

PERFORMANCE IN PADEL

WHAT SHOULD WE MEASURE?

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INTRODUCTION

Padel is a racket sport, practiced in pairs, in a rectangular playing area of 10 by 20 meters, divided into two halves by a net. The padel court is characterized by a completely closed perimeter, combining areas of a metal mesh with areas that allow for a bounce against the baseline and the sidewalls. In recent years, there has been an exponential increase in both the popularity and expansion of this sport, with more and more sports clubs dedicating their facilities to padel. In addition, there are 65 federations worldwide that implement their own ranking system and issue their own padel licenses¹ to compete as well as multiple international professional circuits that have emerged and evolved (ATP Padel Tour, World Padel Tour, and Premier Padel). The professionalization of the sport has induced a more rigorous and scientific analysis of the technique, tactics, physical conditioning, physiological and psychological adaptation with the goal of improving the preparation and planification of training sessions to best match the needs of competition. Consequently, studies surrounding the padel industry have seen a major increase lately², with performance analysis being a key point of analysis.

In padel, there are various parameters that quantify the external load that the athletes are subjected to. These may be the

length of the points, rest between points, the number, types and placements of each shot, the distances covered, acceleration and deceleration of movements, their velocity etc. One of the most studied external factors of the game is the actual time of play. It has been extrapolated that the average time of play is just over 30 minutes per set. This means that the actual total time of play in a match can range approximately between 60 and 90 minutes, depending whether 2 or 3 sets have been played³. One of the professional circuits (World Padel Tour) has modified its rules in order to limit the duration of each match. For example, they have incorporated a golden point rule once the score is 40-40 in a game. Nevertheless, said rule hasn't affected the total duration of each match much⁴. Moreover, the women's game sees longer matches than their men's counterparts⁵. In general, the actual time of play is around 30%-35% of the total time^{3,5}, with the women playing slightly longer. More specifically, each point is around 10-15 seconds long.

There are many investigations that have analyzed parameter related to the external load, like the different actions in the game. Studies show that professional players play an average of 8-10 shots per point, with the number of shots per second in men is significantly larger than in women. This shows that the speed of play in the men's

game is higher than in the women's⁶. In addition, the effectiveness, type of shots and hit zone are also topics investigated.

One of the most important shots that characterize the game of padel is the smash; men: 35.7%, women: 33.9%, followed by the men's volleys; forehand volley: 15.1%, backhand volley: 16.4%; and in women; forehand volley: 15.5%, backhand volley: 12.5%. From the back of the padel cage, men; forehand: 10.9%, forehand off the wall: 10.1%, backhand: 6.1%, backhand off the wall: 5.7%. Whereas in women; forehand: 11.4%, forehand off the wall: 11%, backhand 7.8% and backhand off the wall: 8%. This same study determined that men played more shots closer to the net, mostly volleys: 34.2%. In contrast, women play most of their shots from the middle of the court, the so-called "bandejas" or "trays": 51.6%. From the back: 27.5%, women play mostly forehand shots⁷. In a study by Escudero-Tena et al. (2022), they analyze the efficiency of the final shot or winner, by both the men and women in the professional circuits. They closely examine the type of shot while taking into account the importance of each situation in the game, set, and match as a whole⁸. They came to the conclusion that both the men and the women make more errors than winners, which reinforces the importance of minimizing errors in order to gain consistency. Furthermore, the results of



Illustration

the study show that the difference between the errors and winners increases as the game progresses and the points become more important. On the men's side, more than 60% of the golden points finish with an error. Nonetheless, on the women's side, this difference between errors and winners decreases, going from 70% of errors on points that have less importance to less than 60% of errors on golden points. This shows that the importance of the point affects the behavior of the competitors and the way they play the point. Men become more conservative, waiting for the opponent's error, whereas the women's percentage of winners increases, making them more aggressive on important points. Looking at the final shot in either category, men hit most of their winners by playing the smash, whereas women find their winners by playing the smash and the "bandeja", followed by shots off the wall, and in third place both the forehand and backhand volley. Since the smashes and "bandejas" are mostly played in areas close to the net, the efficiency of these shots reduces the further

away they are played from the net⁹. For the players that are at the back of the court and are forced to play a shot off the wall, their goal is to play a shot that can help them gain the net, whereas for the players that are at the net, their goal is to keep their position at the net.

Padel players cover an average distance of 11 meters per point, though approximately 40% padel players cover a distance of less than 8 meters. When looking at a complete match, padel players cover a total distance of around 2900 meters. However, the score (amount of points played) as well as the intensity of the match (taking into account the rest between points), are important factors that influence the distance a padel player covers in a match. More specifically, in a point, the players that are serving and returning are normally the ones that cover more distance during the point, compared to their respective partners that usually don't cover as much^{10,11}.

The analysis and results of these studies allow us to define the game of padel as an intermittent sport since the game alternates

from periods of high intensity and periods of low intensity where players can recover and rest. During periods of high intensity, players must be prepared and able to change directions fast as well as show a variety of technical skills. It is clear that the area at the back of the court where players are forced to play shots off the wall and against the wall, is an area where players intend to spend the least amount of time possible by playing shots like the lob in order to gain area closer to the net. On the other hand, players at the net will try to use different shots in order to force the opponents to stay as far away from the net as possible. These are important concepts to understand when playing important points like break points, golden points and game points.

It is also important to consider that the performance in padel is not only about the technical or tactical skills of the game itself, but also directly related to the level of physical conditioning and physiological and anthropometric characteristics of each player. For this reason, it is important to control and develop these characteristics

wherever possible as they can determine the future performance of the player. In padel, there are various studies that have quantified the parameters of internal load. Among the different stimulations that cause a specific level of effort in the organism, important ones that relate to padel are: the changes in heart rate, the utilization of oxygen, the production of lactic acid and its concentration in the blood. Pradas et al (2019) analyzed a diverse range of professional padel players. They obtained that the men have an average body mass of 78.2kg and a height of 178.3 cm. More specifically, they have an average percentage body fat of 10.6%, muscle mass of 43.4% and a body mass index of 24.5 kg/m². On the other hand, on average, female players have a body mass of 60.3kg, a height of 166.7cm, a percentage body fat of 17.6%, muscle mass of 37% and a body mass index of 21.7 kg/m². In terms of the somatotype of the players, the men presented a 2.86 endomorphic, 5.47 mesomorphic and a 2.02 ectomorphic components; while the women had a 3.8 endomorphic, 4.0 mesomorphic and 2.6 ectomorphic components. Additionally, the maximum VO₂ values for men were 55.43 mL/kg/min, whereas for the women it was 46.77 mL/kg/min. Male padel players have stronger values in maximum strength, explosive strength and grip strength than women¹³.

Finally, injuries lead to setbacks that are inherently unavoidable as physical activity comes with a certain risk. However, this risk can be significantly minimized through preventative training, and steps can be made to make the recovery process as short as possible. Even though injuries are very often caused by a wide range of factors, there are some risks that are well-known to be the result of a certain activity or exercise. Continuing on what Casais (2008) explored, the intrinsic elements that can be analyzed include¹⁴:

- The previous injuries and their inadequate rehabilitation.
- The age; a factor that allows us to recognize patterns of typical injuries in different age groups. Equally, injuries can also be strongly correlated to the athlete's sex.
- Anatomical aspects, such as joint misalignments, posture alterations, joint laxity and instability, rigidity and shortening of the muscle; which typically suppose the most important



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aspects to bare in mind, along with the individual physio-motor qualities of each athlete (strength, resistance, flexibility, speed, coordination, etc).

- The psychological state.

Within the extrinsic elements, the important ones that stand out are (Casais, 2008):

- Sport-specific motor skills, which is the most relevant extrinsic factor as the gestures to be performed involve the exacerbation of a certain injury mechanism, include the most common forms of injury production: direct trauma, overuse due to repeated gestures, speed, incoordination, etc.
- The training workload, since it is associated with the amount of injuries present in cycles of high competition or the increase in training workload. Likewise, the training volume, in terms of time exposed or accumulated workload in the season (minutes and disputed competitions). These could indicate residual fatigue.
- The competition (the level, time exposed, etc), supposes a factor that doubles or triples the risk of injury.
- Inadequate equipment and materials (padel rackets, balls, shoes, etc.), surface or the state in which the padel court is in, etc.
- Environment conditions (thermic stress, etc.)
- Type of activity (category of training). This is something that hasn't been studied much, but it is extremely relevant to establish specific guidelines for injury prevention.
- Specific moment in the session. The accumulated fatigue produced by the training or the competition is an element that can multiply the risk of injury, since the body is more vulnerable

to injury towards the end of the training session or competition.

- An inadequate warm up.

In padel, the lower body extremities are the parts of the body which are most harmed, followed by the upper body extremities (torso) and finally the head and neck¹⁵. In terms of the most vulnerable part of the body; the elbow, where most injuries are tendinous (followed by muscular injuries). Within the elbow region, epicondylitis constitutes the most frequent injury in padel players. Other common injuries in padel players include ankle sprains due to lateral movement, knee ligament injuries, sciatic and lower back injuries, rotator cuff tendinitis, scaphoid fractures and eye damage. Additionally, other factors such as training intensity, years of experience, and gender can be influential in padel injuries.

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