

# Pickleball: Injury Considerations in an Increasingly Popular Sport

by Nicholas Greiner, DO

## Are the benefits worth the risks? With a few precautions, yes for most people.

Pickleball is a recreational sport that is gaining in popularity and has become one of the fastest growing sports in America. The sport is easy to learn, promotes competitiveness and socialization, and is a great form of low impact exercise.

The game was developed in 1965 by a former Washington state congressman, Joel Pritchard. He and a friend were looking to play badminton, but unable to find a full set of rackets they improvised, playing with wooden ping-pong paddles and a perforated plastic ball. With this collection of equipment, they played on an asphalt surface using a badminton net adjusted to a height similar to that of tennis. The friends eventually developed a permanent set of rules. Their intention was to develop a sport the entire family could enjoy together. Within two years, the first permanent court was constructed next door to Joel Pritchard's home. Within a few more years, a corporation was developed to protect the sport. Since its inception, the game has continued to grow, and is now played in all 50 states.

There are differing reports on how the sport developed its interesting name. According to Joel Pritchard's wife, she started calling the game Pickleball because the combination of elements of multiple sports reminded her of the pickle boat in crew, where oarsmen were chosen from the leftovers from other boats. However, according to other accounts, the game was named after the Pritchards' dog, Pickles. In the early development of the game, there no official name

assigned to it. As the game progressed, an official name was needed, and "Pickleball" was it.

Pickleball is currently the fastest growing sport in the US.<sup>1</sup> The Sports & Fitness Industry Association (SFIA) estimated that in 2017 there were over 2.8 million Pickleball players in the U.S., which was an increase of 12.3% from the previous year.<sup>1</sup> Further details from the 2016 SFIA report included that over 1.5 million people were 'casual' participants (play one to seven times per year), and that 930,000 were 'core' participants (play eight or more times per year). Further breakdown of participation rates by age showed that 'core' participants tend to be older, with 75% of core participants being age 55 or older, and 42% of all players over 65 considered to be core participants. Along with fitness benefits of the sport, many older adults enjoy playing Pickleball because it promotes competitiveness and socialization.<sup>2,3</sup>

### Rules

Pickleball can be played indoors or out, on a court that is 20 ft. by 44 ft. This is comparatively much smaller than a tennis court (36 ft. by 78 ft). Like tennis, Pickleball can be played as doubles or singles, but the court dimensions do not change for the doubles game. The net is slightly lower for Pickleball at 34 inches at the center, compared to 36 inches for tennis. There is a seven foot no-volley zone that extends from each side of the net (Figure 1).

The premise of the game is similar to other racket sports. To score points, a player hits a hard plastic ball with holes (similar in size to a Wiffle ball) over the net with a wooden or composite racket. The racket is larger than a ping-pong paddle, but smaller than a tennis racket. Serving is performed underhand, with the server making contact with the ball below the waist. The receiving opponent returns the ball within bounds of the court, but outside the no volley zone. Once the ball bounces once on each side, a volley ensues. The serving team continues to serve until a fault occurs. A fault can occur if the ball touches any part of the no-volley zone on the serve, is hit out of bounds, does not clear the net, is volleyed from the no volley zone,



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or is volleyed before a bounce has occurred on each side. Only the serving team can score. If the serving team commits a fault, the serve passes to the other team. Games typically are played to 11, 15, or 21 points, with the winning side required to win by two points.

### Associated Injuries

A recent literature search did not reveal any published research describing specific injuries related to Pickleball.<sup>4</sup> However, there is published research on injuries associated with other racket sports. In tennis, a similar style racket sport played on a similar surface, the most common injuries are sprains/strains of the lower extremity, followed by sprains/strains of the upper extremity and injuries of the trunk and low back.<sup>5,6,7</sup> Given the underhand nature of the game play of Pickleball, one would expect a lower occurrence of shoulder injuries than in tennis where overhand serving is a major component of the sport. However, there is still a risk for a variety of other upper extremity injuries in Pickleball.

### Acute Injuries

Acute traumatic injuries in Pickleball can result from falls, secondary to a sudden turning or pivoting movement. Sprains of the ankle joint, particularly with inversion, are very common in tennis and the mechanism for this injury would be similar for Pickleball. Depending on the severity of the sprain, this injury could result in significantly impaired movement or inability to bear weight. If weight bearing is painful, initial treatment may initially include crutches (if needed), or immobilization with an ankle brace. Further treatment consisting of relative rest, icing, compression, and elevation (RICE) are generally useful in the treatment of sprains of the ankle and other joints. Depending on severity, ankle sprains can take several weeks to resolve, but patients can generally resume their previous level of play if proper steps are taken during the healing process. Return to sport participation for this and other injuries is often expedited by physical therapy.

Other injuries that can arise near the ankle can involve the Achilles tendon. These can include an Achilles strain, which can present as pain anywhere along the tendon, from the musculotendinous component at the lower calf muscle, to the body of the tendon, to its insertion at the calcaneus. Treatment of Achilles tendon strains typically consists of relative rest, focused stretching of the tendon, and eccentric



Figure 1. USAPA Regulation Pickleball Court

loading exercises. This injury can take weeks to fully heal. A much less common but more severe injury, Achilles tendon rupture, can occur with forceful movement of the ankle, usually an abrupt plantarflexion. This injury usually results in severe pain in the posterior ankle and an inability to bear weight or actively plantarflex the foot. This type of injury will often require surgical repair, and should be evaluated promptly for optimal long term outcome.

Knee injuries are also common in racket sports such as tennis,<sup>5,7,8</sup> and likely to affect Pickleball players as well. These can range from acute sprains of the knee, to meniscal and ligamentous injuries. A sprain of the knee can affect the collateral ligaments, caused by rapid starting/stopping and sudden turning or pivoting movements. A sprain will often result in pain with weight bearing, usually worse with lateral movement. Acute injuries of the meniscus can include tears, which can present with the same mechanism as a ligament sprain, but often will result in the inability to bear weight, decreased range of motion, and significant swelling. Treatment of these injuries can range from initial non-weight bearing, to bracing, to physical therapy, or even potential surgical repair. Any knee injury that results in pain with weight bearing, decreased range of motion, or significant swelling should prompt immediate evaluation by a physician.

Muscle groups in the lower extremity that can be

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acutely strained include the hamstring muscles, quadriceps, hip flexors and adductors, and calf. Many strains can involve partial tearing of the muscle body or tendon. These injuries can present as pain in the muscle with stretching or muscle contraction. Mild sprains usually respond to RICE treatment, and participants can usually return to their activity in a matter of a few weeks. More severe muscle strains or tears may have more severe pain, associated swelling or bruising of the muscle, and tend to take longer to recover. As stated above, many of these injuries will respond well to physical therapy, and this can often help to assist players to return to their previous level of competing, and can often address other potential biomechanical inefficiencies that can be future injury risks.

For the upper extremity, the wrist is a common site of tennis injury, and Pickleball players are at risk as well (Figure 2). Falls onto an outstretched hand are a common mechanism for wrist sprains, and can also result in a fracture. The elbow and shoulder can also be injured by falls. Minor bruising to the upper extremity may be initially treated with RICE, but an injury to the upper extremity that causes significant swelling, bruising, or limited range of motion should prompt a player to be evaluated.

### Chronic Injuries

Chronic injuries that can affect Pickleball players will typically result from overuse or repetitive pounding on the hard playing surface. In the foot, these can include plantar fasciitis and heel contusions. Plantar fasciitis typically results from irritation of the fascia that originates at the calcaneus and extends along the medial arch of the foot. This is typically treated with activity modification, stretching, intrinsic foot exercises, and potentially shoe orthotics or heel cups. Heel contusions, or bruises of the calcaneus, are treated with relative rest and localized padding or footwear modification. Blistering of the foot can also be an issue, particularly with prolonged use of improper footwear. To limit the potential for foot injuries, a player should make sure they have proper fitting shoes.

As previously mentioned, strains of the gastrocnemius, hamstring, quadriceps, or groin can be acute, but also can occur over time, presenting as gradually worsening muscle pain with prolonged use of the affected area. If a player is having persistent soreness in these muscle groups, focus should be placed on stretching the affected area and avoidance of offending activity until symptoms improve.

Lumbar muscle strains are a common injury,<sup>9</sup> often associated with forward bending and repetitive trunk rotation while striking the ball. Initial management of

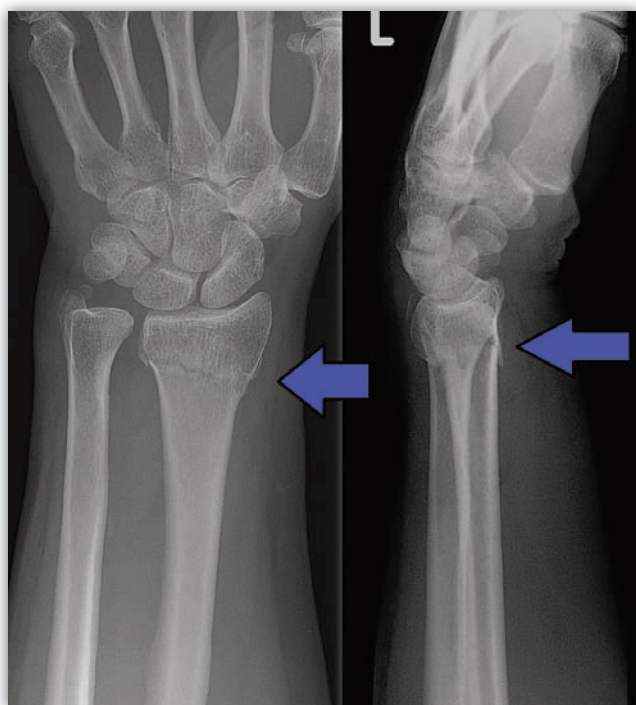


Figure 2. X-ray of a Colles' fracture of the left wrist accompanied by an ulnar styloid fracture. This injury is commonly associated with falls onto an outstretched hand.

Source: wikipedia

lumbar strains is similar to strains of other muscles with RICE treatment. Preventive conditioning strategies to limit low back muscle injuries include core stability lower extremity flexibility training.<sup>9</sup> This is another injury for which physical therapy can help an athlete return to their level of play. Low back injuries that do not respond to the above conservative measures may warrant MRI or other imaging to assess for more significant injury such as disk or vertebral injury.

In the upper extremity, flexor and extensor tendon strain at the wrist can develop, as well as epicondylitis injuries at the elbow. These are overuse injuries associated with repeated ball striking, and can be limited by proper ball striking form. Once present, these injuries often respond to rest, focused stretching and gentle resistance exercise targeting the injured area. Bracing of the wrist or elbow can also potentially provide increased comfort and stability while healing.

Chronic shoulder injuries would be expected to occur less frequently in Pickleball given the predominantly underhand play, but strains of the rotator cuff could occur with overhand volleys or repetitive stretching to reach for the ball. As with other muscle strains, these injuries will often improve with relative rest. Stabilization and range of motion exercises for the shoulder can be used to facilitate



Figure 3. Pickleball tournaments are popular as vacation destinations.

recovery and a return to normal function. If a patient's progress plateaus with a shoulder or the other mentioned areas, treatment with a skilled physical therapist can help restore proper strength, balance and motion to allow a player to resume pain-free activity.

### Equipment

There is not a lot of individual equipment required for Pickleball, other than a racket. However, proper footwear can help prevent acute and chronic injury. Making sure that shoes fit properly and limit sliding of the foot can prevent excess friction on the foot. Given the need for lateral stability due to rapid side to side movements, cross-training or court shoes would be preferred to running shoes. For people with chronic ankle pain or instability issues, an ankle brace with laces and/or straps may help provide lateral stability. Likewise, for participants with chronic knee pain or stability issues, a lightweight compressive knee brace may provide increased comfort and stability.

### Injury Prevention

For more general injury prevention, regular cardiovascular exercise outside of Pickleball can help limit fatigue associated with play. The United States Office of Disease Prevention and Health Promotion recommends 150 minutes of moderate intensity aerobic physical activity per week.<sup>10</sup> If one is not playing Pickleball for 150 minutes every week, then cardiovascular exercise including running, jogging, or lower impact activities such as biking, elliptical machine, pool walking or swimming can help promote general fitness.

Pickleball is an easy to learn, low impact exercise that can be enjoyed by most people. However, if a person has significant cardiovascular or pulmonary conditions that

limit their ability to exert themselves, participating in Pickleball or other exercise activities should be discussed with their physician. Also, if a person has a functionally limiting musculoskeletal problem such as severe osteoarthritis, one should be cautious when beginning Pickleball, given the hard surface and recurrent impact with quick steps and rapid starting and stopping.

### Conclusion

Pickleball is a very popular and rapidly growing sport. Given its ease of play and low impact nature, it can be an enjoyable way for people of all ages to stay active and fit and help to promote a healthy lifestyle. As with all sports, there is a risk for a variety of injuries. However, taking a few steps in preparation coupled with proper knowledge of one's own health, Pickleball can be an enriching activity enjoyed by players of all ages (Figure 3).

For more information about Pickleball, visit the USAPA website at [usapa.org](http://usapa.org).

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