Imagery for the Improvement of Serving in Beach Volleyball: A Single Case Study

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Abstract

Imagery is a widely spread technique in sport psychology. The aim of the present study was to use PETTLEP and Paivio's imagery models as an intervention to establish routine, to improve technique and to boost self-confidence toward serving of an Elite Beach Volleyball player. A single case study was conducted with a 25-year-old athlete. The researcher followed the athlete during serving practice for 4 months, guiding him through imagery exercises. Two open-ended interviews and six questionnaires were examined by content analysis. Results suggest that imagery did help the player. Limitations of this study and recommendations for imagery use are presented.

KEYWORDS: Imagery, Volleyball, Serving, Performance, Motivation.

Imagética para melhora no saque no Vôlei de Praia: um estudo de caso

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Resumo

Imagética é uma técnica bem conhecida na Psicologia do Esporte. O objetivo do presente estudo foi usar os modelos PETTLEP e de Paivio de imagens mentais como intervenções para estabelecer ritual, melhorar a técnica e aumentar a auto-confiança em relação ao saque de um atleta de elite de Vôlei de Praia. Um estudo de caso foi conduzido com um atleta profissional de 25 anos de idade. O autor acompanhou o atleta por quatro meses durante seus treinos de saque guiando-o por exercícios de imagens mentais. Duas entrevistas abertas e seis questionários foram considerados através do método de Análise de Conteúdo. Os resultados sugerem que a prática de imagética ajudou o jogador. Limitações do estudo e recomendações para o uso da imagética são apresentados.

Palavras-chave: Imagética, Voleibol, Saque, Performance, Motivação

Imágenes mentales para servir mejor en el Voleibol de Playa: un estudio de caso

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Resumen

Imágenes mentales es una técnica bien conocida en psicología del deporte. El objetivo de este estudio fue utilizar los modelos PETTLEP y de Paivio de imágenes como intervenciones para establecer el ritual, mejorar la técnica y aumentar la confianza en sí mismo de un atleta de élite de voleibol de playa. Un estudio de caso fue realizado con un atleta profesional de 25 años de edad. El autor acompañó al atleta durante cuatro meses durante su práctica de servicio guiándolo a través de ejercicios de imágenes mentales. Dos entrevistas abiertas y seis cuestionarios fueron considerados por el método de análisis de contenido. Los resultados sugieren que la práctica de imágenes mentales ayudó al jugador. Se presentan limitaciones del estudio y recomendaciones para el uso de las imágenes mentales.

PALABRAS-CLAVE: Imágenes mentales, voleibol, servicio, performance, motivación.

Introduction

Imagery can be described as the psychological ability of imagining and mentally reproducing any real situation. Historically, in 1934, Sackett developed a study to test the hypothesis that symbolic rehearsal enhances performance in a maze task. Indeed, the results showed significantly better performance in participants who mentally rehearsed the trajectory in the maze when compared to control participants (Sackett, 1934).

While it is well known that imagery is capable of improving performance on both cognitive and mental tasks (Bihan et al., 1993), it was only through recent advances in neuroimaging that researchers were able to demonstrate the relation between a mental representation of a psychomotor task and its actual execution (Porro et al., 1996; Stephan et al., 1995). Elite athletes are known for their ability to control psychomotor movements. The findings regarding imagery opened a new frontier to understand how athletes could gain performance by mentally rehearsing their movements before motor execution (Bergmann, Kumpulainen, Avela, & Gruber, 2013; Callow, Roberts, Hardy, Jiang, & Edwards, 2013; Callow & Waters, 2005; Holmes & Collins, 2001; Mizuguchi, Nakata, Uchida, &Kanosue, 2012; Moran, Guillot, MacIntyre, & Collet, 2012; Slimani, Chamari, Boudhiba, &Chéour, 2016; Wakefield, Smith, Moran, & Holmes, 2013).

Holmes & Collins (2001) suggested that imagery relies on memories stored in the brain in the form of central representations that are accessed whenever an athlete needs to execute a motor task. This means that, when the psychologist uses mental rehearsal to train the physical skill of an athlete, he/she should provide several cognitive and emotional elements to successfully help the individual to develop a motor imagery. An evidence-based guideline was, then, proposed: a 7-factor theoretical model of motor imagery called PETTLEP, an acronym for the elements of mental images necessary for a good rehearsal: physical, environment, task, timing, learning, emotional and perspective (Holmes & Collins, 2001; Wakefield et al., 2013).

The PETTLEP theoretical approach shows good evidence regarding both functional brain activity in neuroimaging studies (Holmes, Collins, &Calmels, 2006; Uithol, van Rooij, Bekkering, &Haselager, 2011) and performance enhancement in athletes and non-athletes (Lebon, Collet, &Guillot, 2010; Louis, Collet, &Guillot, 2011). However, Wakefield et al. (2013) reminds that the PETTLEP was thought to provide a behavioral matching model, rather than explain brain activation during motor imagery. This means that it is not expected that mental elements be separately represented in the brain cortex, which makes difficult to find evidence in neuroimaging studies based on the PETTLEP model.

Another issue regarding PETTLEP is its lack of explanation regarding some of those elements. For example, some EEG evidence found based on this model were provided by participants observing a motor execution, which can be considered an external or third person imagery (Holmes et al., 2006). On the other hand, some imagery exercises seem to be more effective when the participant imagines himself in the first person—internal or kinesthetic imagery—, rather than in the third person—external imagery (Callow et al., 2013). The model also does not provide enough explanation for the motivational role of imagery on the athlete's confidence, as found in the literature (Callow & Waters, 2005). Nonetheless, the PETTLEP model suggests interesting guidelines that should be followed in order to conduct good motor imagery.

In order to fill the gaps left by the PETTLEP model, another theoretical approach combining motor imagery and motivational imagery seems adequate. Paivio (1985) proposed a hypothetical model to explain imagery, describing it as the ability to reproduce mentally a task based upon cognitive (e.g., memory and motor skills) and motivational (e.g., arousal and affect) elements. Paivio's model provided the foundation to build a psychometric instrument extensively used in sports sciences to assess imagery, the Sport Imagery Questionnaire (SIQ) (Hall, Rodgers, & Barr, 1990). According to this theoretical approach, imagery can be divided into two different mental aspects and then subdivided in five factors: Cognitive [subdivided in: cognitive general (CG) that involves mentally rehearsing plans and strategies; cognitive specific (CS) that involves mental rehearsal of physical and motor skills] and Motivational [subdivided in: general-arousal (MG-A) that involves imaging the arousal and anxiety while competing; general--mastery (MG-M) used to imagine emotional control and confidence; and specific (MS) that involves imaging winning, goal achievement and accomplishment]. Indeed, factor analyses conducted on the original psychometric research (Hall, Mack, Paivio, &Hausenblas, 1998) and adaptation studies to other languages such as Spanish (Ruiz & Watt, 2014), Finnish (Watt, Jaakola, & Morris, 2006) and Turkish (Kizildag&Tiryaki, 2012), showed a 5-factor solution with high reliability for each factor as measured by Cronbach's alpha, ranging from 0.71 to 0.88 (Gregg, Hall, McGowan, & Hall, 2011; Hall et al., 1998; Kizildag&Tiryaki, 2012; Ruiz & Watt, 2014; Watt et al., 2006).

Several research studies have been conducted under Paivio's imagery model (Paivio, 1985), with successful results. Evidence in elite athletes show that imagery enable motor performance enhancement after six 1-to-1.5 hour sessions during a 3-week period (Gregg, Hall, &Nederhof, 2005). Regarding motivation, mental rehearsal improved self-efficiency and self-confidence among high-level Badminton players (Callow, Hardy, & Hall, 2001). In addition, results from different studies suggest that imagery helps in maintaining motor performance and self-confidence among athletes throughout the off-season (Cumming & Hall, 2002); and, finally, motivational imagery seems to help manage competitive anxiety among roller-skating elite athletes by enhancing self-efficacy (Vadoa, Hall, & Moritz, 1997). Evidence based on Paivio's model suggests that imagery use seems to be related to the athletes' ability to mentally rehearse in first or third person, which can partially explain the importance of determining a kinesthetic or external perspective when producing motor or motivational imagery (Gregg et al., 2011).

It seems that Holmes and Collins' PETTLEP theoretical approach and Paivio's imagery model tap into different points-of-view of the same phenomenon. PETTLEP provides a guideline to imagery practice that is used whenever imagery is executed, whereas Paivio's model suggests sport domains needed to be controlled by the athlete for good performance. This means that each one of Paivio's model domains (i.e., CG, CS, MG-A, MG-M and MS) (Paivio, 1985) requires imagery conducted with the seven elements of the PETTLEP model (i.e., physical, environment, task, timing, learning, emotional and perspective) (Holmes & Collins, 2001). For example, a basketball player who wants to enhance his free-throw performance (cognitive specific) should imagine him or herself executing the perfect movement with the perfect outcome mentally rehearsing: his/hers biomechanics (physical), the crowd and stadium (environment), the free-throw skill (task), slow motion and real time movements (timing), the development and improvement of

the skill (learning), the emotional arousal entailed with a decisive free-throw (emotional) and rehearse both in first and third person (perspective).

Among volleyball players, it is known that imagery is used to improve performance of three basic fundamentals: serve, pass and spike. However, scientific evidence to understand imagery in volleyball is rare. Results from different studies suggest that imagery helps learning passes among amateur volleyball players (Johnston, 1971) and enhances motor performance among high-level players with regard to both passing and serving (Greboggy, 2012). Electroencephalography studies show that the alpha band among high-level athletes while executing visual and kinesthetic imagery of a volleyball spike tends to remain in higher sub-bands (11-13 Hz) when compared to non-athletes (Stecklow, Infantosi, & Cagy, 2007). Imagery also seems to help routine establishment and execution of servings among elite volleyball players (Velentzas, Heinen, &Schack, 2011), improve anxiety management during serving routine (Roure et al., 1998) and enhance self-efficacy when spiking (Ardehjani, Mokhtari, &Tayyari, 2013). The present study aims to combine PETTLEP and Paivio's imagery models to establish a routine, to improve technique and to boost self-confidence toward serving of an Elite Beach Volleyball player.

Method

Participant

The participant was a 25-year-old male professional beach volleyball player. The researcher was invited to work as the sport psychologist of the participant's beach volleyball duo through the 2016 Olympic Games classification. The athlete has been involved with the sport for 10 years and has been a professional player for the last 7 years. He is an internationally ranked beach volleyball player with some podiums in the World Tour. The participant also gave a written consent for publication of the present study data and its content.

Procedure

The researcher began working with the participant as a sport psychologist. After the three first meetings, the researcher suggested a combination between the PETTLEP and Paivio's imagery approaches to establish a serve routine and enhance psychomotor control and precision. The participant agreed with the researcher's proposition, consenting to the study[1]. The present study was approved by the author's institution Ethics Committee.

The imagery protocol consisted in a combination of Paivio's domains: MG-A, MG-M, MS, CG and CS, with PETTLEP behavioral guidelines. The focus of the intervention was serving. Eighteen 45-minute sessions were scheduled during 4 months before the athlete's first participation in the 2015 Beach Volleyball World Tour. Session structures varied according to their objective.

The first sessions consisted in choosing and remembering the best

[1] A written consent of the athlete about publication of the data was obtained.

serve among those the participant had conducted the previous year. One serve among thirty, previously video-recorded serves, by the athlete's coach during the 2014 Beach Volleyball World Tour and the Brazilian Tour was selected by the participant as the best serve he had given in a match. The chosen serve was carefully viewed by the researcher and the participant, who was then asked to remember its PETTLEP elements: *physical* sensations of his biomechanics; crowd, press, opponents and other *environment* variables; *timing* of the serve routine and speed of the execution; the attention focus concentrated on the *task* (serve) itself and nothing else; the development until the perfect serve through consciously *learning* its strengths and limitations; *emotional* arousal, excitement and anxiety before and during the serve; and imaging from both *perspectives*: internal/first person and external/third person. Serve routine was also discussed and the participant was asked to consciously describe the routine he would feel more comfortable with.

The following 16 sessions consisted the mental training itself. Each time the participant imagined the serve, he had to do it following these steps: (1) cognitive specific imagery—the serve itself, including the PETTLEP elements: biomechanics and sensory-motor information, different environment, variation of serve timing, focus on the task, the evolution of the learned skill, emotional arousal and control over anxiety, two times in a row, first from an internal perspective and then from an external perspective; (2) cognitive general imagery—serve variation according to strategy: serves on the line, angle and middle of the court, including the same PETTLEP elements previously described; (3) motivation general-arousal—emotional arousal and anxiety by imaging the serve against different opponents; (4) motivation general-mastery—complete control of emotions focusing on highly anxious situations, such as end of matches, opposite crowd chanting or crowd demanding results; (5) motivation specific—involving a match or championship winning-serve. During each of the 16 sessions the participant was guided by the researcher through the imagery by following this order: CS-PETTLEP (perfect serve), CG-PETTLEP (serve to line, angle and middle), MG-A-PETTLEP (three most important opponents who bring more emotional arousal, excitement and/or anxiety), MG-M-PETTLEP (end-of-the-match, crowd against, crowd in favor) and MS-PETTLEP (match-winning serve, championship-winning serve).

The last session involved two parts. During the first part, the participant had to consciously describe the imagery protocol followed during the last 16 sessions. During the last part, the participant had to conduct the own imaging by himself, asking the researcher for help whenever needed. He reported to keep doing the imagery protocol during the World Tour without a schedule.

The participant was interviewed two times using a semi-structured interview guide. In each interview, the participant discussed using the PETTLEP-Paivio imagery approach to consolidate serve routine, manage emotional arousal and enhance performance. The first interview took place in Brazil one week before the beginning of the 2015 Beach Volleyball World Tour, and the second interview happened one week after the last tournament of the international season. Each interview took about 45 minutes and followed the same structure. The interview was recorded using a standard audio recorder from the researcher's computer. Probing questions were asked after each main question in all two interviews (e.g., "Are you able

to imagine your perfect serve from a first- and a third-person perspectives with the same efficiency?"). Also, additional questions were added based on the data from the questionnaires that warranted further exploration (e.g., "How did imaging a winning-serve with the Netherlands crowd in your favor help you make a number of aces in a row?").

Additionally, the participant filled 6 open-ended questionnaires with 5 questions each asking about his imagery practice during the 2015 Beach Volleyball World Tour. The questions were: #1) How often did you use imagery through this tournament? #2) Which mental images did you conduct while imaging during this tournament? #3) How did you feel about the images? #4) How did the images help you? #5) Did you feel anything different in your serve due to the use of imagery?

Questionnaires were filled every month so information would be fresh in the participant's memory. The researcher sent an e-mail to remind the participant to answer the questionnaires. Data from both interviews and questionnaires were analyzed.

Data Analysis

Content analysis based on Laurence Bardin's vision was adopted (Bardin, 2013; Santos, 2011). This method allows the researcher to focus on communication looking at themes and categories rather than at the mere classification of the discussed topics. The main objective of content analysis is to categorize messages in such a fashion that those reorganized themes enable the researcher to infer a reality other than what the message literally means, in other words: the message beyond the message.

The first step was to transcript the recorded interview. A professional transcripter was responsible to write the full content of both interviews. The researcher also read the interviews while playing the recorded audio to double-check the transcription.

The first phase of the content analysis is a pre-analysis (Santos, 2011). During this phase, the material is gathered and then organized according to the type of message. In the present study, 2 semi-structured interviews transcripts and 6 open-ended questionnaires were the research *corpus* (Bardin, 2013). The second step of content analysis is speed reading the material; in this phase there is only one quick and minimized reading that allows the researcher to hypothesize the main topics of the research and to suggest the initial categories that will be used to subsequently organize the content. The objective of the present study, i.e., establishing serve routine, technique improvement and self-confidence/motivation were used as guides to organize the data.

After the second step, the material is codified in systematic units. According to Bardin (2013), units are themes, sentences or words that depict one aspect of the message in which the researcher is interested in. In this phase, words and expressions such as: "ace", "deep-breathing" and "routine"; sentences such as "I had a hard time trying to image a specific opponent at the other side of the court." and "I always imagine myself throwing the ball as high as I can, so I can hit the ball at the right height."; and themes such as winning a medal and feeling self-confident were codified in units. The codification process is considered the third step

and happens alongside a careful and deep reading of the material (Santos, 2011). The fourth step is named rule establishment and involves counting a unit and judging whether it is significant or not. A unit can be explicit—a unit that appears several times in the message, or implicit—the absence of certain elements can constitute an unit. Therefore, the content analysis considers both what is said and also what is not. In the present study, some imagery aspects were harder to achieve for the athlete than others. This means that he reported trying to imagine those aspects in the first two questionnaires, but then pushed them aside in the last four questionnaires and the last interview. Bardin (2013) suggests four criteria for considering a unit significant: (a) frequency of a unit appearance (or disappearance), (b) intensity of a unit (whenever the unit is followed by adjectives such as: huge, big, small, tiny, few, among others), (c) the direction of a unit (if it is positive, neutral or negative), and (d) co-occurrence of two units (whenever A happens, B also happens). For example, when the athlete reported "Applying the serve imagery against a specific opponent helped me a lot to visualize the victory and to increase my self-confidence.", the unit was considered significant because it appeared twice in the player's reports, it was intense (which is reflected by the expression "a lot"), it had a positive sense, since it helped the athlete to boost his self-confidence, and it occurred every tournament the athlete was playing against this specific opponent team, but it did not happen when he was not meant to play against them in other tournaments.

The fifth and last step of the content analysis is the categorization of units. Once the significant units are established, the researcher must create categories to organize those units accordingly (Bardin, 2013). This is the most important step of the content analysis, because it allows the researcher to identify the organization of his data and the strength of each category in the material. The categories, for example, involved herein were: boosting self-confidence (a theme that repeated several times in the participant's messages) and establishing serve routines (an aspect of the athlete's game that had been built during the World Tour)—which will be further explored in the results section.

Results

Data from 2 semi-structured interview transcripts and 6 open-ended questionnaires yielded 3 categories, according to Bardin's (2013) method of content analysis. The present research aims to understand in what extent a PETTLEP-Paivio combined imagery intervention would help an elite Beach-Volleyball athlete to establish a routine, to improve technique and to motivate/boost self-confidence toward his serve. Based on these objectives, the data were organized in the following 3 categories: (i) establishing a serve routine, (ii) improving technique and (iii) boosting self-confidence. These categories reflect the way and the extent of help that the imagery was able to provide, respecting the goals of the present study. The themes of the first category implied: pre-execution of the routine and new steps of assessment and establishment of the pre-serve; the second category involved: perceived performance enhancement, earned prizes and coach feedbacks, and the third category accounted for: self-talk, motivation and goal attachment.

Establishing a serve routine

Pre-execution routine

The pre-execution routine played a major role in helping the player establish his own serve routine and minimize motor variability. It can be defined as the routine before a motor task that helps an athlete to become prepared to execute it. The player showed some concern about how pre--execution changed his motor variability during serve: "I feel that sometimes I roll the ball in my hands five times, sometimes I roll it seven times, and it somehow impacts on my serve.". Other aspects of his pre-serve routine were also observed in the first interview, such as eye-fixation and motor rehearsal:

"My eyes sometimes are fixed at the opponent I want to serve at, but at other moments I have a hard time fixing them anywhere, so I try to rehearse my movements by slowly executing them with my hands, but that takes time and I have only 8 seconds to serve after the referee whistles, so I also cannot do it every time.".

Those problems were tapped through imagery intervention and the athlete reported how imagery helped him manage those aspects in three different moments. In the final interview, the player indicated that these problems were not issues anymore, because imagery was now a tool to help him to choose and modify his own pre-execution routine:

"I use it [imagery] to help me choose the number of rolls I feel more comfortable in doing during a competition day. Sometimes I cannot imagine myself rolling the ball at all before the serve, so I simply don't do it in the game. It also helped me to establish where to put my eyes on: first I look at the ball, so I count to 3, and then I look to the line I want to serve at the opponent's side. Thus, every day I wake up and it is competition day, I just imagine myself serving and my pre-serve routine is guided by the one easiest to imagine.".

New pre-serve step assessment and establishment

Besides the athlete's already established serve routine, new steps could also be introduced to this routine. The player himself wanted to develop a new serve routine, including: deep breathing, visualization of the throwing height of the ball and stop rolling the ball before serving. He reported the evolution of his pre-serve routine throughout the World Tour. The first evolution reported was being able to assess new steps of his routine and whether they helped or not, based on imagery:

"Once I could guide myself through my imagination, I was able to see whether something helped my performance regarding serving or not... For example, I wanted to evaluate whether counting would increase my focus of attention; I imagined myself preparing to serve several times and counting in different ways. None of my trials felt easy and fluid, so I realized that counting was not helping and I forgot this idea... From this time on, I always used it [imagery] to assess whether something that I came up with would help me or not.".

It appears clear in the discourse of the player that he would be able to use imagery to assess other new steps and behaviors associated with his

serve routine. Based on this statement, the athlete addressed his issues one step at a time:

"I feel that the first thing I started to use was deep breathing. We [the researcher and the athlete] discussed the importance of deep breathing in order to maintain emotional arousal and attention focus before. Because of our talks, I decided to assess deep breathing instead of rolling the ball. In the beginning I imagined and felt the sand in my mind, the smell of sea air in my nose, the crowd around me, everything I wanted to picture inside my head... After that I was there, standing with the ball in my hand just holding it and deeply breathing once... twice... and then I threw the ball the highest I could... It felt right and the image was so clear in my mind that I had no doubt of using it again and again. I killed two rabbits with just one axe swing.".

The Brazilian popular saying "to kill two rabbits with just one axe swing" means that one action provided the solution to two different problems. Regarding the athlete's pre-serve routine, he successfully replaced one undesired behavior (i.e., to roll the ball) with a desired one (i.e., deep breathing). He also reported assessing deep breathing efficiency in different moments during the World Tour: "Sometimes I had some doubts about using deep breathing before a serve, but then I imagined it and it felt so fluid that I kept doing it nonetheless.".

The height of the throw during serve was an important step the player wanted to establish. To decrease motor variability and consequently throw the ball the same way, the athlete adopted imagery as a tool to visualize the same throwing height before the serve and, consequently, executed the serve with the same movements.

"I had a hard time throwing the ball at the same height every serve; probably because my routine varied and my execution varied to the same extent... To establish a routine that could help me to throw the ball always at the same height, I imagined myself throwing it during different moments. I began the World Tour imaging the throw before the serve routine. It did not work out. After three tournaments I felt I had to use imagery as a step of the serve routine. It worked out... I felt that my performance improved and I no longer worried that much about the throw height, I just imagined it and then executed it the way I imagined.".

Improving technique

Perceived performance enhancement

The most recurrent unit that appeared in the athlete's discourse was performance enhancement. In every questionnaire he stated that his serve performance had no limit: "... it is amazing how it [imagery] works well for me: I keep improving my serve and I cannot see any limits to how far I can go.". There were three basic improvement aspects reported by the athlete: precision, motor control and strength. Regarding precision, the player perceived decreases in variation:

"I feel that it [imagery] somehow improves my performance because it allows me to think about my own technique and correct myself without anyone's help... You see, when I use it [imagery] I try to imagine the best

serve I could do, so I always imagine my ball touching the backcourt line of my opponents. The serve in the middle of the court is very hard to pass, so I try to imagine this one more than the others... In fact, I imagined myself doing this same serve so many times that I started to feel that I was always executing the same thing I imagined and vice-versa.".

As can be seen, the athlete opted to imagine one kind of serve. Apparently, his decision was planned, involving a game strategy that could be generalized to different opponents. It helped him to improve his serve, to be conscious of his technique and to even correct himself. The other important aspect of his serve improvement was motor control:

"I tried to imagine myself completely controlling my body. I felt my muscles, my position, my posture, everything around me... Once I had a picture of my own body in my mind, I could easier transit between a first person perspective and a third person perspective... It [imagery] provided me with the opportunity to think about my motor performance and how it would affect my serve. I was then able not only to think about my body, but to see my own motor performance through mental images and to correct myself whenever I wanted. In fact, after watching some match videos, I realized that I was imaging myself the exact same way I watched on the video.".

One important factor of the player's discourse was the transition between an internal and external perspective. His statement highlights the importance of both points-of-view regarding motor control. The athlete's strength appeared four times in his discourse. Interestingly, it was depicted apart from other performance aspects:

"One of the most important things I wanted to improve was my strength. My serve is based on strength and I tried to improve it at the gym without much success; it appears that my development reached some kind of plateau... Using it [imagery] allowed me to realized that more than strength, I had to move my arm the fast as I could, so speed could lead to a faster ball and a stronger serve.".

Earned prizes

The player reported each time he earned a prize for his serve. Among the three reports of prizes he earned, imagery had a pivotal role in two of them according to the athlete:

"I played in the World Tour other four years, but this was the first time I had a consistent and precise serve... My performance probably improved due to mental practice. I won the World Cup best server and the World Tour best server prizes and it happened because I practiced a lot physically, but most importantly, I practiced it mentally.".

This last discourse was during the second interview, when the athlete had already won all the titles of the year. Regardless, when he earned his first prize at the Brazilian Tour, he already depicted the importance of imagery on his performance: "When I got the trophy in my hands I remembered how hard I had practiced my serve mentally. It somehow led to the prize.".

Coach's feedbacks

The coach's opinion and feedbacks were very important to enhance performance. They also allowed the athlete to practice more vivid and intense imagery which enabled the correction of motor execution through mental images. According to the athlete, the technical feedbacks of the coach helped to picture himself executing the serve in the right way:

"Every time my coach talked to me about my serve I tried to imagine how I could make it right. In the beginning it was a hard thing to do, but at some point during the World Tour I could just hear his opinions and I already saw myself doing it correctly. He talked in a fashion that made it [imagery] easy to practice [mentally].".

Boosting self-confidence

Self-talk

The athlete reported imagery as a tool to improve self-confidence and build self-efficiency towards his serve. One of the most cited aspects of this development was self-talk. In fact, he reported talking to himself several times during matches, addressing the mental practice to build stronger self-confidence:

"Sometimes when I was going through a hard time in a match, I remembered how well I served during mental practice, so I talked to myself: 'Man, you can serve better than that. Just remember the best serve you imagined and do it.'. That helped me to get into the right mindset and serve better.".

Self-talk was also a tool used during imagery. The player suggested twice that, while he was mentally practicing his serve, he also talked to himself in the same way he would use self-talk in a match:

"I had to practice everything, right? So, I did... I imagined myself talking to me as if I was going through difficulties with my serve: 'Throw the ball high and hit it as fast as you can.', 'Ball on the line, you can do it.', these thoughts helped me to achieve the right mindset and to serve the best I could... It [imagery] actually helped me sometimes when I was having a bad serve tournament; I was able to turn the tables."

It is also important to note that imagery helped the athlete to achieve the right mindset through self-talk. He reported once that he tried different self-talk contents and choose among the ones that worked for him: "I tried to imagine a few different self-talks, but I kept three of them that worked the best for me.".

Motivation

Motivation is an ample definition in Sport Psychology, and is composed of several constructs. Under the label of motivation: resilience, emotional arousal when serving, positive thoughts and the will to do more and more were put together. One of the first things the athlete talked about regarding motivation was how it helped him become more resilient towards mistakes:

"While doing it [imagery], I became aware of the fact that I could correct my mistakes just by imaging the right way to execute my serve... Despite making mistakes in both practices and games, I was not influenced by them because I knew I could always re-imagine the way I was doing my fundamentals.".

Indeed, the will to serve better became something to pursuit. The athlete reported in five of the eight sources of data of the present study that imagery provided him with pleasure and positive thoughts about his serve:

"It does not matter if I am at practice or in an important tournament, it does no matter whether I am in a good or a bad mood, to serve gives me pleasure, I am happy about my serve and I believe myself when I am serving... I always have good thoughts when I serve, regardless of the final result, even when I am having an awful tournament, I always think that my serve will help me win, I do not have doubts about my serve anymore... I built this confidence, this positive attitude towards serving by repeatedly imaging my best serve.".

The results also suggest that imagery helped the athlete to practice better. He reported a better attitude towards training his serve. In fact, using imagery allowed him to introduce mental practice within physical and technical practices, enabling the consciousness of motor control and correction of his biomechanics:

"At some point I started using it [imagery] during practice... I felt I could practice for hours in a row because I already did that in my own mind the whole week. It helped me to become aware of my movements, of my body, and to correct myself whenever I wanted to, because I could see myself doing each serve from outside my body and to control my movements in my mind; then I had only to transfer from my mind to my body.".

Another important aspect of how imagery would enable the athlete to boost his motivation was building serve-plans against specific opponents. Every sport has a group of players that are the ones everyone wants to beat; beach volleyball is not any different. Those opponents demanded better tactics. The player reported twice that he used imagery to build a serve strategy that could help him against specific opponents:

"Every time we knew we would play against Netherlands and Spain, I took at least thirty minutes before the match to imagine myself serving in their lines. It helped me to see myself winning them, I felt more confident after creating this mental image and motivated to win.".

Goal Attachment

It is common among professional players to establish season goals. Among the goals, to become a better server and to use the serve as a tool to win games were established for the athlete in the present study. These goals demanded both physical and mental practices, and he had to make a number of serves and aces during tournaments to achieve what his staff had planned. According to him, imagery provided the opportunity to develop resilience and made him mentally stronger to take the pressure in exchange for results:

"Once, in the beginning of the mental practice, I visualized myself receiving the best server prize of the World Cup. It was a clear picture in my head, so clear that I could remember as if it had really happened... Whenever I was making lots of mistakes during practice, or when I could not achieve the number of aces in a tournament, I went back in my mind and I saw myself receiving that award again. That memory I created inside my head made me pursue the goals we established without any doubts that I would fulfill them.".

Perhaps the athlete overstated he had no doubts. Regardless, his reports provided evidence that imagery helped keeping him motivated to pursuit and achieve the goals established toward his serve.

Discussion

Results from the content analysis provided a good picture of the qualitative dataset gathered from both the interviews and the questionnaires. The underlying discourse revealed aspects that were not explicitly said (Bardin, 2013; Santos, 2011), but were, nonetheless, pivotal to understand how imagery helps an elite athlete to improve psychological and motor aspects of his serve in Beach Volleyball.

The first result was that imagery enabled the athlete to establish a serve routine from a pre-execution to the serve itself. Evidence in the scientific literature shows that mental rehearsal of a motor task improves precision and accuracy (Bergmann et al., 2013; Gregg et al., 2005). The role of the pre-execution routine regarding these aspects seems rather important, because athletes with the same pre-task routine tend to show less motor variability when executing the task itself (Mesagno&Mullane-grant, 2010) and it also seems to apply to indoor volleyball serves (Velentzas et al., 2011). In the present study, the novel findings are the ability of the player to develop his own pre-serve routine based on how different gestures and behaviors feel during his mental rehearsal. It means that imagery also allows the athlete to insert or create new serve routines without the need to physically test the serve, as only to rehearse and see what feels better seems to be effective.

Another point that should be noted in the athlete's pre-serve routine was the deep breathing adopted. The literature shows that deep breathing is a physiological technique that allows individuals to regulate autonomic nervous system activation, thus reducing stress and anxiety (Paul, Elam, Verhulst, Elam, &Verhulst, 2007). Golf players use it massively during their pre-shot routines and report improvement of self-efficacy, attentional focus and stress management (Yancey, Czech, Joyner, Zwald, &Gentne, 2011). Among Beach Volleyball players, there is no evidence in the literature regarding the benefits of deep breathing on pre-serve routines. The present study sheds some light on how it works for elite athletes. The participant player in the present study used mental rehearsal to assess the benefits of deep breathing and stated that it helped him imagine a clearer image of his serve routines. Indeed, imagery allows individuals to feel emotions related to imaging events (Roure et al., 1998; Vadoa et al., 1997), which means that what the player did in the present study does not only makes sense, but it can also be used as a strategy among sport psychologists to practice anxious situations by combining deep breathing and imagery.

Regarding performance, the present study did not assess this variable directly. Regardless, the athlete gave good indexes suggesting that his performance did indeed evolve partially due to imagery. The athlete himself reported improvements to his serve because mental rehearsal allowed motor control and proprioception consciousness, which could indirectly influence his performance. Indeed, there is evidence suggesting that imagery enables those psychological domains to be evaluated by the athletes themselves (Bergmann et al., 2013; Callow et al., 2013; Kizildag&Tiryaki, 2012). The consequence of this ability is to correct wrong movements and to assess whether a motor skill is in fact controlled by the player or not. Athletes who create easy and fluid mental images of a motor task are probably doing the task correctly, whereas hard-to-make-out or blurry imagery indicates a wrong technique or an incongruence between what is right and the mistakes made by the athlete (Mizuguchi et al., 2012; Porro et al., 1996; Wakefield et al., 2013). However, being able to build fluid and clear mental images does not imply in enhancement of motor or sports performance. In fact, there are several variables that can influence the estimates of an individual's own performance. For example, unskilled people or individuals who are unaware of what it means to be good at a skill fail to estimate their own performance in cognitive tasks (Krueger & Mueller, 2002). On the other hand, people who show chronic self-views—both high and low self-efficacy—fail to estimate their own performance on career-paths (Ehrlinger& Dunning, 2003). This means that, in order to accept the athlete's estimate and assessment of his own performance, he/she has to be sure that he/she presents a balanced self-view and is both skilled and aware of his/her limits regarding his serve. This does not seem to be the case, since other sources, such as earned prizes and coach's feedbacks were also present in the player's discourse.

The athlete earned three major prizes during the season: best server at the Brazilian Tour, best server at the World Cup and best server at the World Tour. He had never achieved any of those prizes before. This apparently means that imagery helped him, at least in part. In the present research other important variables existed, such as hours of practice, serve accuracy, and in-game statistics, thus it is not possible to infer the actual impact of imagery on the enhancement of the athlete's serve performance. The last source of information the athlete provided was his coach's feedbacks. Indeed, it seems that the coach actually felt improvement, partially due to mental rehearsal. Altogether, although it is not possible to state this for certain, this evidence seems to suggest that imagery partially helped the athlete to serve better this year compared to previous years.

Finally, the last psychological domain that imagery tapped into was self-confidence. The results basically replicate some of the literature findings, but also bring new contributions to applied sport psychology (Van Raalte, Vincent, & Brewer, 2016). The benefits of self-talk are well-known among sport psychologists, since it helps regulate emotional arousal (Kross et al., 2014), manage stress and anxiety (Wei, Cummings, Villabø, & Kendall, 2014), improve motor control (Chang et al., 2014), enhance motivation (Blanchfield, Hardy, De Moree, Staiano, &Marcora, 2014), and increase endurance of the flow state-of-mind in expert athletes (Jackson, 1995). However, the sport-science literature lacks studies that show the relationship between imagery and self-talk. Nevertheless, the combination of these techniques has been explored before, and, when combined, there is evidence suggesting that athletes improve their performance (Neck &Manz, 1992) and develop goal attachment (Zourbanos, Papaioannou, Argyropou-

lou, &Hatzigeorgiadis, 2014). It is also possible that self-talk facilitates imagery (Cumming, Nordin-Bates, Horton, & Reynolds, 2006). In the present study, however, the athlete reported a new way to use imagery: according to the results, imagery was the foundation of positive thoughts regarding his serve skills. Even though the literature suggests a facilitation of imagery through self-talk, the relationship between those two domains seems deeper than facilitation, and the results of the present research suggest that athletes who create good and clear mental images can use them to build a positive and more efficient self-talk.

Regarding motivation, results showed that the athlete was able to build up stronger self-confidence by believing that he could do the things he imagined before. Likewise, he built a better self-efficacy and strengthened his attitudes towards himself. This is a well explored aspect of imagery, as research conducted with badminton players (Callow et al., 2001), slalom skiers (Callow et al., 2013), horse jockeys (Callow & Waters, 2005), indoor volleyball players (Ardehjani et al., 2013) and other sports (Hall et al., 1990) present evidence that imagery allows the athlete to think of himself as doing something that he had difficulty in doing before, which then enables him to create a stronger attitude towards himself in his own mind. This self-image allows him to believe in himself and consequently generate motivation to achieve something that was or was not achieved before (Gregg et al., 2005). It seems that this is also the reason athletes overall, and the athlete in the present study specifically, keep themselves attached to an established goal: if they can do it in their minds, then they are able to do it physically (Zourbanos et al., 2014).

In conclusion, the present study provides evidence that a combined imagery intervention based on both Paivio's (1985) and PETTLEP (Holmes & Collins, 2001) theoretical models is possible and helps the athlete to become more self-confident, improve his performance with regard to serving skills and establish a better pre-execution routine. The results also depict some new findings that deserve further investigation in future studies: (a) that imagery allows athletes to assess whether a behavior works during his/her pre-shot routine or not, and (b) somehow imagery provides the resources to develop positive and more efficient self-talk. The main limitations, however, rely on the nature of the present study: a qualitative single-case study is hard to generalize, but perhaps it can shed some light into future research regarding imagery applied to sport psychology.

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