroke's, mainly focusing on their advantages. In this context we can state that in our study we found:

1. There seems to be a small ball speed but statistically significant advantage for the closed stance position, both in forehand and backhand;

2. As expected, forehand strokes produced higher ball speed than backhands;

3. Shoulder rotation was higher in closed stance strokes;

4. Open stance backhand shoulder rotation was especially limited achieving the lowest average scores, as expected;

Summarizing, although there is a clear movement reaction advantage in open stance strokes, closed stance seem produce more power probably associated accuracy mainly due more shoulder rotation and larger hitting zones in the direction of travel. Therefore closed stance is probably a best choice for pressure/winner forehand shots, especially combined with the necessity to step in.

REFERENCES

Aleksovski, A. (2015) Forehand Backswing - From Theory to Practice, Activities in Physical Education and Sport, Vol. 3, No. 2, pp. 229-231, Bulgaria.

Bahamonde, R. (2001). Biomechanics of the forehand stroke. Coaching & Sport Science Review.

Bahamonde R., Knudson D. (2003), Kinetics of the upper extremity in the open and square stance tennis forehand. J Sci Med Sport, March, pp 88-101 Elliot, B. (2006), Biomechanics and tennis. Br J Sports Med, pp 392–396

Elliott, B. (2007), Sports Biomechanics: Does it have a Role in Coaching? International Journal of Sports Science & Coaching, pp 177-183

Knudson, D. V. (2004), Biomechanical studies on the mechanism of tennis elbow, The Engineering of Sport, 1, pp. 135–141

Muhammad, T., Golestani, F. & Razak, M. (2015) Comparison of Open and Closed Stance Forehand Strokes among Intermediate Tennis Players International Journal of Kinesiology & Sports Science, Vol. 4 No. 1, pp 7-8

Reid, M., Elliott, B., & Crespo, M., (2013) Mechanics and learning practices associated with the tennis forehand: a review, Journal of sports science & medicine, pp 225 Schoenborn, (2002), Advanced Techniques for Competitive Tennis, Paperback Edition, Meyer and Meyer Sports

White side, D., Bane, M. & Reid, M., (2015) Differentiating Top-Ranked Male Tennis Players From Lower Ranked Players using Hawk-Eye Data: an Investigation of the 2012–2014 Australian Open Tournaments, 33rd International Society of Biomechanics in Sports Conference, Poitiers, France.

RECOMMENDED ITF TENNIS ICOACH CONTENT (CLICK BELOW)

TennisiCoach

The psychology of turning points in tennis

Ana Soares (POR) and Chris Harwood (GBR)

ITF Coaching and Sport Science Review 2017; 71 (25): 26 -27

ABSTRACT

The psychological strategies used by players to deal with these turning points will determine how effective players are in using these situations to their advantage. The purpose of this study was to investigate the concept of turning points and understand more clearly the strategies applied by elite players to deal with turning points during a tennis match. A series of semi-structured interviews was conducted with nine elite professional players from five different countries, followed by a thematic content analysis of the interviews. The analysis revealed four key themes: positive turning points situations, negative turning points situations, strategies to capitalise on positive turning points and strategies to cope with negative turning points. On a practical level, strategies are suggested that coaches and psychologists can use to help players managing turning points. This research was partially supported by an International Tennis Federation Sport Science Research Grant.

Key words: Psychology, turning point situations, coping methods

Article received: 30 Sep 2016

Corresponding author: anadsoares@gmail.com

Article accepted: 25 Feb 2017

INTRODUCTION

Momentum is a frequently mentioned concept in the sporting community (Higham, 2000). Coaches, athletes and supporters perceive it and talk about it; however, from a scientific point of view, it remains an elusive concept (Moesch & Apitzsch, 2012). Turning points are commonly associated with momentum and are defined, in the current research proposal, as situations in a match that affect the feelings of control a player has at a given moment.

Momentum is frequently divided into positive and negative momentum (Briki, Den Hartigh, Markman & Gernigon, 2014). According to Briki and colleagues (2014), positive psychological momentum is experienced as an upward spiral, a period in which everything seems to go well. Negative psychological momentum is perceived as a downward spiral, where everything seems to go wrong.

Since the 1980s, a growing body of research has examined the concept of psychological momentum. Different models of psychological momentum have been developed and partly corroborated. However, despite the increased knowledge about different aspects of momentum and the development of models that can be tested empirically, momentum still needs further investigation (Crust & Nesti, 2006). In tennis, specifically, knowledge of how the players perceive turning points and what strategies they use to deal with them is limited. At the elite athlete level, this concept has not yet been investigated in any sport.

As such, in order to assist coaches, players and sport psychologists when planning psychological interventions, current research employed a qualitative method, consisting of semi-structured interviews that explored elite players' perspective of turning points and the strategies applied by these players to deal with turning points during a match.

METHOD

Participants

Nine male professional players or ex-players from five different countries, aged between 26 and 72 years (M = 44, SD = 15), were interviewed. All participants had played in the main event of a Grand Slam and played for their country's Davis Cup. The highest ranked player interviewed was number seven in the world and the lowest ranked player was in the top 190. The median value of the best rankings was 48.

Procedure

A series of in-depth semi-structured interviews was conducted. Interviews lasted between 29 and 88 minutes (M = 61, SD = 24). An inductive thematic analysis was used, which allowed the emerging themes to be closed linked to the data (Braun & Clarke, 2006).

RESULTS

Data analysis resulted in two main categories related to experiences of turning points. These categories were turning point situations and managing turning points. These two categories were then divided into positive and negative turning points situations and strategies to cope with negative and to capitalise on positive turning points (see Figure 1).

The following sections highlight some of the categories mentioned in figure 1, including quotations from the participants.

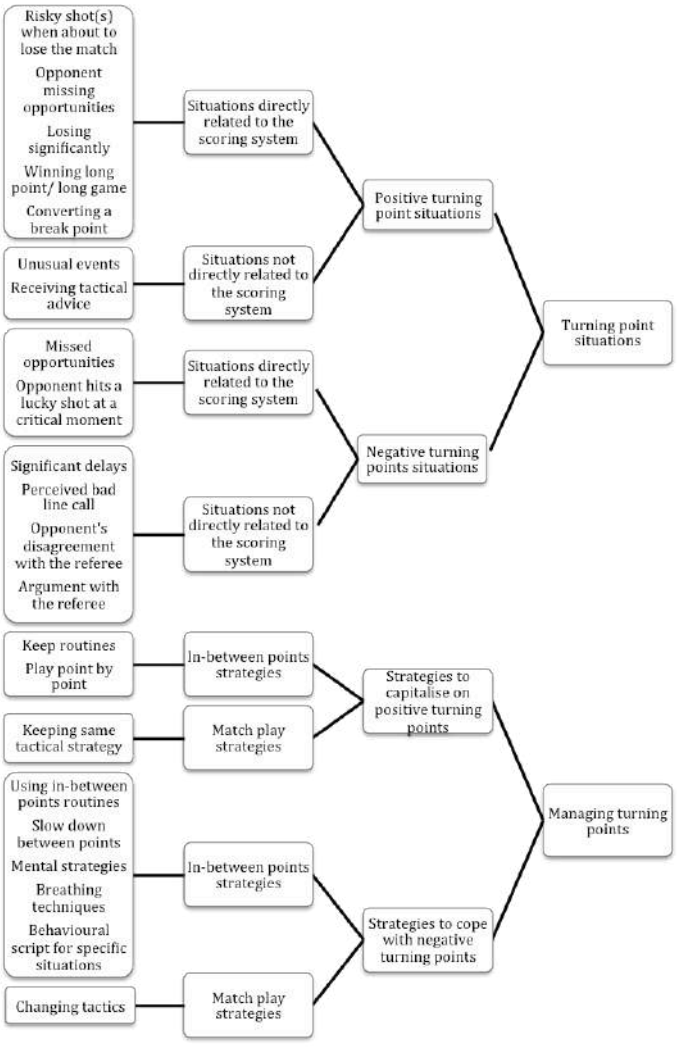


Figure 1. Analysis of turning point experiences.

Positive turning point situations

Participants described several situations that they consider positive turning points. These situations were divided into two categories: directly related and not directly related to the scoring system.

One situation directly related to the scoring system mentioned by the participants was opting for a risky shot and winning the point when about to lose the match. As an example, participant A described, "The guy was serving. I was one set and 5-4 down. He was serving, and I closed my eyes on two down-the-line shots, and it went well, and after that I started playing well".

Negative turning point situations

The negative situations were also divided into those directly related and not directly related to the scoring system.

Situations that are not directly related to the scoring system are, for example, significant delays that stop the normal progression of the match, such as rain delays or medical time-out:

If I hadn't stopped for the rain, I would have beaten him 6-1, 6-0, 6-1 or 6-0. I mean, I was on a roll, and I think that for that guy, it was good to have time to think, and that's why the third set was completely different from the others (participant B).

Strategies to capitalise on with positive turning points

When dealing with a positive turning point, participants emphasised continuity: keeping to routines between points and keeping the same tactics that they used to get to the positive situation.

The strategies described can be divided into in-between points strategies and match play strategies. After a positive turning point, participants stated, "If things start to go well, I keep the same [in-between points] routine (...). It makes me stay more concentrated, focused on the match, and then I keep this routine, and I make the turning point [effect] last longer" (participant A).

Strategies to cope with negative turning points

When contemplating how a player can cope with a negative turning point, participants gave many examples of in-between points strategies and match play strategies.

Regarding in-between points strategies, players described going back to their routines after a negative turning point: "Usually, I turn to my rituals, like, I turn to the towel or ask the ball boy for the towel" (participant D). The same player mentioned that he would do this routine but "try to go a bit slower." Taking breaks, such as "asking for the trainer", "going to the toilet, taking time between points: that is, breaking his rhythm," (participant I) is a strategy that participants referred to as important after experiencing a negative turning point.

When a player is faced with a situation that happens frequently and is consistently becoming a negative turning point, a player can develop an alternative, specific strategy to cope with it. For example, a player described that when the opponent went off-court, he would also leave and made sure the opponent was coming back to the court first.

DISCUSSION AND PRACTICAL IMPLICATIONS

When describing how to manage turning points, players reinforced the idea of change when coping with negative turning points and the idea of continuity when capitalising on positive turning points. However, routines in-between points were mentioned as a strategy that should be used in both moments, which reinforces its importance as a fundamental psychological strategy in tennis (Mamassis & Doganis, 2004).

Regarding practical implications, the first topic that should be highlighted is the preparation for matches. This is important because there is probably potential for turning points in every match. According to a player:

Because of the way that tennis is played and scored, I honestly think that these moments are happening ... well, if it was a three set match, there's potential for them hundreds of times in a match because of how it works (participant E).

Therefore, players should be aware that potentially, one or more events during a match will represent an additional risk or a potential opportunity to change the control of the match.

From a psychological perspective, preparation for a match should include a combination of psychological strategies that should be developed outside the competition so that the players can apply such in matches. Such strategies can include routines, breathing exercises and specific scripts to deal with a particular situation (such as leaving the court when the opponent has left the court and returning after the opponent has returned). Each player should understand what kind of strategy or routine is useful for his/her particular case and apply it consistently throughout the match (in the case of routines) or whenever he/she feels that a situation might be a potential turning point.

CONCLUSION

Findings from this study suggest that players consider a variety of events in a match as turning points. According to the players, these situations can be seen as positive or negative and there is a range of strategies that can be used to deal with them. As such, this research provides applied implications that can be used with players, in order to help them to take advantage of positive turning points situations and adequately cope with negative turning points situations. However, the identification of a turning point seems to be an individual phenomenon and as such, different strategies should be adapted to the specific characteristics and needs of each player.

REFERENCES

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. Qualitative Research in Psychology, 3, 77-101.

Briki, W., Den Hartigh, R. J. R., Markman, K. D., & Gernigon, C. (2014). How do supporters perceive positive and negative psychological momentum changes during a simulated cycling competition? Psychology of Sport and Exercise, 15(2), 216–221. doi:10.1016/j.psychsport.2013.11.006

Crust, L., & Nesti, M. (2006). A review of psychological momentum in sports: why qualitative research is needed, 8(1), 1–15. Retrieved from http://www.athleticinsight.com/Vol8Iss1/Momentum.htm

Higham, A. (2000). Momentun: The hidden force in tennis. Oxford: Meyer and Meyer Sport.

Mamassis, G., & Doganis, G. (2004) The Effects of a Mental Training Program on Juniors Pre-Competitive Anxiety, Self-Confidence, and Tennis Performance. Journal of Applied Sport Psychology, 16, 118-137. doi: 10.1080/10413200490437903

Moesch, K., & Apitzsch, E. (2012). How Do Coaches Experience Psychological Momentum ? A Qualitative Study of Female Elite Handball Teams. The Sport Psychologist, 26, 435–453.

Tennis and disabilities guidelines for coaches

David Sanz and Alejandro Sánchez (ESP)

ITF Coaching and Sport Science Review 2017; 71 (25): 28 -30

ABSTRACT

Tennis is a sport with a high technical, tactical, physical and psychological content. These contents can be developed by players with some kind of impairment. In fact, although at the institutional level, the International Tennis Federation (ITF)´s regulations only consider wheelchair tennis for persons with physical disabilities, we find more and more experiences from people with other forms of disability who play tennis too. So much so, that even the ITF is considering their development at recreational and inclusive level. This article discusses the different modalities of tennis for persons with different abilities and provides some tips for coaches.

Key words: Adapted tennis, impairment, disability, methodologic orientation

Article received: 30 Sep2016

Article accepted: 20 Jan 2017

Corresponding author: david.sanz@rfet.es

INTRODUCTION

Tennis is one of the most widely played sports at world level, and the first one among racket sports (García Ferrando & Llopis Goig, 2011). Tennis has been adapted for persons with some kind of disability with the main target of facilitating its practice to all persons regardless of their capacities.

This paper will approach each adapted modality in relation to the type of disability of the tennis player, as well as the methodology for the teaching-learning process.

TENNIS AND SENSORY DISABILITY

The concept of sensory disability includes persons with visual and hearing impairment. The senses of sight and hearing are the most important for the human being, since it is through them that we perceive most of the information we receive from the world around.

Tennis for persons with hearing impairment

Those people who practice tennis and suffer from some kind of hearing impairment are the ones who will need less adaptation as compared to other impairments. In fact, inclusive tennis practice, that is, playing with abled persons, is a reality that has taken players with this impairment to top performance levels as is the case of Charlotte Cooper (who won Wimbledon 5 times) over a century ago, or Duck Hee Lee, deaf from birth, who is in the world top junior ranking. Even though this problem does not prevent the players from competing at top level, we must consider a number of associated constraints that may condition performance, such as the acoustic perception of the opponent´s sound at impact (which provides information about the ball spin and power) the acoustic of our own impact, as well as the information provided by the umpire or the opponent during the match (calling let, out, etc.)

Aspects to bear in mind when teaching tennis to persons with hearing impairment:

Most of the feedback and instruction in a tennis lesson comes through hearing channels, so the teacher must change this aspect of the methodology and bear in mind the following (Sanz & Reina, 2012):

- Convey a great deal of visual, kinetic and tactile information and stimuli enlarging the information given.
- Using visual means before and during the sessions (targets, concepts, tasks, etc.) and graphic support by means of boards, tablets or smart phone apps.

- Use body language: Technique acquisition can be done by "shadowing" and increasing verbal information with "graphical" gestures that represent the information we provide.
- Avoid background noise (for those with partial hearing impairment).
- Approach the player for feedback, and make sure he/she does not lose the utterance focus (the mouth) and can always read lips.
- Indicate the change of tasks by means of gestures the player can easily understand.

Tennis for persons with visual impairment

Tennis for blind persons, internationally known as "Blind Tennis" was invented in 1984 by D. Miyoshi Takei. This sport modality has regulations and a national and international competition plan, but it is not included in the International Tennis Federation at competition level. The first tournament was played at the Disabled Rehab National Centre in 1990 (Sato, and cols., 2010). The main differences with tennis for able-bodied persons can be summarized as follows: the space is reduced (the size of a badminton court), the ball is made of rubber foam with a jingle bell inside, which rings when the ball is hit or bounces, mini tennis rackets are used, and the number of bounces before hitting the ball varies depending on the categories, but the maximum number is three, and the server must say "ready" before serving and the receiver must answer "yes".

Given the impossibility of watching the ball, (partially or totally), one could imagine the possibilities for a rally are dim. Research

concerning tennis for the blind shows a relationship between practice time- resting time in tennis for the blind or visually impaired as compared to conventional tennis, shows a similar average number of strokes in both cases (Sato, and cols., 2010). Thus, the characteristic of continuity in the game is a fact.

There is a ranking for players with a certain degree of visual condition which varies from colour, light and shadow perception impairments and with a certain peripheral vision, to total blindness. Athletes are ranked in different categories (Bullock, 2007):

- B1: totally blind athletes. They play with their eyes blind folded and they are allowed three bounces.
- B2, B3, and B4: athletes in these categories have partial sight and are allowed two bounces.
- B5: in this group players have vision problems and are allowed one bounce.

Aspects to bear in mind when teaching tennis to persons with visual impairment:

Tennis is characterized for its highly tactical component, the player being aware of the opponent´s position on court, and addressing the ball far from him/her. This makes the sense of sight necessary to comply with this tactical aspect. Thus, one could think that tennis for the visually impaired, mainly those who are totally blind, would be a different sport due to that tactical lack as compared to conventional tennis. Independently, the teaching process should follow some specific methodology recommendations, among others (Sanz & Reina, 2012):

- Conveying a great deal of (hearing, kinetic and tactile) information and stimuli. The verbal message must include all possible details, and the kinetic support will provide exact references that will be easily interpreted by the person with sensory disability.
- Providing feedback during and after the action to facilitate the knowledge of execution.
- Calling students by their names to capture their attention.
- Being familiar with the space, tools and targets by means of previous recognition of the materials and spaces they will be working with.
- Avoiding changes when transmitting the message, keeping a fixed position.
- Using tactile lines for the player to know at all times, where he is, in the court.

TENNIS AND DEVELOPMENT DISABILITY

Neurological development disability is, no doubt, the most diverse, since it encompasses: penetrating development disorder, (autism, asperger syndrome, Rett syndrome...), cerebral palsy, intellectual disability, among others. The variety of development disabilities is just as broad as their characteristics. From a general point of view, the term "development disability" is used for all those that start during growth, that is, until the age of 18. This condition is characterized for limitations in relevant areas of life, such as language, movement, learning, self care, independent life, etc. Just as the USTA (2006) points out, persons with a development disability are supposed to have a lower learning rate, reasoning difficulties, little memory, short attention spans, hyperactivity, social immaturity, perceptive deficiencies and agility and movement problems.

So far, there are no regulated competitions for players with these disabilities at the international level, organized by the world tennis regulator, the ITF. So, its practice must mainly be driven to physical, social, recreational and affection development of the player, although it is true that there are some organizations and associations like Special Olympics that do organize competitive activities at the national and international level.

Out of all the types of development disabilities, tennis has mainly succeded among autist persons, (Young, 2013) persons with Down syndrome (López & López, 2013). In this sense, and according to Young (2013), the most specific aspects to bear in mind when teaching persons with autism are:

- Knowing the player: Each person is different, the autism spectrum is very broad.
- Paying attention to behaviour: most children with autism do not express their feelings/ emotions through speech, so the coach must very well observe their behaviour and their body language.
- Building on familiar routines: familiar tasks will give them more confidence. This way, if we have to change the routine, the student must be prepared in advance.
- Finding their own areas and spaces: it is important to have a quiet place for tennis practice, far from noise, and other players, since children with autism would rather avoid large groups.
- Incorporating repeated and restricted behaviour patterns: most children with autism have repeated behaviour patterns, (throwing objects, turning, shaking hands etc.). These patterns can be used to develop games/ perform tasks in a complementary way, and can be organized as routines.

Aspects to bear in mind when teaching tennis to persons with development disorders:

As we said before, there is a great variety and there are many types of development disorders. So, it is necessary to know the specific characteristics of each disability to be able to adapt the methodology to the teaching- learning process. In a more general way, we present below some of the methodological aspects to bear in mind when teaching persons with some kind of development disability (Sanz & Reina, 2012; USTA, 2006):

- Simplify the tasks to focus attention on the target.
- Give short and clear instructions. Avoid complex words and technical jargon.
- Provide visual information to complement hearing information.
- Propose motivating tasks driven to social and affectionate work.
- Use success pedagogy where the player can easily achieve his goals.
- Keep the model/ ritual in the sessions, it will be familiar and will give them confidence.
- Present easy and short tasks to avoid concentration problems.

TENNIS AND PHYSICAL DISABILITY

Physical disability encompasses a great deal of disorders at bone, joint, muscular or nervous level. It alters the motor system producing an impact mainly in motor action (Sanz, 2003). Wheelchair tennis, is the adapted modality with the greatest number of players and one of the most widely practised adapted sports (Croft and cols., 2010). It started in the US, in the late 70´s, and the number of players has never stopped growing ever since. So has the number of international tournaments grown, reaching over 160 in 2014, in some 40 countries. Matches are always played to the best of 3 sets (even in Grand Slams), the main difference with conventional tennis being that the ball may be hit after the second bounce (ITF, 2016a). This adaptation of the rule is based on making the points longer for the wheelchair player to be able to reach balls he would not reach in one bounce. This sport modality regulated by the ITF, considers tennis practice regardless of the type of physical disability (simple or double amputation, complete or incomplete spine injury...) for all players in a sitting position on the wheelchair.

Aspects to bear in mind when teaching tennis to persons with physical impairments:

Any person with a functional constraint that prevents them from playing conventional tennis can play wheelchair tennis, as long as this constraint is considered "minimum disability", expressed in the ITF international regulations as "minimum eligibility" (ITF, 2016b). This shows that the spectrum can be very broad (spine injury, amputation, bifid spine, poliomyelitis, etc...) Depending on the condition, the player will have more or less functional constraints to perform different actions, when playing tennis.

Thus, the coach needs to know specifically the type of injury and its degree of impact. In a more general way, we present below some specific aspects to bear in mind when teaching tennis to persons with some kind of physical impairment (Sanz, 2003; Sanz & Reina, 2012; USTA, 2006):

- Knowing the location and the level of affection the disorder involves. This will condition, among other things, the hitting techniques.
- Adapting to the sport wheelchair (mobility).
- Working on hitting planes next to the body and with diagonal movements.
- Using the anchorage to the chair and the supports with the free hand. This will give confidence to the player and stability to the body when hitting.
- Reducing the court at the beginner level of practice for a better management of space.
- Using lighter and smaller rackets for players with more functional limitations.

Before we end, we would like to mention the new possibility that started some time ago in tennis practice for differently abled persons: it is adaptive tennis in standing position, that is tennis for persons who suffer from a physical impairment, but can play on both feet with a prosthesis. This modality is being developed, and although its practice is not generalized in all countries, it is gaining players little by little: There already exist some national and international competitions, outside the ITF umbrella.

CONCLUSIONS

Apart from the health benefits that sport practice involves, the degree of functional independence and social integration are extremely favoured in the case of persons with some kind of disability (Gil, 2011). Likewise, athletes with disabilities are motivated to practice adapted sport because it is a means to social integration and affection (Gutiérrez & Caus, 2006), and it is also necessary for their health, and their good physical condition (Torralba, Braz, & Rubio, 2014). This motivation of the players facilitates the task of the coach for tennis practice.

Coaches who teach tennis to people with some kind of disability must remember the ideas presented here, as well as have a sound knowledge of the different types of disabilities to be able to prepare an efficient working plan.

Apart from the considerations presented, we propose tennis practice for disabled persons in inclusive environments, that is to say, combining abled and disabled people. It will not just involve learning values for all, it will also favour the latter to have sport schools where to practice tennis, in a normal situation, and foster full integration. Apart from the existent methodologies proposed, adapted material (size of the court, the racket and type of ball), and employing them in an appropriate way will be a great help for the evolution and learning of players with some kind of impairment, whether physical, intellectual or sensory.-

REFERENCES

Bullock, M. (2007). Tenis para ciegos y personas con visión limitada. ITF Coaching and Sport Science Review, 43, 10.

Croft, L., Dybrus, S., Lenton, J. & Goosey-Tolfrey, V. (2010). A comparison of the physiological demands of wheelchair basketball and wheelchair tennis. Int J Sports Physiol Perform, 5(3), 301-15.

García Ferrando, M., & Llopis Goig, R. (2011). Ideal democrático y bienestar personal. Encuesta sobre los hábitos deportivos en España 2010. Consejo Superior de Deportes y Centro de Investigaciones Sociológicas, Madrid.

Gutierrez, M, & Caus, N. (2006). Análisis de los motivos para la participación en actividades físicas de personas con y sin discapacidad. Revista Internacional de Ciencias del Deporte, 2(2), 49-64.

Gil, A. M. (2011). Avances en la investigación del deporte para personas con discapacidad. Archivos de medicina del deporte, 143(28), 165-167.

International Tennis Federation (2016)a. Rules of wheelchair tennis. ITF Wheelchair Tennis Regulations. International, 4-5.

International Tennis Federation (2016)b. The competitive wheelchair tennis player. ITF Wheelchair Tennis Regulations. International, 6-7.

López, L., & López, G. F. (2013). Enseñanza del tenis para personas con síndrome Down. Una experiencia práctica. EmásF: revista digital de educación física, 20, 47-55.

Sanz, D. (2003). El tenis en silla de ruedas, de la iniciación a la competición. Barcelona, Paidotribo.

Sanz, D., & Reina, R. (2012). Actividades físicas y deportes adaptados para personas con discapacidad. Barcelona, Paidotribo.

Sato, S., Tomosue, R., Sato, M., Yoshinari, K., Hirata, D., Tanaka, N., Takei, M., Matsui, A., & Azar, P. (2010). Análisis del juego de tenis para ciegos. ITF Coaching and Sport Science Review, 52(18), 15-16.

Torralba, M. Á., Braz, M., & Rubio, M. J. (2014). La motivación en el deporte adaptado. Psychology, Society & Education, 6(1), 27-40.

USTA. (2006). Manual para la enseñanza de Tenis Adaptado. New York, USTA.

Young, J. A. (2013). Entrenar a niños autistas: Puntos de vista de los entrenadores australianos. ITF Coaching and Sport Science Review, 59(21), 17-19.

Recommended e-books

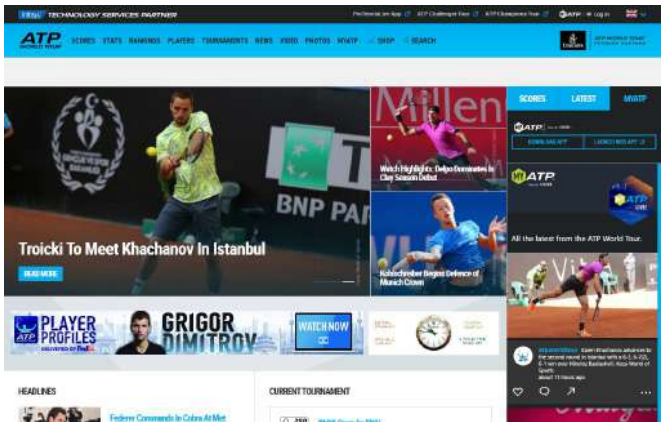
ITF EBOOKS

ITF ebooks offers an exclusive range of publications from the world of tennis, which are a must read for all those with an interest in the sport.

In this app users will find manuals for training and development, regularly published scientific research articles from worldwide experts and key technical and tactical information.

Users can also download and read several free publications on their mobile device or purchase ebooks at a significant discount to the printed versions. This app provides publications in Spanish, English, French and Russian.

Recommended web links



General guidelines for submitting articles to ITF Coaching & Sport Science Review

PUBLISHER

International Tennis Federation, Ltd.
Development and Coaching Department.
Tel./Fax. 34 96 3486190
e-mail: coaching@itftennis.com
Address: Avda. Tirso de Molina, 21, 6º - 21, 46015, Valencia (España)

TOPICS & SCOPE

ITF Coaching and Sport Science Review considers for publication original research, review papers, opinion pieces, short reports, technical notes, topical lectures and letters in the disciplines of medicine, physiotherapy, anthropometry, biomechanics and technique, conditioning, methodology, management and marketing, motor performance, nutrition, psychology, physiology, sociology, statistics, tactics, training systems, and others, having specific and practical applications to tennis coaching. The intended readership of the publication is directed to all those involved in, and interested in coaching methodology and sport sciences relating to tennis.

PERIODICITY

ITF Coaching and Sport Science Review is published tri-annually in the months of April, August and December.

FORMAT

Articles should be word-processed preferably using Microsoft Word, but other Microsoft compatible formats are accepted. The length of the article should be no more than 1,500 words, with a maximum of 4 photographs to be attached. Manuscripts should be typed, double spaced with wide margins for A4-size paper. All pages should be numbered. Papers should usually follow the conventional form: abstract, introduction, main part (methods and procedures, results, discussion / review of the literature, proposals-drills-exercises), conclusions and references. Diagrams should be done using Microsoft Power Point or any other Microsoft compatible software. Tables, figures and photos should be relevant to the paper and should have self explanatory captions. They should be inserted in the text. Papers should include between 5 and 15 references that should be included (author/s, year) where they occur in the text. At the end of the paper the whole reference should be listed alphabetically under the heading 'References' using the APA citation norms. Please refer to http://www.apastyle.org/ for guidelines and tutorials. Headings should be typed in bold and upper case. Acknowledgement should be made of any research grant source. Up to four keywords should also be given and the corresponding author contact details.

STYLE AND LANGUAGES OF SUBMISSION

Clarity of expression should be an objective of all authors. The whole emphasis of the paper should be on communication with a wide international coaching readership. Papers can be submitted in English, French and Spanish.

AUTHOR(S)

When submitting articles authors should indicate their name(s), nationality, academic qualification(s) and representation of an institution or organisation that they wish to appear in the paper.

SUBMISSION

Articles may be submitted at any time of the year for consideration for future publication. Articles should be sent by e-mail to Miguel Crespo ITF Development Research Officer to the following e-mail address: coaching@itftennis.com. In calling for papers, the Editors ask that contributors adhere strictly to the guidelines. Views expressed by contributors are their own and not necessarily those of the Editors or publisher.

REVIEW PROCESS

Manuscripts with insufficient priority or quality for publication are rejected promptly. Other manuscripts are reviewed by the editors and associate editor and in some instances, articles are sent for external review to expert consultants on the editorial board. Author identities are known by reviewers. The existence of a manuscript under review is not revealed to anyone other than peer reviewers and editorial staff.

NOTE

Please note that all articles commissioned for ITF Coaching & Sport Science Review may also be used on the ITF's official website. The ITF reserves the right to edit such articles as appropriate for the website. All articles online will receive the same credit as in ITF Coaching & Sport Science Review.

COPYRIGHT

INDEXING

ITF CSSR is indexed in the following databases: COPERNICUS, DIALNET, DICE, DOAJ, EBSCO HOST, LATINDEX, RESH, SOCOLAR, SPORT DISCUS

ITF Ltd, Bank Lane, Roehampton,
London SW15 5XZ
Tel: 44 20 8878 6464
Fax: 44 20 8878 7799
E-mail: coaching@itftennis.com
Website:http://en.coaching.itftennis.com/home
ISSN: 2225-4757
Foto Creditos: Gabriel Rossi, Paul Zimmer, Sergio Carmona, Mick Elmore, ITF

ITF Coaching and Sport Science Review:
www.itftennis.com/coaching/sportsscience

ITF Coaching:
http://en.coaching.itftennis.com/home

ITF Development:
http://www.itftennis.com/development/home

ITF Tennis Play and Stay website:
www.tennisplayandstay.com

ITF Tennis iCoach website:
http://www.tennisicoach.com/en/home

ITF Store:
https://store.itftennis.com

ITF Junior Tennis School:
www.itfjuniortennisschool.com/

ITN:
www.itftennis.com/itn/