FEET

Are you protecting your most valuable asset, or are you slowly killing your feet?

BY PAUL DOWIE

As a fighter and an athlete, you understand the importance of protecting and preserving one of your primary assets — the structure and function of your feet.

But how well do you know your feet? You know when they hurt, as they contain more nerves than anywhere else in the body, but do you know how they work and how we damage them?

As a highly complex mechanical system upon which you rely on to be able to kick, move, skip, walk, run and get around, each foot consists of 26 bones (a quarter of all the bones in the body), 33 joints, 107 ligaments, 19 muscles and tendons, an intricate network of muscles, nerves and blood vessels, plus 250,000 sweat glands that produces approximately 500ml of perspiration daily. Your feet will not be the same shape; one will be larger than the other (greater than 50 per cent of the population has a larger left foot), and one will move differently than the other. Your feet are capable of enormous array of movements whilst absorbing cumulative weight-bearing forces of hundreds of tonnes each day.

You'll be taking in excess of 10,000-15,000 steps per day, with each step generating between 1.5 and three times your bodyweight. That equates to walking over 128,000kms in your lifetime — more than three times around the earth.

The intricate structure of the human foot was described by Leonardo DeVinci as, "a masterpiece of engineering and a work of art."

However, as the only pair of feet you will ever own, they need to last you a lifetime. A better understanding of what your feet need to tolerate, and how martial arts damage them, will help you keep your feet kicking.

Genetics play a major role in the predisposition, or proneness your feet have to injury. The shape of your joints, the attachment of the ligaments and tendons, the structure of your legs, knees, hips pelvis and spine all influence the way your feet function. Whilst you cannot change your structure, you can, with a little knowledge and foresight, care for your feet and ankles to minimize time loss to injury and maximize their performance.

What Causes Common Types Of Fighting Injuries?

Foot and ankle injuries are a normal part of martial arts. Blunt force trauma and sprains are the two basic categories of martial arts injuries that occur in the foot and ankle. Blunt force trauma injury is a direct result of the foot hitting another solid object. The object could be the heavy bag, a target mitt or your opponent. Misjudging the opponent's intended next move or improper technique can result in blunt force trauma. As a result, you may suffer a contusion, a laceration or a fracture to your foot or ankle.

Like any type of injury, foot and ankle problems in fighting can be classified in different ways. Kickboxing emphasizes rapid foot strikes and ballistic full contact, which can result in contusions (bruises) and lacerations of the skin, ligament sprains, tendon and muscle strains and bone or joint fractures.

Research into the rate and type of injuries occurring to registered

professional kickboxers in Australia, using data describing all fight outcomes and injuries sustained during competition, shows a total of 382 injuries recorded from 3481 fight participations, at an injury rate of 109.7 injuries per 1000 fight participations. The most common body region injured was the head/neck/face (52.5 per cent), followed by the lower extremities (39.8 per cent). Specifically, injuries to the lower leg (23.3 per cent), the face (19.4 per cent), and intracranial injury (17.2 per cent) were the most common. Over 64 per cent of the injuries were superficial bruising or lacerations. Foot and ankle account for at least 10 per cent of the total injuries sustained in the martial arts — and is probably higher due to the lack of reporting of many digital injuries such as contusions, toenail trauma and uncomplicated fractures.

What Are The Risks?

Some of the factors that can increase your risk of injury include:

- Poor technique – holding or moving the body incorrectly can put unnecessary strain on joints, muscles and ligaments. The surface you train and fight on can have an influence here.
- Using excessive force – failing to pull a punch or kick can inflict injury on an opponent.
- Inexperience – beginners are more likely to get hurt because their bodies are not used to the demands of the sport. Injuries are seen throughout the spectrum of expertise. Amateur participants are the most likely to sustain sprains and soft-tissue injuries. Among professional fighters, the main risks are fractures and life-threatening injuries to other parts of the body, namely the head.
- Overtraining – training too much and too often can lead to a wide range of overuse injuries.

Contusions / Bruises

A bruise, or contusion, is caused when blood vessels are damaged or broken as the result of a blow to the skin. The raised area of a bump or bruise results from blood leaking from these injured blood vessels into the tissues as well as from the body's response to the injury. A purplish, flat bruise that occurs when blood leaks out into the top layers of skin is referred to as an ecchymosis.

Contusions, which are usually less severe than fractures, are a common result of sparring. Advancing opponents often cut short well-intentioned kicks, which land in an unintended area such as the elbow or shin.

Contusion injuries may have symptoms for up to six weeks although one can usually recommend an early return to martial arts activities. No objective criteria are available for deciding which fighters should be removed from the field of play and which may return to competition. In general, individuals with injuries involving the larger muscle groups, such as the quadriceps or calf, have to stop for immediate attention and evaluation. Each case must be assessed on an individual basis. The first step is to ice the affected area and reassess function and swelling within a short period. You must always consider the potential for re-injury when deciding when to return to competition. Re-injury of an injured muscle is a major factor in developing further damage and also significantly increases the healing time.

Ankle Sprains

Most ankle sprains involve the foot suddenly rolling under the ankle as you bring your weight to bear on the foot. This excessive movement past the ankles normal range of motion can tear the ligaments on the outside of the ankle — the 'straps' that hold the joint together.

Acute swelling on one or both sides of the ankle bones accompanied by pain or difficulty putting weight on the foot, often requires immediate rest and injury assessment. Icing, compression and elevation will limit the pain, reduce the amount of tissue damage

and result in a faster recovery. The high forces that can sprain ankles can also break bones and chip cartilage within the ankle joint, foot, and the lower leg, so careful medical examination is important with potential X-Rays providing clarification as to the condition of the local bony structures. Even a diagnosis of a simple ankle sprain requires full recovery — one of the most common causes of recurrent ankle sprain is the previous sprain that was never properly treated or rehabilitated. Ligament repair usually does not require surgery and will heal sufficiently to resume full impact training within two to three weeks.

Disability from an ankle sprain can last four months or more. It is essential that all ankle injuries be totally healed before returning to competitive sparring. If you've recently sprained an ankle, the best prevention for future re-sprains is retraining your ankle muscles and proprioception — the sense of how your foot and ankle are positioned relative to the ground. Sound medical advice and thorough rehab is often the fastest way of returning to full, uninterrupted training and sparring after a major sprain. The ankle should be pain-free, with full ankle joint range of motion available and ability to walk and run without a limp. There should be equal and symmetrical ankle proprioception for both limbs.

Fractures

A broken bone or bone fracture occurs when a force exerted against a bone is stronger than it can structurally withstand. Bones are a form of connective tissue, reinforced with calcium and bone cells. Bones have a softer centre, called marrow, where blood cells are made.

There are different types of bone fractures that vary in severity. Factors that influence severity include the degree and direction of the force and the particular bone involved. Fractures require early diagnosis and immobilization to ensure healing. The most common foot fractures occur as spiral oblique injuries of either the digits or the metatarsals. They are usually the result of the torsion generated by the impact of the moving foot hitting a fixed object such as an opponent.

If you suspect a fracture, do not continue the training or competition. Further trauma from competition can convert a simple non-displaced fracture into a displaced, comminuted fracture or even a compound fracture. Like the ankle, broken toe/foot bones can look like bad sprains, so any persistent swelling and pain, particularly around where the toes meet the foot, should be medically evaluated ASAP. The worse the fracture, the longer the healing time (with possible surgery required to reduce and stabilize the break). Immobilize the injured area. Apply ice and elevate the limb after achieving initial immobilization.

Do not resume any activity that may subject them to blunt force trauma until the fracture is completely healed, which is usually eight weeks. You will be required to engage in appropriate exercises to maintain strength and flexibility during the bone healing process. Buddy taping toes in groups of two can make fractures less common, at the sacrifice of a little traction; learning techniques properly to avoid unintended impacts during training or sparring may actually do the most good.

Tendon sheath trauma

Tendon sheath trauma on the top of the foot can be incredibly painful — the aforementioned kicking of an elbow is a common mechanism. The tendon straps running atop the foot bones are easily pinched, and can rapidly swell and make even walking difficult. 'Conditioning' this area (skin over tendons and tendon sheaths) is considered possible in some styles, but is more difficult to accomplish than conditioning the shin surfaces (skin over bone). Protective gear and carefully practicing kick placement may be a more valuable in the long run: preventing the mechanism of injury can mean the avoidance of weeks of recuperation time. **IK**

DR Paul Dowie

Paul Dowie is one of Australia's foremost Sports Podiatrists. He has vast clinical experience in both treating and teaching sports medicine.

Over the past 14 years he has been the chosen Podiatrist for many of the World's best professional athletes, including seven of the world's number one tennis players, the top PGA golfers, Olympic gold medallists and Australian cricket team members. Just some of his patients have included Pat Rafter, Leyton Hewitt, Martina Navratilova, Nick Faldo, and Lauren Burns.

Paul gained a scholarship to the Australian Institute of Sport as a member of the Australian Taekwondo Team and Australian Olympic Squad. He was a multiple Australian champion and was awarded the coveted 'Fighting Spirit Award' at the 1996 World Cup. He was also Captain of the Australian Taekwondo Team in 1997. An injury ended his career prior to competing at the Sydney Olympics.

Paul is available to assist all athletes with their foot and leg injuries. He works closely with Dr Peter Lewis at Recreation Medical Centre in Armadale, Melbourne.

Paul also owns and operates the Foot + Leg Pain Clinics throughout Melbourne. You can find more information at www.footlegpainclinics.com.au