PREVENTION OF PADEL INJURIES

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BACKROUND

The joy we experience nowadays playing and watching padel is owed to the Mexican entrepreneur Enrique Corcuera who, back in 1969, decided to build walls around a land of approximately 20×10m, for a game played in pairs, thought for his family and close friends who would spend nice summer days at his house in Acapulco[1]. Little did he know back in the days that a sport which started fortuitously and was played barefoot and in swimsuits, with wooden beach tennis rackets, would now be the most emerging sport internationally, played by athletes who must develop outstanding physical qualities to match the demands of the sport.

With the evolution of the sport, we have also found an increase in the type and number of injuries the athletes suffer, which together with the increasing competitive loads the players have to cope with, leave the medical teams with a challenging new scenario in order to keep the athletes as healthy as possible.

Padel is a very particular sport, as for now it is only played in very few countries around the world, but the number of players in those countries is outstandingly high, especially in Spain, Argentina and Brazil. Right now, in Spain it is the second sport in number of licenses, only after soccer, but the sport's youth and the limited areas where it is played, leaves a temporary gap of research of its injuries and most effective injury prevention approaches.

In the few studies we can find related to this, the data shows that 65.6% of players report having suffered an injury during play[2], with an injury risk of 2.75 injuries per 1000 hours of play[2,3]. Almost half of the injuries reported were on the lower limb (41%), and the most common injury was the lateral epicondyle tendinopathy, representing more than 20% of all reported injuries.

OBJECTIVES

The main objective of this article is to provide effective injury prevention tips that can help the recreational padel players to practice this sport as injury free as possible. As a health professional, one of the main daily goals is to provide my patients with advice that can improve their overall health. There is no doubt that one of the main pillars of health is physical activity and sports, and padel has turned out to be a sport that ticks many of the boxes that a person needs in order to engage to a sport: it is technically easy, as you do not need a high level to have fun, it has a competitive aspect, and it is a social sport, as it needs 4 players on the court. Looking at it from a more scientific perspective, focusing on the way padel improves health, we could quote the following: it stimulates the eye-hand coordination, which is good for the brain; it requires accelerations and decelerations, good for the muscular and tendinous system; it is a high intensity interval training, good for the cardio-pulmonary system, and it's social aspect is very good for the psychological and emotional sphere. There is a very interesting study, the Copenhagen City Heart Study (CCHS), published in Mayo Clinic Proceedings 4, which followed close to 9,000 people over 25 years and found that playing tennis added 9.7 years to their lives, becoming the sport which lengthens life the longest. Tennis and padel obviously are different but, in my opinion, many of the qualities found in tennis can be extrapolated to padel, making it an ideal sport for longevity. But nobody can practice a sport for many years if one gets injured too easy, so let's take a deeper look into the injury risk factors and its possible solutions.

INJURY RISK FACTORS

As in any other sport, there are intrinsic and extrinsic factors that affect risk injury.

To better understand the injury risk factors, it is interesting to understand how padel is played tactically, which determines the technical requirements and therefore the biomechanical demands. According to a study by Sánchez-Alcaraz et al[5], most of the winning points are scored from the middle

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and net region of the court. For one team to be able to be in those areas, the strategy is to send the ball to the baseline near the walls, through lobs, keeping the opponents away from the offensive areas. Having the opponents in those defensive positions allows the attacking team to use volleys and overhead shots, which are more likely to be winner shots. There is a continuous movement of the players, who transition from the baseline to the net, from defensive positions where they have to be in constant trunk flexion, to attacking positions where they accelerate overhead shots.

The constant accelerations, decelerations, change of directions and jumps become a high risk for acute muscular injuries in the lower limb, while the low intensity repetitive athletic gesture of the different shots increase the overload injuries on the upper limb.

Among the intrinsic factors, we can find biology, biomechanics, joint mobility, physiology, age, body deterioration, lack of preparation or overtraining. Among the extrinsic factors, we can consider weather conditions, surface of play or material used: racket, shoes, balls[3].

It is logical to think that injury risk factors will not be the same for professional and amateur players. Normally the amateur padel player gets injured due to lack of preparation- insufficient load tolerance in muscles and tendons which may lead to acute muscle injuries or tendinopathies-, or due to a very fast increase in the number of hours dedicated to the sport without the adequate time for their bodies to adapt to the specific biomechanical demands. Also, the amateur player may not pay enough attention to the type of material used, where it is important to make a good selection of racket weight and grip size to match the physical qualities of the player, as to avoid overloading the upper limb structures. The same can be applied to the type of shoe used, which needs as to match the type of carpet the court has, as this has changed throughout the past years, from a more sliding one, to the curly haired carpet used nowadays, with a higher gripping surface, which needs to be compensated by the type of sole in order to avoid acute joint injuries in the lower limbs.

Focusing on the professional player, all the statements made above need to be taken into consideration, though it is rare that a professional padel player fails to make good decisions in all that has to do with material election. They will for sure have relative overloads, due to either higher training peaks or higher competitive demands, but they also have large teams which will be constantly making modifications on the training programs for the athlete to be able to adequately adapt and avoid excessive physical load or physiological overtraining.

Basically, the professional player will mainly suffer three type of injuries:

- Overload injuries, mainly tendinopathies, due to the large amount of repetitive biomechanical gestures they have to complete during every practice or match.
- Acute muscle or joint injuries, due to the high intensity and aggressiveness of change of directions and jumps.
- Acute accidental wounds or injuries, due to the abrasion of the surface on the skin, to ball impacts or impacts against the glass walls.

On top of that, the professional padel player faces different situations that turn out to be potential risk factors, and do not necessarily apply to the amateur player. Padel as a professional sport has particularities which make it a very special sport for the fans, but a complicated sport for the athletes. On top of the extrinsic factors applied to the amateur player, we could add:

- Calendar: in the past three years, professional competitions have grown to the point where players now compete at least double of the tournaments they played two years ago. That is a very high increase, meaning an overload not only for the muscular- tendinous structures, but also physiologically and psychologically, as tournaments mean a lot of systemic stress.
- Competition on consecutive days. Due to the competition system (an elimination draw), the teams will compete in consecutive days, from 4 to 6 depending on the size of the draw, making post-match physiotherapy recovery, hydration, nutrition and supplementation absolutely key to perform at their best as the tournament advances and fatigue starts to be present.
- International expansion: one of the main differences of professional padel nowadays compared to how it used to be is the international expansion of the sport. Since the past couple of years, players are trying to adapt from easy drives within Spain (where 95% of professional circuit used to happen), to international trips on consecutive weeks, with the consequent changes in time zone, diet, and rest.
- Ball change: another extrinsic injury risk factor is the election of a different ball at every tournament, a new factor which has implications on relative overloads of the upper limb, with special repercussion on the elbow joint. It is important to know that conditions such as altitude, humidity or ball pressure will change the conditions of the ball, therefore changing the moment of impact, to which the players must constantly adapt.

INJURY PREVENTION

Considering the different intrinsic injury risk factors, some are under our control while others aren't, so it is interesting to focus on those which can be modified for the better.

According to Fu et al[6], tendinopathies are a failed healing process in which many factors influence (metabolic, hormonal, genetic predisposition...), but where the trigger usually is a mechanical relative overload that cannot be adapted by the tendon. This, together with all that we have learned from Cook et al[7] model of tendinopathies, leaves a painful and dysfunctional tendon with low load tolerance. Therefore, one of the key treatments for tendinopathies will be a good exercise protocol that can increase the tendon load tolerance, both for injury recovery and prevention of future injuries.

There are various studies regarding which type of load is best for tendon recovery, with many different protocols and variations. Eccentric load is believed to have an impact on collagen regeneration[8], whereas isometric load works really well decreasing pain intensity of the tendon. Considering padel, as every other sport, has concentric-eccentric demands, probably the best protocol will be one which combines different type of contractions, depending on the moment of the injury.

The initial weeks will have a higher demand of isometric, analytic contractions, with eccentric inputs and kinetic chain exercises which guarantee the optimal biomechanical functionality of the different shots once the specific tendon is recovered, progressing to high load eccentric demands and multiplane exercises along the weeks, finishing with variations in velocity, plyometric demands and specific biomechanical gestures. Studies propose protocols from 12 weeks up to 6 months, though clinical experience, especially with elite players, tells us we will obtain improvements with 6-8 week protocols for tendon injury, as long as the latest acute phase of the degenerative progression of the tendon has an onset of no more than 6 months. The key point to manage the progression adequately is to use pain scales and subjective functionality questionnaires as indicators of progression. We should expect less pain and more functionality on everyday activities throughout the treatment weeks, though when talking about tendon recovery we cannot expect zero pain during exercises, and managing a small amount of pain (up to 3-4 on an EVA scale) will help us progress in tendon's load

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Illustration

tolerance, and help the patient to manage better the avoidance conducts they tend to have when they are dealing with long term tendinopathies. Obviously, protocols will be adapted individually to every patient, considering the specific starting point and future demands of that tendon, always taking into consideration the patient's background regarding general health, specifically metabolic aspects like diabetes or pre-diabetes, hormonal menopause changes in women and any other clinical situations that can interfere in the tendon's biochemistry, which will need to be addressed adequately.

Regarding tendinopathies, the most frequent in padel players are the lateral epicondyle tendinopathy, and the Achilles tendinopathy, followed closely by plantar fascitis.

Due to the high number of overhead shots played in padel, it is also important to monitor the shoulder when talking about injury prevention. Burkhart et al defined, in their series of articles The disabled throwing shoulder[9], the relation between overhead biomechanics and injuries presented on this athletes. Combining the authors' knowledge with the findings we see in clinical practice; we could classify injuries in two types:

- Structural injuries: rotator cuff tendinopathies, bursitis or SLAP injuries.
- Biomechanical or functional injuries: scapular diskinesis, GIRD (glenohumeral internal rotation deficit), and instability.

What we find in overhead injured shoulders usually is a combination of at least one structural injury with one or more of what we could call functional injuries; normally scapular diskinesis and GIRD. Therefore, an appropriate injury prevention exercise plan including specific exercises for good scapular biomechanics, together with a posterior capsule stretch like the Sleeper's Stretch to improve GIRD would be a good approach for future throwing shoulder injury prevention in padel players.

In regard to prevention of acute injuries in padel, it is more difficult to offer guidance as acute injuries are not predictable, but there are some key points the amateur player should incorporate to their routines in order to try to avoid acute injuries, specially muscle injuries. Muscle injuries happen on eccentric demands, and in padel the most typical muscle injury is the tennis leg, which is the tear of the medial gastrocnemius muscle and connective tissue, in relation to the soleus. The transition from single-leg landing from an overhead shot to try to volley the next shot, which is a typical backwards-forward transition repeated numerous times during play, is the moment of higher risk for this injury. After the single-leg landing, the player has to sprint to the net, and in that landing, the gastrocnemius and the Achilles tendon suffer a high eccentric demand, which can cause and acute muscle injury. Therefore, two easy ways of preventing this injury is to work both on ankle dorsiflexion and on eccentric tolerance of the triceps surae and the Achilles tendon. Insufficient ankle dorsi flexion will generate a higher demand on the triceps surae on the single-leg landing, and the accumulated fatigue of that repetitive gesture during a match can increase injury risk. Therefore, it is interesting to work on the eccentric load tolerance of the triceps surae and Achilles tendon, to increase it over time and have more resistant and elastic structures.

CONCLUSIONS

Padel is a very young sport and studies regarding injury risk, effective treatment and prevention are still very limited. From clinical experience with amateur and professional players, we can assume that lateral epicondyle tendinopathy and tennis leg are two of the most frequent injuries. The professional athlete is also facing challenging times, with an increase in the number of tournaments and international travels. For injury prevention, eccentric workload for tendons and muscles is the key point, together with a good election of the material used (racket, shoes and balls).

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