# IS PADEL THE RIGHT SPORT TO PROMOTE HEALTH IN THE GENERAL POPULATION?

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## INTRODUCTION

Padel (or paddle tennis) is a modern rackets sport that is played in pairs, with a ball and a paddle, hence its name. It is practiced on a closed rectangular court 10m wide per 20m long, a third smaller than tennis courts.

If we go back to its origins, we could say that padel was born in the second half of the 20th century in México, specifically in Acapulco, by Enrique Corcueca, although there are historians who place its origin in the 19th century. Paddle was adapted from game based on amusement for the passengers of the English ships, and others who think that is was already played in 1924 in the parks of New York, being known as "Paddle Tennis) because of the paddle that they used to play[1].

Paddle tennis could be defined as a sport characterized by the repetition of a high frequency of actions, in which short-distance sprints in different directions are interspersed, predominantly forwards and to the sides[2]. These characteristics could classify padel as an intermittent sport of medium/high intensity of long duration[3] with numerous physical, psychological, personal and social benefits[4].

Despite being a relatively new sport, its popularity has grown exponentially in the last decade. It is practiced in more than 60 countries worldwide, 50 of them recognized by the International Padel Federation (IPF) with their own national federation.

Padel is an emerging sport both in terms of sport and research. The map of the current state of research in this sport has increased exponentially in the last decade, with five fields of interest being the most studied: anthropometric profile, physiology and physical performance, biomechanics, injury epidemiology and match analysis[5]. However, more experimental research is still needed.

## PADEL AND ITS SPORTS PRACTICE

Among the list of options to practice exercise, racket sports, and particularly paddle tennis, stand out as emerging practices for both young people and adults to enjoy, as they improve their physical condition[6] and potentially develop motor and cognitive skills[7].

Although similar to tennis, a paddle court is about a third smaller than a tennis court. In this scenario, the key to this success is that high levels of technical ability are not considered essential to start practicing and it is usually played outdoors with cheap equipment[8].

If we talk about volume of play, referring to the number of strokes per minute, paddle tennis is also a more entertaining sport because it has a greater dynamism and volume of play than in tennis.

Recent studies suggest that racket sports can be an effective activity for


**Illustration**

health promotion and to improve leisure time physical activity in the sedentary population[9,10].

Another important focus that makes the practice of paddle tennis interesting are the skills that are developed at a coordination level. The very structure of the playing area, the walls that surround the player, along with the ball that bounces at certain heights add an external implementation to our body. For example, the shovel with which it is hit allows one to develop spatial abilities. In turn, this coordination is shared with the partner in the same space, where coupling and adjustment of space-time perception is fundamental. Consequently, padel could be an effective strategy to encourage children and adolescents to engage in regular physical activity for optimal health outcomes and to limit sedentary behaviour, particularly recreational screen time[11].

The regular practice of physical exercise guarantees a control of the state of health, the lack of objectives and the ease of locating a place to carry out a continuous practice can be an inconvenience for sports adherence. In more detail, a study by Courel-Ibáñez et al[12]. in middle-aged adult women who practice paddle tennis regularly, reported better physical condition and body health compared to sedentary women, with greater proprioception, strength, and cardiorespiratory endurance. In addition, they reported minor differences in abdomen, hip circumference, and leg skinfolds in sedentary women, reducing the risk of cardiac disorders, osteopenia, and back pain[13].

PHYSICAL CHARACTERISTICS OF THE PADDLE PLAYERS.

Good fitness is essential for effective sports practice in all sports, however, perhaps in the case of padel practiced as a non-professional sport, less physical conditioning does not limit the player's performance as much, making it a fundamental aspect that is possibly related to the greater ease of practice and consequently with the growth of the number of practitioners in the last decades. On the opposite, the increasing intensity of elite competitions makes strength and conditioning training a priority for success in professional players[14]. Padel athletes tend to change their posture quickly and require a lot of strength in the legs to shift the weight of the upper body quickly. In this sense the height seems to be crucial in the effectiveness of a shot as well as a better development capacity strength[15].

In addition, the presence of walls and grids that surround the field and that can be hit by the ball, prolongs the duration of the rally, thus, the number of actions and hits is greater than in other racket sports, such as badminton and tennis[16]. Male professional padel players have been shown to have high levels of cardiopulmonary fitness, upper body and grip strength, and quickness, highlighting the role of padel in enhancing favourable adaptations in the cardiovascular system in a manner similar to other sports[17,18].

The predominant anthropometric profile in both male and female players is meso-endomorphic when playing at a high level and endomorphic at lower levels of competition. These anthropometric differences between game levels may be due to the greater number of training hours invested by players of different levels and that could serve as a reference to build a nutritional plan for athletes[5].

The height and the span of the arms of a paddle tennis player will be an important physical quality. Taller and more muscular padel players could execute very powerful shots (which can sometimes take the ball out of court, scoring a direct point)[14].

Based on the study by Pradas et al (2021)[8], we can recognize the physical condition characteristics of professional paddle tennis players and observe the differences in physical performance according to the gender of the players (15 men and 15 women). In detail, professional athletes train about 23.5 hours per week, have an average height of 177.9 cm and a weight of 78.2kg, with a fat mass percentage of 12.53%, similar to the results of other racket sports. In this sample of 30 professional players (15 men and 15 women), maximum oxygen consumption values (VO2 max) of 55.43 mL/kg/min and a hand dynamometer power

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of 51,14kg were obtained for the dominant hand. The energy cost is similar to tennis. Significant differences between the sexes are reported in nearly all fitness indices (VO2 max, maximal dynamic strength, hand grip, or explosive jumps), particularly for the arm, in both maximal dynamic and explosive power. In addition, male padel players have a greater explosive power than women, in line with the demands of the competition, in which there are faster rallies and more powerful blows (smash).

In another study, in which physical condition was evaluated with respect to age and gender differences in young people (between 13 and 16 years old), female players showed better reaction time and greater flexibility ($p<0.05$), while the rest of greater assessed capacities in men. On the other hand, the results were also higher in both genders in the 15-16 age group than in the 13-14 age group[19].

PHYSICAL DEMAND IN PADEL COMPETITION MATCHES

Gender differences have been reported according to temporal variables in paddle tennis games, with higher values in female matches than in male ones in terms of the duration of the rallies, number of shots per rally, real playing time, rest time, rest time for rally and rallies per match. Comparing U-16 vs. U-18 players, the older the age, there is a greater effective playing time (%), more games per set and a longer duration of the rally ($p < 0.01$). In addition, in women, shorter rest times between rallies were observed in U-18 players ($p < 0.01$)[20].

If we analyse what happens in padel matches in relation to the different levels of competition, a higher game rate (shots per second) is observed in national players compared to regional players ($p < 0.05$). Regarding the recreational players ($p < 0.001$), they differed from the national and regional players in the rally time, the number of shots per point, the distance covered, the pace of the game and the speed during the active game[21].

Studying data found in a literature review by García-Giménez et al (2022)[5], we present below physiological performance values during laboratory tests and paddle tennis matches to gain knowledge of the physiological demand that the practice of this sport affects at different levels.

Laboratory tests show that, in professional padel players, VO 2max is in a range between 38.4 ± 0.7 mL/kg/min and 55.64 ± 8.84 mL/kg/min depending on the gender and level. In addition, their first (VT 1) and second ventilatory thresholds (VT 2) are between 72% of VO 2 max. and 84–85%, respectively.

Heart rate values (HR max) recorded during the matches indicate that it follows a similar pattern in both high-level paddle tennis players and amateurs (maximum 154-179 bpm - 80-85% of HR max and average 130-151 bpm68 – 74% of the HR max). On the other hand, amateur players remained 97.75% of the time below the aerobic threshold and 2.25% between VT 1 and VT 2, which confirms, at a cardiovascular level, that amateur padel produces predominantly aerobic efforts.

The lactate concentration during matches also seems to follow a similar stable pattern between different levels of players, starting below VT 1 at the beginning (1.83–1.90 mmol/L) and reaching values between VT 1 and VT 2 (2.40– 3.38 mmol/L) at the end of the match.

By way of conclusion, from all these data on physiological variables, we obtain valuable information on intensity, noting that there are no drastic changes in these variables and that they contribute to a predominantly aerobic character during paddle tennis. However, we must underline the high degree of heterogeneity in the studies and results in the literature, despite the popularity gained in recent years by this sport. This issue needs to be properly addressed, considering that paddle tennis, given its attractiveness, could be considered an important health promoter with relevant implications in terms of implementation of an active lifestyle and global health[15].

PADEL INJURIES

In order to understand the epidemiology of injuries in a sport, it is necessary to study the competition model, analysing the specific nature of the sport and the place where it is practiced.

The area where the game of paddle tennis takes place, the court, has the peculiarity, previously mentioned, of being smaller than that of other racket sports such as tennis, the game is faster and the movement is shorter, with many changes of direction[22,23]. The structure of the game is characterized by a greater number of ball hits compared to

other racket sports, but also includes a wide variety of types of hits[20].

The characteristic of the smaller size of the playing area, if related to the increase in the frequency of hits, is also associated with a faster and more intense game.

In amateur players, often not adequately prepared to play padel, overtraining or exercise loading may also be associated with injury risk, highlighting the need to focus physical preparation, rest, and recovery[15].

Approximately 40% of players suffer an injury per year, with the most frequent injuries being muscular, followed by ligament/muscular injuries[5].

Finally, footwear may also play a role in injuries, even if scientific literature is still unconclusive on this[15].

Among non-professional padel players, 3.1% of all injuries required more than a month of recovery, with ligament injuries being the most common. A large majority of them (72.2%) required physiotherapy and 21% of recreational players required sick leave, 52.6% reported some physical sequelae, where increasing age, higher body mass index and laterality were the main predictors of the musculoskeletal affectation of paddle tennis[15].

## THE BENEFITS OF PADEL

According to the latest updates from the World Health Organization in 2020 on physical activity, it is recommended that adults perform 150 to 300 minutes of moderate intensity physical activity or 75 to 150 of severe intensity, apart from participating in regular activities of muscle strengthening[11].

The lack of physical activity is considered the fourth cause of death worldwide.

Regular physical exercise improves body composition, cardiometabolic and cognitive conditions, delaying the onset of some 40 chronic diseases. Furthermore, physical activity improves depression and anxiety and reduces stress.

Analyzing specifically the practice of paddle tennis and taking into account the studies so far analyzed, it can be concluded that:

1. Regular practice of high-level paddle tennis induces healthy cardiovascular and strength adaptations.
2. Improved cardiorespiratory fitness, upper body power, grip strength, speed and agility, while women who practiced padel had a better physical condition than sedentary ones, with better composition strength, explosive power and cardiovascular capacity. In addition, data have been obtained that confirm a lower waist/hip circumference and thigh skinfold compared to sedentary people, which is why it is observed that it contributes to an improvement in body composition and a decrease in cardiovascular risk.
3. Taking into account the sports habits of paddle tennis players, with a game frequency of 2-3 times per week, 60-120 min per session, if compared with the data published in the latest WHO physical activity guidelines , this volume of practice would be beneficial for the health of the general population[24].
4. Recent studies indicated that amateur padel practice stimulates a biomarker related to brain health, such as brain-derived neurotrophic factor (BDNF) in female players[7].

Regarding the strength values of the upper and lower limbs of the young paddle tennis players, they were notably lower than in other racket sports, with less launching and jumping capacity.

Do not forget that the habitual practice of paddle tennis induces the repetition of unilateral gestures, which can lead to negative adaptations, such as asymmetries or musculoskeletal injuries due to overuse.

Although an increase in the intensity of physical activity can produce even greater health benefits for adults, it also exposes the player to a greater risk of injury.

## CONCLUSIONS

Padel is growing a lot at the amateur level due to its ease of practice, it is very common in neighbouring communities to locate a paddle court due to the dimensions it occupies. At a professional level, as in most sports, the level of physical demand is high, but at an amateur level, paddle tennis requires a lower level of technique and physical fitness than other racquet sports such as tennis. Padel can be practiced by anyone with low levels of average and technical fitness, from 4-5 year olds who can already pick up a light weight racket, to older adults who can keep the ball in play without moving much, and even people of different physical abilities, gender and ages can share a sporting moment with enjoyment.

It could be said that paddle tennis is a sport suitable for amateur athletes, which promotes health among the young population and even helps to combat a sedentary lifestyle.

Finally, it should not be forgotten that amateur athletes generally do not have a multidisciplinary service of professionals who work on all the factors that affect performance, mainly injury prevention, so it is really important to prevent injuries, control of training volume as well as trying to practice it in the best possible conditions, starting with a correct warm-up.

*References*
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