International Tennis Federation
www.itfcoachingreview.com
August 2013. 21th Year. Issue 60. 35-38
ISSN 2225-4757
https://doi.org/10.52383/itfcoaching.v21i60.457

Application of variable practice to technique training in tennis.

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ABSTRACT

The human being is interpreted as a complex system with a capacity to adapt, and in continuous interaction with his environment (Kelso, 1995). Any variation around him will create changes in the system to adjust to the surrounding conditions. This capacity to adapt, a characteristic of the biologic system, is an appropriate reference to understand the motor learning processes (Davids, Button & Bennett, 2008). Learning stems from an adaptation process that the learner goes through. If the tasks proposed are repeated, the system tends to aim for a new balance with new features depending on the characteristics of the tasks. That is, the direction of the behavior changes we produce will depend on the conditioning tasks (Moreno 2006). It is at this point that variable practice appears, making the tennis player explore his/her motor-perceptive skills, looking for new coordination patterns or attractors so that the most appropriate technical patterns solve the different game situations.

Key words: Coaching, Learning, Technique, Variable practice, Dynamic systems.
Received: 20 May 2013
Acepted: 20 June 2013
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INTRODUCTION

Recent research has shown different learning and training systems for tennis technique. At the methodological level, Crespo and Reid (2007) have divided them into three main stages:

• From its beginnings until the 40´s, very analytical and centered around the coaches direct instruction on the pupil as a model and in individual teaching sessions with a strong emphasis on the technical aspect.

• Between the 50´s and 80´s, a very analytical phase, centered on the technical execution, group classes begin to emerge using the basket as a didactic resource and the lines to organize practice. The repetition of movement as a basis for the construction of the technical pattern for the different strokes takes place at this time.

• The contemporary stage, as of the 80´s and up to the present time when the pupil gets more involved in the activity, becomes more comprehensive and not so analytical and technique orientated. Tactics have an important role in the teaching process and in game situations reproducing the kind of situation the tennis player will face on court.

In this sense, and in this contemporary stage there are different learning methods for tennis specific technical skills, the latest ones present this sport as a complex system (Crespo, 2011), made up of a number of elements in a continuous interaction with the game environment. The methodology of variability practice started from the cognitive perspective through the Motor scheme theory (Schmidt, 1975). This paradigm is still being discussed and developed. Cognitive constructs have been proved useful in motor learning recent literature (Schmidt, 2003; Newell, 2003; Sherwood & Lee, 2003; Ulrich & Reeve, 2005). The General Theory of Dynamic Systems targets a new model for cognitive proposals, considering motor behavior as a whole, and restating the macroscopic study of the person- environment relations as a dynamic and open complex system (Moreno & Ordoño, 2009).

It will be from this paradigm that we will plan technique training and/ or learning in conditions other than the ones the tennis player usually faces, linked to the concept of automation and systematic repetition of the movement pattern in the same conditions (Gentile, 1972), reproducing what is considered the ideal movement pattern from the mechanic point of view. Thus, variable practice in learning and technique training are presented to produce an execution imbalance to make the tennis player spontaneously discover individual movement patterns exploring their perceptive-motor skills (Davids, Button & Bennett, 2008), adapting to the task, and to the environmental and personal conditions while increasing motor efficacy. The disturbances the player is forced to undergo try to

reach a new status by auto- organizing the components of this system with the presence of noise. When the task becomes complex, finding those movement chains that provide maximum possible efficacy to the strokes. This characteristic of the complex systems is based on their capacity to operate in unstable- unbalanced conditions- (Wallace, 1997). Thus, practice targets a change in the distribution of the attractors characteristic of the tennis player coordination pattern or the generation of new attraction status trying to consolidate them (Menayo & Fuentes, 2011). This persistence of change, even if the conditions/ stimuli that caused them may not be present, is a characteristic of the "hysteresis" of a system (Wallace, 1997).

It is from these concepts that the coach can design different tasks, taking into account the elements mentioned above like (Menayo & Fuentes, 2011):

1. Disturbances impacting on space and distance orientation, speed and acceleration, movement amplitude or execution times.

For example, playing a 1x1 situation in which both players are showing their back to the net, and when the coach feeds a ball to one of them, they just turn and start the point.

2. Change the environment using different materials and instruments.

For example, raising the net to achieve greater consistency and depth when rallying from the baseline.

3. Modifying the support surfaces (practice in the water or sand, with different degrees or stability, etc.).

For example, serving from a position sitting on the Fit-ball keeping the feet on the ground at all times.

It is important to remember that, when introducing disturbances during execution, key technical aspects must be respected in practice variables modifying the technique, not in an absolute but in an optimal way (Neumaier, 2002), preventing the execution from getting away from the technical movement pattern, to avoid interference in the movement or negative transfers that could be detrimental to performance. This variability load is being researched to adjust the proposals of the performance needs and targets.

In this line of thought, Moreno & Beneroso (2009), propose an interesting similarity with what we call the General Adaptation Syndrome (GAS) (Selye 1956), in sport coaching theory. The GAS explains how a system reacts to an environmental modification changing the behavior of such a system. A training load produces a warning phase which decreases the functional capability of the athlete. The system responds to this situation with a number of resistance mechanisms leading to an adaptation process. In this adaptation or super compensation phase, the system undergoes changes, adjusts its characteristics and gets ready for this load, increasing its capabilities (Stone, O'Bryant, Garhammer, McMillan & Rozenek, 1982). So, when learning or training technique, the load must be adapted to the tennis player, in such a way that it is significant enough to produce an adaptation.

Thus, we could create tasks, evaluating the practice load for the athlete, according to the impact it will have on the tennis player, and therefore, the effect on him/her, trying to avoid those that do not generate enough stimulus or those that, on the contrary, are excessive and could even hinder his/her performance. Figure 1 shows how in the phase of application of the load, performance will initially decrease, with conditioned technical movements not adjusted (warning phase). If this stimulus continues, the player will naturally modify his action repertoire to gradually reduce errors and be more efficient and efficacious in his response, adapting to the situation and modifying his relationship with the environment (endurance phase). Then, the phases of adaptation and super compensation will see the tennis player not only doing well with the practice load but also, without a stimulus, he/she will show a significant change in behavioral patterns (Moreno & Beneroso, 2009).

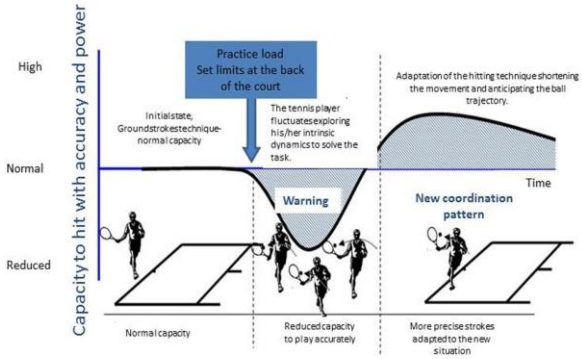

Figure 1. GAS adapted to the application of practice loads.

CONCLUSIONS

New training techniques and learning paradigms are being researched and developed, and somehow, it gets close to those models that respect the essence of a complex sport as tennis,

characterized by uncertainty and decision making in each action. Thus, it seems reasonable to propose working models for the tennis player to adapt to the different situations all of the time. Task changes which are characteristic of the variable practice expose the tennis player to a number of disturbances which try to make the technical movement more resistant to unstable conditions in order to make them more stable and permanent in time (Moreno, Ávila, Damas, García, Luis, Reina & Ruiz, 2003).

In tennis, just as Menayo & Fuentes (2011) pointed out, some authors like Benko & Lindinger (2007), use differential learning to work with speed, coordination and footwork. Elliot, Reid & Crespo (2009) suggest using different equipment, like rackets with different characteristics or manipulating the diameter of the ball. On the other hand, Menayo (2010) prefers variable practice with different elements and balls to analyze the impact of differential learning on the variability of movement, accuracy and speed of the ball on the flat service.

In variable practice, the loads should be applied intermittently with different levels of load to observe adaptation and in such a way that modified behavior becomes stable in real practice (Moreno & Beneroso, 2009). Likewise, we must balance the effect of the loads in practice, to avoid hindering the players´ progression and performance, making good use of the right time during the season, controlling intensity and being careful not to involve the player during his / her competition period, which can be more critical.

According to (Moreno & Ordoño, 2009) the principles to design training or practice loads are mainly:

- Set concrete execution conditions
- Determine the characteristics of the player
- Adjust practice loads
- Set an evaluation system

In the next issue we will be developing these general principles for the design of technique training tasks, and a number of practical examples for the application of variable practice in tennis.

REFERENCES

Benko, U. y Lindinger, S. (2007). Differential coordination and speed training for tennis footwork. Coaching and Sport Science Review, 41, 10-11 (parte 1); 43, 6-8 (parte 2).

Crespo, M. y Reid, M. (2007). Metodología de la enseñanza del tenis para principiantes. Stadium, 8-13.

Crespo, M. (2011). El enfoque sistémico aplicado al entrenamiento del tenis. E-coach, 9, 15-24.

Davids, K., Button, C. & Bennett, S. (2008). Dynamics of Skill Acquisition: A Constraints-led Approach. Champaign, Illinois. Human Kinetics.

Elliot, B. Reid, M. y Crespo, M. (2009). Techinique development in tennis stroke production. London: International Tennis Federation.

Gentile, A. (1972). A working model of skill acquisition with application to teaching. Quest, 17, 3-23. https://doi.org/10.1080/00336297.1972.10519717

Kelso, J.A.S. (1995). Dynamic Patterns: The self organisation of brains and behaviour. Cambridge, MA. MIT Press.

Menayo, R. (2010). Análisis de la relación entre la consistencia en la ejecución del patrón motor del servicio en tenis, la precisión y su aprendizaje en condiciones de variabilidad. Tesis Doctoral. Cáceres: Servicio de Publicaciones. Universidad de Extremadura.

Menayo, R. y Fuentes, J.P. (2011). Aprendizaje diferencial y práctica variable como medios para optimizar la ejecución del servicio en tenis. E-Coach, 10: 5-11.

Moreno, F. J., Avila, F., Damas, J., Garcia, J.A., Luis, V., Reina, R., & Ruiz, A. (2003). Contextual interference in learning precision skills. Perceptual and Motor Skills, 97, 121-128. https://doi.org/10.2466/pms.2003.97.1.121 https://doi.org/10.2466/PMS.97.5.121-128

Moreno, F.J. (2006). Variabilidad, adaptación y aprendizaje de habilidades cerradas. I Congreso de la Sociedad Española de Control Motor. Melilla.

Moreno, F. J.; Ordoño, E. M. (2009). Aprendizaje motor y síndrome general de adaptación. Motricidad. European Journal of Human Movement, 22, 1-21

Moreno, F.J y Beneroso, F. (2009). Criterios metodológicos en el trabajo de la técnica basados en el Síndrome General de Adaptación. E-Coach, 5: 24-37.

Neumaier, A. (2002). Enfoque científico del entrenamiento de la técnica. En J.R. Nitsch, A. Neumaier, H. Marées, y J. Mester (eds.), Entrenamiento de la técnica (193-243). Barcelona: Paidotribo.

Newell. K.M. (2003) Schema theory (1975): Retrospectives and prospectives. Research Quarterly for Exercise and Sport. 74, 373-388. https://doi.org/10.1080/02701367.2003.10609108

Schmidt, R. A. (1975). A schema theory of discrete motor skill learning. Psychological Review, 82, 225-260. https://doi.org/10.1037/h0076770

Schmidt, R.A. (2003) Motor schema theory after 27 years: Reflection and implications for a new theory. Research Quarterly for Exercise and Sport. 74, 366-375. https://doi.org/10.1080/02701367.2003.10609106

Schmidt, R.A. & Lee, T. (2005). Motor Control and Learning. A behavioural emphasis. Illinois. Human Kinetics.

Selye, H. (1956). The stress of life. New York. McGraw-Hill.

Sherwood, D.E. & Lee, T.D. (2003) Schema theory: Critical review ans implications for the role of cognition in a new theory of motor learning. Research Quarterly for Exercise and Sport. 74, 376-382. https://doi.org/10.1080/02701367.2003.10609107

Stone, M., H. O'Bryant, J. Garhammer, J. McMillan & R. Rozenek. (1982). A theoretical model of strength training. National Strength & Conditioning Association Journal, 4(4), 36-39. https://doi.org/10.1519/0199-610X(1982)004%3C0036:ATMOST%3E2.3.CO;2

Ulrich, B.D. & Reeve, T.G. (2005) Studies in motor behavior: 75 Years of research in motor development, learning, and control. Research Quarterly for Exercise and Sport. 76, 2 SUPPL. S62-S70. https://doi.org/10.1080/02701367.2005.10599290 https://doi.org/10.5641/027013605X13100559650128

Wallace, S. (1997). Dynamic Pattern Perspective of Rhythmic Movement: A Tutorial. en Zelaznik, H.N. (Ed.) Advances in Motor Learning and Control. Illinois. Human Kinetics

Note

The concept of the attractor is used to qualitatively predict the behaviour of a dynamic balance system of freedom involved in a movement, generating a new functional coordination state or attractor in which the system meets the target set before this status. If the attractors in a complex system behave in an orderly and stable way, consistent movement patterns are created for specific tasks (for ex. linear speed of the hip when walking). (Menayo & Fuentes, 2012).

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