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Editorial

"You cannot be serious". The translation of sport science research to the tennis court.

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Tennis has become a major sport in the last few years, with players such as Novak Djokovic, Serena Williams, Roger Federer, Iga Świątek, Rafael Nadal or Carlos Alcaraz, generated a lot of public interest. Behind the curtains, practitioners (i.e, tennis coaches, strength and conditioning coaches, physiotherapists) have to invest a lot of time and hard work to improve the quality of the game (1), which is supposed to be supported by scientific research. Unfortunately, as in any other sport, tennis training is sometimes based on old beliefs and anecdotal evidence from coaches, lacking scientific support. In this regard, it´s not unusual to hear from tennis coaches things like: "research is for universities, not for tennis", "this is too complicated" or "these are not people from tennis", when sport-scientists try to apply relevant up-to-date research findings to develop or optimize practice. This step, defined as "evidence-based practice", and described as the integration of coaching expertise, athlete values, and the best relevant research evidence into the decision-making process for day-to-day service delivery to athletes (2), is often neglected in the "tennis-world". For example, despite the strong evidence linking effective methods (i.e., monitoring training loads) to enhancing numerous aspects of player´s performance, tennis coaches often perceive these strategies with skepticism (3). Thus, in this "tennis-world", it is normal to see coaches and players following training methods without any scientific support but achieving a high impact on the social media (i.e., Instagram). Examples are numerous, and from a scientific point of view, very unfortunate.

Part of the role of a coach is to continually seek opportunities to learn new information that may benefit the performance of his/her organization (4). In this regard, the acquisition of knowledge should be paramount for tennis coaches, and although different organizations, such as The International Tennis Federation (ITF), or The Society for Tennis Medicine and Science (STMS) have tried to disseminate practical, scientific, tennis-related information in order to optimize the health and performance of tennis players worldwide (1), the reality is that tennis is behind many other sports, such as soccer, basketball, handball or rugby. At a national level, this is maybe because people in charge of the coaches education areas are not qualified for those positions, and they are not able to transfer learning from different sources to improve the practitioner–coach dynamic. To alleviate this issue, national tennis federations (i.e., Tennis Australia, British Tennis) created sports-science departments, providing scientific expertise in assessing long-term performance solutions, as well as to find research questions that do align with coaches' needs. Of course, this is not only a coaches´ problem, and sport-scientists should also try to find solutions in order to deliver research findings into the real world, and for example, attend practical coaching courses or spend additional time in team meetings to develop their ability to transfer sport science knowledge to the areas coaches view as most important (5).

Some examples of how sports science research can be applied will be detailed from here. As a first example, it is important to highlight that tennis training involves coeducational training, meaning that female and male adolescent players exercise in one training group. A limitation of this approach is that sex-related physiological and maturational differences are seldomly considered during exercise programming. Accordingly, training loads are often imbalanced and not individualized (6). There are validated and efficient procedures based on anthropometric parameters ("somatic maturation"), which allow to evaluate the maturity status using equations to estimate peak height velocity (PHV). The assessment of age at PHV allows to differ pre-, from around-, and post-pubertal athletes (7). Normal maturing girls reach on average PHV at 12 years of age and boys at age 14. Different researchers (8–10) recently showed that in tennis, boys circa-PHV boys aged 15 years showed better performances compared with circa-PHV girls aged 12.5 years in sprint, jump, and change-of-direction performances. Since performance of boys and girls is different, especially in the first periods of sports development (i.e., Pre-PHV), coaches should not only be aware of these differences, but also provide efficient training stimuli to avoid possible fitness deficits. From a practical perspective, it seems that girls benefit most from strength and conditioning programs that are incorporated into training before the onset of puberty (11), aiming to improve performance through enhanced neuromuscular activation and also helping to minimize the risk of sustaining injuries.

Another example which seems interesting in the daily training routines of tennis players is how to manage the within-session sequence of training contents. In this regard, tennis practices often involves the realization of inadequately planned training sessions conducted within close proximity and foresees players to conduct athletic training before or after a sport-specific tennis training, with a break in between sessions that rarely exceeds 30 minutes (12). Moreover, serve training has been traditionally conducted at the end of the regular tennis training (13), although there is evidence that motor skill learning should be conducted in an unfatigued condition (i.e., at the beginning of the session) to achieve better outcomes and reduce the risk of sustaining injuries (14,15). Based on recent studies (12,16), it would be more effective for coaches and strength and conditioning coaches who wish to implement relatively short (i.e., 30-35 min) neuromuscular training sessions (i.e., strength, dynamic stability, core focused strength, plyometrics, and agility) for their tennis players, to conduct it before the regular tennis training to avoid excessive levels of fatigue and, above all, to obtain improvements in tennis performance–related factors (e.g., sprint, jumping performance, and/or stroke velocity). Furthermore, a recent study showed that training the serve at the end of the regular tennis sessions compared with a protocol conducted at the beginning of the session resulted in significant decreases in serve performance (e.g., speed) together with impaired shoulder function (e.g., strength and ROM) in female and male players.

Finally, a typical routine used by lots of tennis players is to perform 5–15 min of low- to moderate-intensity exercises within approximately 1 h after their practice and competition to facilitate recovery (17), and preserve performance levels between sessions, especially if athletes complete more than one session per day. Scientific research on this topic has shown that an active cool-down generally does not improve and may even negatively affect performance later during the same day when the time between successive training sessions or competitions is > 4 h (18). However, it is true that some athletes nevertheless perceive an active cool-down as more beneficial than a passive cool-down and may differ depending on the individual preferences and beliefs.

In conclusion, tennis has a lot of room for improvement in the application of sport science research and there are still many perceived barriers, including time, coach/player/'buy-in' and poorly designed research questions (5). The use of evidence-based practice in tennis can improve training and performance, reduce training errors (i.e. injury or inappropriate training), challenge belief-based views with evidence, and integrate athlete and coach preferences into decision making about approaches to training and performance (2). However, it is imperative that coaches and sport scientists work together in this process. One possible solution would be to embed sport scientists within tennis federations and work directly with these stakeholders under the pressures and constraints of high performance.

Conflicts of Interest: The author declares no conflict of interest.

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