

The Treatment of Acute Ankle Sprain with Acupuncture

Abstract

This article presents a clinical approach to the acupuncture treatment of an extremely common injury: acute ankle sprain. Case histories from the author's sports medicine clinical practice are included to illustrate the theory and show the immediate results that can be obtained through proper treatment - which are especially important in cases where sportspeople require a rapid return to competition.

Introduction

Ankle sprain accounts for between three and five per cent of all Emergency Department visits in the UK, equating to approximately 5,600 incidences per day (Cooke, 2003). It is the most common soccer injury, accounting for up to 67 per cent of all soccer-related injuries (Woods, 2003). Ankle sprains are commonly regarded as minor injuries that resolve quickly with little or no treatment; however, the incidence of residual symptoms following ankle injury is thought to be somewhere between 40 to 50 per cent (Doherty et al., 2014). Residual symptoms can include mechanical insufficiencies such as restricted movement of the joint surface, laxity, synovial changes and degeneration, and functional insufficiencies such as impaired proprioception, postural control, neuromuscular control and strength deficits. These problems have more recently been grouped together as Chronic Ankle Instability (CAI) (see Doherty et al., 2014). To be classified as having CAI, residual symptoms should be present for a minimum of one year after the initial sprain.

Although many acupuncturists treat sports injuries on a regular basis, in the experience of the author there are often limitations in their understanding of the treatment of common injuries such as ankle sprain, especially new practitioners, who are frequently reluctant to treat in the very acute phase of injury. In this article an effective treatment approach is presented that uses a combination of techniques to provide flexibility in the clinic where time, patient mobility and pain are often limiting factors during the acute phase.

Basic anatomy

The ankle is a hinge joint formed between the inferior surface of the tibia and the superior surface of the talus. The medial and lateral malleoli provide additional articulations, and the joint is strengthened

and stabilised by a number of ligaments that act like strapping to connect the bones. The lateral ligament consists of three parts: the anterior talofibular ligament (ATFL), the calcaneofibular ligament (CFL) and the posterior talofibular ligament (PTFL). The ATFL is a thin, flat band that extends from the tip of the fibula anteriorly to the lateral talar neck; the CFL is a chord-like structure that extends posteriorly and inferiorly from the tip of the fibula to the talus; and the PTFL extends posteriorly from the posterior aspect of the fibula to the talus. The medial or deltoid ligament extends from the medial malleolus anteriorly, inferiorly and posteriorly in a fan shape. This article focuses on lateral ankle sprain ('rolling laterally' or inversion) with ligament damage, which is the type of injury most commonly seen in the clinic (Brukner & Khan, 2007).

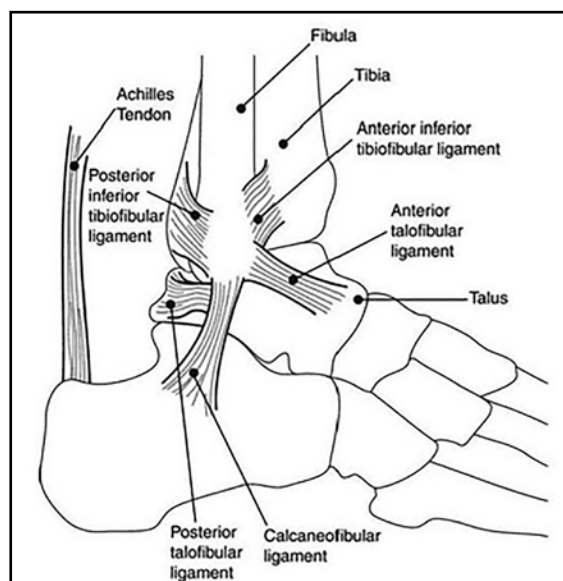


Figure 1: Ligaments of the lateral ankle (https://en.wikipedia.org/wiki/Lateral_collateral_ligament_of_ankle_joint)

By: John Kelly

Keywords:
Acupuncture,
Chinese
medicine, ankle
sprain, acute
injury, sports
medicine,
musculoskeletal.

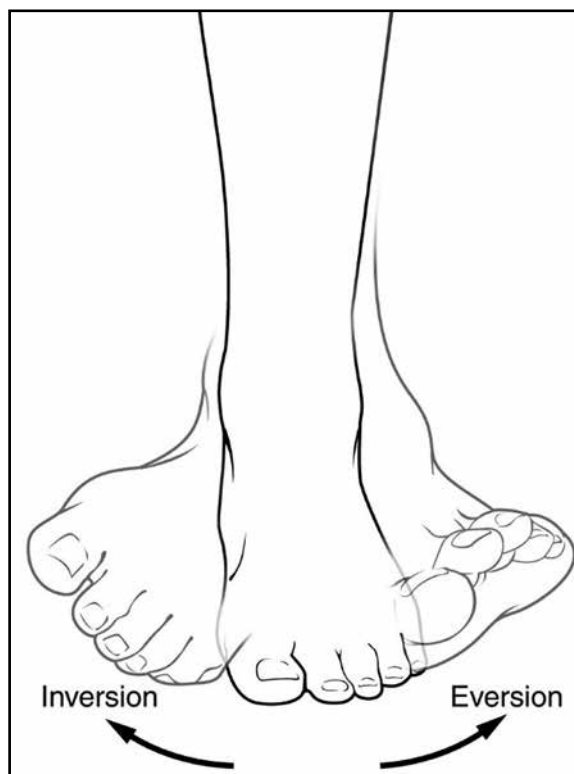


Figure 2: Ankle inversion and eversion

Ligament injuries

Inversion injuries, where the foot rolls laterally, tend to occur in activities where rapid changes in direction are required, especially on uneven surfaces or when players have to jump frequently (and therefore are at risk of landing badly). The result is damage to one or more of the lateral ligaments, usually the ATFL and/or the CFL. Because the medial ligament is stronger and more stable than the lateral ligament, and because eversion is a less common mechanism of ankle sprain, medial ligament injuries are less common than lateral ligament injuries. Occasionally, medial and lateral ligament injuries occur in the same sprain. Medial ligament sprains should be treated in a similar way to lateral ligament sprains, but generally require more time to heal (Brukner & Khan, 2007).

Taking a detailed history of the mechanism of the traumatic incident is critically important for the differential diagnosis of acute ankle pain. A history of sudden traumatic inversion or eversion with subsequent pain, bruising and swelling suggests ligament injury, but also leaves the possibility of a fracture. The location of the swelling and pain can indicate which ligaments are involved, with injury to the ATFL presenting with tenderness/pain on the anterior aspect of the lateral malleolus, and injury to the PTFL presenting with tenderness/pain on the posterior aspect of the lateral malleolus. Experienced doctors often rely on their own palpation skills to determine whether an X-ray is needed, guided by how much tenderness is over the ligaments versus the malleoli, whether the patient can

bear weight and the severity of the symptoms. In severe cases the whole lateral aspect can be painful and swollen, making precise differentiation difficult. The Ottawa Ankle Rules can be used to provide guidance on whether an X-ray is required (summarised in Table 1):

An X-ray is required if any of the following are present:

- Point tenderness at the posterior edge or tip of the lateral malleolus.
- Point tenderness at the posterior edge or tip of the medial malleolus.
- Inability to weight bear for four steps immediately after the injury.
- Point tenderness at the navicular bone.
- Point tenderness at the base of the fifth metatarsal bone.

Table 1: Summary of Ottawa Ankle Rules (Brukner & Khan, 2007)

Diagnosis

The most common damage in ankle sprain is to the ATFL, with symptoms such as pain, bruising, heat and swelling on the anterolateral aspect of the ankle in the region of Qiuxiu GB-40, Shenmai BL-62 and Jiexi ST-41. There may also be tenderness and muscle spasm radiating to the lateral malleolus and upwards towards Yanglingquan GB-34. From a Chinese medicine perspective the diagnosis is simply local stagnation of qi and blood (xue). More specifically, the stagnation is located in the Luo-connecting vessels, and at this acute phase invasion of wind, cold and damp is rarely a consideration, although it is not uncommon to see pre-existing underlying deficiencies such as Liver yin or blood deficiency that have caused malnourishment and brittleness of the tendons and connective tissue, and which may need to be considered at a later stage of treatment.

Whether treating acute or chronic injuries, I cannot emphasise enough the importance of palpation and visual inspection to identify areas of stagnation, including areas proximal and distal to the injury site. In some acute cases with severe discomfort or swelling, palpation over the site of the injury may be difficult. Careful palpation for ashi/trigger points in the injured tissues is required. It is not uncommon in chronic ankle pain to find myofascial trigger points in the extensor digitorum longus muscle that traverses the lateral aspect of the lower leg along the pathway of the Gall Bladder channel. If present, the ashi point is usually found two to four cun below Yanglingquan GB-34.

Having made a diagnosis, the treatment principles and treatment plan should logically follow. In the majority of acute musculoskeletal problems the main treatment principle will be to disperse stagnation of qi and blood,

stop pain and reduce swelling. A lot of the patients I see - especially sportsmen and women sent by their team doctors - often present at my clinic within the first 24 to 48 hours, and some even within hours of the initial trauma. Usually a fracture has been ruled out, and they are often using a crutch and/or limping badly. For most of these sportspeople the priority is to return to competition or training as soon as possible, with tight deadlines looming for those competing at a high level.

Treatment methods

Depending on the severity of the pain, mobility limitation and local swelling, I use the following treatment options, which may change from case to case.

Bleeding jing-well points

This technique treats the tendinomuscular channels (jingjin) directly, and is particularly effective in acute cases. Although the jing-well points can be needled, in acute cases my preferred technique is to bleed the point. Using surgical gloves and a sterile lancet, gently massage the toe of the channel, and swiftly prick the point to draw out some drops of blood. Firmly squeezing the toe and holding the foot a little below the level of the body (if the patient is lying supine) will help. Ask the patient to try moving the ankle immediately after bleeding the jing-well point/s will show relief in acute cases.

Crossing technique

There are various approaches to selecting points to balance left with right and upper with lower. The method I find most useful to treat acute injuries is to select channels that share the same polarity and name but lie on the contralateral side of the body to their corresponding or mirrored area. This matches, for example, hand Yangming with foot Yangming, or Hand Shaoyang with Foot Shaoyang. Mirroring means selecting an anatomical area that mirrors the injured area, such as the wrist mirroring the ankle, or the knee mirroring the elbow. The principle of selecting points from areas of the body sharing the same polarity is not new:

‘Select points from the lower part of the body for a disease in the upper part of the body, and select points from the upper part of the body for a disease in the lower part of the body ... Select points from the right side to treat the left side.’ *Ling Shu*, Chapter 7 (trans. Wu, 2002)

A brief look at the circulation of qi in the channel system helps to explain why points are selected in this way. The head is the area of maximum potential energy and the chest is the area of minimal potential energy. Qi flows from the chest to the head via the hands, and back to the chest via the feet; the tips of the fingers and toes are the

points where the yin-yang polarity changes (Maciocia, 2006). Thus the potential energy increases as qi flows towards the head via the arm channels, and decreases as it flows back to the chest via the leg channels. In the crossing method we select mirrored body areas and channels of the same yin-yang polarity but opposite potential energy in order to harness the clinical effects of this differential. Specific clinical applications of this method are outlined below.

Embedded needle

This technique seems to have developed from ‘Wrist and Ankle Therapy’ that was developed in the mid-1960s in China (see Zhang, 1991). This system originally used electrical stimulation only (through electrodes rather than needles) at six points on the wrists and ankles. It was later found that clinical results were better when traditional perpendicular needling was used at these six points, and later still it was found that the more shallow the needling was, the stronger the analgesic effects produced. Subcutaneous needling is therefore now used to produce good results while allowing the patient to move freely without discomfort.

Luo-connecting vessels

It is helpful to remember, when we are visually inspecting and palpating the channels, that it is primarily the Luo-connecting vessels we are inspecting, as the primary channels are not visible at the surface. The Luo-connecting vessels irrigate the area of the body that lies between the primary channels and the skin, which makes them essential in the treatment of joint and sinew injuries:

‘The twelve major channels lie hidden between the divisions of the flesh. They are deep and invisible ... Those channels which float may be seen frequently and are the Luo or linking channels.’ *Ling Shu*, Chapter 10 (trans. Wu, 2002).

Because they connect with the main channels and enter the internal organs, they represent a route for pathogenic factors to penetrate deeper into the body. I usually needle the Luo-connecting point on the side which is most tender on palpation.

Treatment protocol

The five-step treatment protocol presented below provides modifications according to the following three common clinical presentations:

- *Presentation A:* Pain and swelling mainly affects the lateral aspect of the ankle (Gall Bladder channel)
- *Presentation B:* Pain and swelling mainly affects the posterolateral aspect of the ankle and malleolus (Gall Bladder / Bladder channels)

- *Presentation C*: Pain and swelling mainly affects the anterolateral aspect of the ankle (Stomach / Gall Bladder channels)

Preliminary assessment

With the patient standing, I ask them to move a little and indicate as accurately as they can the location of the most severe pain and restriction on a scale from zero to ten. If they cannot stand I ask them to sit or lie down and flex, extend and rotate the ankle. This allows measurement of progress during treatment.

Step one

The first priority of treatment is to reduce pain and increase mobility. To initiate this, I use one of two approaches. If there is a lot of pain and swelling, and the ankle has little or no mobility, I start with bleeding the jing-well point of the appropriate channel on the side of the pain, because for the crossing method to be effective the patient is required to mobilise the joint. If there is some mobility with no pain when the ankle is at rest, I start directly with the crossing method (see below).

Bleeding the jing-well points (on the side of the pain) according to presentation:

- *Presentation A*: bleed Zuqiaoyin GB-44
- *Presentation B*: bleed Zuqiaoyin GB-44 and Zhiyin BL-67
- *Presentation C*: bleed Zuqiaoyin GB-44 and Lidui ST-45

Step two

The crossing method is applied as follows:

- *Presentation A*: Select a point or points from the channel of the same polarity but contralateral to the pain: in this case, the hand Shaoyang channel. Anatomically speaking, the area of Qiuxiu GB-40 is mirrored by the area of Yangchi SJ-4. Careful palpation of this area will usually reveal a tender spot. Needle this tender point and give moderate stimulation for 10 to 15 seconds. Then ask the patient to move their ankle: flex, extend, rotate - and gently bear weight if possible. Regularly re-stimulate the needle or needles whilst encouraging and/or assisting the patient to move and even walk gently for a few minutes. Continue this for no more than two to three minutes.
- *Presentation B*: Select points from the hand Shaoyang and hand Taiyang channels: on or around Yangchi SJ-4, Wangu SI-4, Yanggu SI-5 or Yanglao SI-6. Needle and ask the patient to move as in Presentation A above.
- *Presentation C*: Select points from the hand Shaoyang, and hand Yangming channels. The mirrored points will be on or close to Yangchi SJ-4 and Yangxi LI-5. Needle and ask the patient to move as in Presentation A above.

Usually there will have been a change after this step, and the patient's pain and mobility will have improved significantly. At this point move on to the next step.

Step three

Ask the patient to move their foot around as much as possible to check where the pain or restriction is. Often the area of initial discomfort will have reduced significantly, and a slightly different area, usually less painful and limiting, will be identified. Based on the new area of discomfort, review the mirrored sore point, re-needle and ask the patient to walk or move the ankle as before. These three steps are often enough to significantly reduce pain and restriction and restore movement to a reasonable level. Then move on to step four.

Step four

After the initial treatment above to restore mobility and reduce pain, ask the patient to lie down (while retaining the crossing method needle/s in the wrist on the opposite side to the painful ankle). Continue treatment by needling the following points (on the side of the pain unless specified):

- Yanglingquan GB-34: hui-meeting point of the sinews
- Guangming GB-37: luo-connecting point; needle on the side of the pain, if tender - if not needle on the opposite side

Presentation A

- Qiuxiu GB-40: Local point
- Zulinqi GB-41: Shu-stream point
- Xuanzhong GB-39: Especially if tender

Presentation B

- Qiuxiu GB-40, Shenmai BL-62, Kunlun BL-60: Local points
- Feiyang BL-58: Luo-connecting point; needle on the side of the pain if tender - if not needle on the opposite side
- Fuyang BL-59: Xi-cleft point of Yang Qiao Mai (Yang Motility Vessel)
- Zulinqi GB-41: Shu-stream point

Presentation C

- Qiuxiu GB-40: Local point
- Jiexi ST-41: Local point
- Fenglong ST-40: Luo-connecting point
- Xianggu ST-43: Shu-stream point

Step five

In general I find that in about 80 per cent of cases there is sufficient improvement after step four that there is no need for this final step. This technique can be used in the following situations:

- If the patient has a sporting competition deadline within one week of treatment
- If the reduction in pain and increase in mobility following steps one to four above has been insufficient

When applied to ankle injury this technique involves subcutaneous needling, distally towards the ankle, at the following points:

- *Presentation A:* Select a point on or near Xuanzhong GB-39; needle subcutaneously distally towards the ankle.
- *Presentation B:* Select two points, on or near Xuanzhong GB-39 and Fuyang BL-59; needle subcutaneously as above.
- *Presentation C:* Select points on or near Xuanzhong GB-39 and along the Stomach channel three cun superior to the lateral malleolus; needle subcutaneously as above.

Wearing surgical gloves, carefully sterilise the area of the chosen point and needle subcutaneously towards the injured ankle. As the needles are retained for 24 hours in place it is important to site the needle correctly to avoid any discomfort. Slowly move the needle into position while constantly asking the patient to report if there is any discomfort. If discomfort is reported, withdraw the needle a little and redirect it slightly until no discomfort is felt. The needle or needles are then taped in place with surgical tape, and the patient is asked to move the ankle and/or walk around to ensure that there is no discomfort with movement. Once the needle or needles have been inserted comfortably, I ask the patient to lie down while I securely tape the area over and around the needles, and ask the patient to take care over the next 24 hours, particularly to avoid snagging the tape with clothing. Generally the needle size is 30 gauge with a length of 40 millimetres. I ask the patient to keep the area warm and mobile and return to have the needles removed the next day. This treatment can often bring dramatic reduction in pain and swelling over a short time.

Points to remember when using the embedded needle technique are as follows:

- No stimulation of the needle or sensation at the site of the needle is desired.
- Do not use if there are many visible blood vessels on the site or pathway of the needle.
- Discontinue if there is pronounced pain or discomfort.
- Do not use if there is scarring, skin disorders, or other medical problems in the chosen area.

Case histories

Case 1: Male, age 26 - left ankle sprain, one day since trauma

History: This young man played sport at a high level and had a provincial final nine days later. The previous day while at work he had been walking backwards over rough ground while carrying a heavy load when he stepped into a hole, rolling his left ankle laterally.

Presenting symptoms: Pain and swelling of the posterolateral aspect of the left ankle over the Gall Bladder and Bladder channels, with impaired mobility.

Examination: The main area of pain and swelling was over the lateral malleolus, Qiuxiu GB-40, with further tenderness anterior to Kunlun BL-60 and extending up over Fuyang BL-59 and Xuanzhong GB-39. The patient walked with a limp, and was unable to roll forward on the foot or extend up on his toes. On a scale of one to ten he rated the pain at a six.

Diagnosis: Local stagnation of qi and blood in the Luo-connecting vessels.

Treatment principles: Disperse stagnation of qi and blood, reduce swelling and stop pain.

Treatment

1. Bleed jing-well points: Zuqiaoyin GB-44 and Zhiyin BL-67 (left side). This reduced his pain level down to a three to four out of ten.

2. Crossing method: Yangchi SJ-4 needled towards the Small Intestine channel, and Yanggu SI-5, both on the right side. It is useful when two areas of tenderness are close to each other to direct the needle from the main mirrored point (in this case Yangchi SJ-4) towards the other mirrored tender location (in this case Yanggu SI-5, the mirror of the painful area anterior to Kunlun BL-60). Moderate needle stimulation was given periodically over a few minutes while the patient walked and mobilised the ankle. This treatment reduced the discomfort down to one out of ten. The patient now reported what he described as a sharp 'catch' in the area of Shenmai BL-62.

3. I then re-palpated and added another needle just distal to Yanglao SI-6, needled towards Yanggu SI-5 (on the right side). I stimulated the needle and asked him to move again. This was enough to resolve the 'catch' he had felt.

4. The above needles were retained and I also needled Guangming GB-37 on the right and Qiuxiu GB-40, Fuyang BL-59 and Yanglingquan GB-34 on the left side. The needles were retained for ten minutes.

Outcome: The patient played a full match of Gaelic football three days after treatment with no difficulty, and competed in the provincial final nine days later without pain or limitation.

Case 2: Male age 26 - right ankle sprain, two days since trauma

History: This young man was referred from the team general practitioner of his Gaelic football team. Two days previously he had sprained his right ankle during training. An X-ray immediately after the injury had ruled out a fracture. The man was a key player on the county team and desperately wanted to play an important end of season match in just over 24 hours. I agreed to try to help (somewhat reluctantly given the deadline).

Presenting symptoms: Severe swelling all around the right ankle. Walking with a severe limp and pain.

Examination: Very swollen ankle with tenderness on the lateral, anterior and medial aspects; marked tenderness and bruising over Qiuxiu GB-40, Fuyang BL-59, Jiexi ST-41 and Zhaohai KID-6. He rated the pain level at nine out of ten.

Diagnosis: Stagnation of qi and blood in the Luo-connecting vessels.

Treatment principles: Disperse stagnation of qi and blood, reduce swelling and stop pain.

Treatment

1. Bleed jing-well points: Zuqiaoyin GB-44, Zhiyin BL-67 and Lidui ST-45. There was not a great change after bleeding the jing-well points.

2. Crossing method: Yangchi SJ-4, a tender point between Yanggu SI-5, Yanglao SI-6, and Shenmen HE-7 (all needled

towards the Small Intestine channel), and Yangxi LI-5 (needled towards the Lung channel) were all needled on the left side. With the patient sitting I stimulated the needles and assisted him to gradually move the ankle. His pain gradually lessened to a five out of ten, and his mobility improved. As there was significant improvement in his overall condition, particularly his mobility, I decided it was not necessary to re-check for another tender point and re-needle.

3. The above needles were retained and I added the following for ten minutes: Yanglingquan GB-34, Qiuxiu GB-40, Zulinqi GB-41, Fuyang BL-59, Jiexi ST-41 and Shangqiu SP-5, all on the right side, and Fenglong ST-40 and Yanglingquan GB-34 on the left.

4. Embedded needle: Needles were embedded along the Bladder, Gall Bladder, Stomach, Liver and Spleen channels (right side). I called his team doctor and asked him to remove the needles just before the match, and to report back on the outcome.

Outcome: A phone call from the team doctor following the match the next day reported that the player had competed hard for the full match with no discomfort, and that all the swelling had disappeared. This player has continued to play with no further problems with his ankle. Note that although this case is unusual in terms of the speed of recovery, it demonstrates the potential therapeutic outcomes of traditional Chinese medicine, even in severe acute painful conditions.

John Kelly began studying acupuncture back in the late 1980s at the Acupuncture Foundation of Ireland, studying mainly with Giovanni Maciocia and subsequently studied Chinese herbal medicine with Michael McIntyre. He has been in full time practice in Wicklow (Ireland) since 1992. He can be contacted at johnjkelly2311@gmail.com.

References

- Bruckner, P. & Khan, K. (2007). *Clinical Sports Medicine*. 3rd ed. McGraw Hill: Sydney
- Cooke, M.W., Lamb, S.E., Marsh J. et al. (2003). A survey of current consultant practice of treatment of severe ankle sprains in emergency departments in the United Kingdom, *Emerg Med J*, 20(6):505-7
- Doherty, C., Delahunt, E., Caulfield, B. et al. (2014). The Incidence and Prevalence of Ankle Sprain Injury; A Systematic Review and Meta-Analysis of Prospective Epidemiological Studies, *Sports Med*, 44(1): 123-40.
- Maciocia, G. (2006). *The Channels of Acupuncture; Clinical use of the Secondary Channels and Eight Extraordinary Vessels*. Churchill Livingstone: Edinburgh
- Woods, C., Hawkins, R., Hulse, M. (2003). The Football Association Medical Research Programme: an audit of injuries in professional football: an analysis of ankle sprains, *Br J Sports Med*, 37(3): 233-238
- Wu, Jing-Nuan (2002). *Ling Shu, or The Spiritual Pivot*. University of Hawaii Press: Hawaii
- Zhang, Xin-Shu (1991). Wrist and Ankle Acupuncture Therapy, *Journal of Chinese Medicine*, 37, 5-14.