



## ANKLE SPRAIN

\*<sup>1</sup>Dr. Verghese A. F., <sup>2</sup>Dr. Udaya D. K. and <sup>3</sup>Dr. Elizabeth P. John

<sup>1</sup>PG Scholar, Department of PG Studies in Shalyatantra, Karnataka Ayurveda Medical College, Mangaluru.  
<sup>2</sup>MD(AYU) (GAU) Professor, PG Studies, Department of PG studies in Shalyatantra, Karnataka Ayurveda Medical College, Mangaluru.

<sup>3</sup>MD(Ayu). PhD, Professor and HOD, Department of PG Studies in Shalyatantra, Karnataka Ayurveda Medical College, Mangaluru.

Received date: 06 September 2022

Revised date: 27 September 2022

Accepted date: 17 October 2022

\*Corresponding Author: Dr. Verghese A. F.

PG Scholar, Department of PG Studies in Shalyatantra, Karnataka Ayurveda Medical College, Mangaluru.

### ABSTRACT

In humans, the foot and ankle serve as the primary interface between the ground and the body during ambulation. The competitive and hectic lifestyle is increasing the incidence of trauma. Ankle sprain is one among the common injury most of the people get during their life time. Sprained ankle is very common in sports related injuries. Lateral ankle sprain is more common than medial ankle sprain and it usually results following an inversion injury of foot.

**KEYWORDS:** ankle joint, sprain.

### INTRODUCTION

Orthopedics is the art and science of the diagnosis and treatment of all diseases and disorders of locomotor system. The most common ankle injuries are ankle sprain and ankle fractures. In 1768 Pott described ankle injuries for the first time. In 1950 Lauge –Hansen proposed a classification of ankle injuries, which is almost universally accepted.

There are six group of ankle injuries

1. Abduction injuries
2. Adduction injuries
3. External rotation injuries with diastasis of the inferior tibio-fibular joint-pronation-external rotation injuries.
4. External rotation injuries without diastasis of the inferior tibio-fibular joint-supination-external rotation injuries.
5. Vertical compression injuries
6. Uncommon unclassified injury pattern.

In a recent systemic review, the ankle was found to be the most common site of injury.

In addition, 22% of sports injuries presenting to emergency rooms were ankle injuries, among which sprains was the most common injury followed by fracture in the ratio 8:1.

### DERIVATION

The word sprain is derived from the French word “espraindre” which means “towring”, i.e. is an injury which occurs to ligaments caused by a sudden over stretching.

### DEFINITION

An injury to a ligament is a sprain. An ankle sprain is a common injury and usually results when the ankle is twisted or turned is twisted or turned in resulting in stretch, tear or complete rupture.

### CAUSES OF ANKLE SPRAIN

- Walking or exercising on an uneven surface.
- Falling down.
- Participating in sports that require cutting actions or rolling and twisting of the foot-such as trail running, basketball, tennis, football and soccer.
- During sports activities, someone else may step on foot while running, causing the foot to twist or roll to the side.

### CLASSIFICATION OF ANKLE SPRAIN

#### 1. Classification as per the severity of ligament tear

- a. Acute Ankle Sprain
- b. Chronic Ankle Sprain

## 2. Classification as per mechanism of injury

- a.Inversion/lateral ankle sprain
- b.Eversion/medial ankle sprain

## 3. Classification as per grades of ligament tear

**Grade 1:** In this the ligament remains intact after sprain, although there is a possibility for microscopic ligament tear. In this the patient resumes activity immediately after twisting the ankle and had a gradual onset of pain and swelling. There may be mild discomfort, local tenderness, mild ecchymosis; but no loss of function.

**Grade 2 :** It includes partial tearing and stretching of ligament in the absence of complete joint dislocation. In this the person is forced to terminate activity immediately after twisting the ankle, but is able to walk and there is rapid onset of swelling. There is more severe pain, muscle weakness and limited range of motion.

**Grade 3:** In this the complete tear of ligament occurs and it may be associated with joint dislocation and damage to the articular surface. It includes a twisting injury followed by immediate instability, pain, swelling and inability to bear weight on the affected foot.

## Classification as per level of ligaments involved

**Low ankle sprains:** An ankle sprain that can occur to either lateral or the medial ligaments of the ankle is called as the low ankle sprains.

**High ankle sprains (syndesmosis sprain):** High ankle sprain include the injury to anterior inferior tibio-fibular, posterior inferior tibio-fibular, inferior transverse as well as interosseous ligaments and the interosseous membrane. The most common mechanism of injury is external rotation with the foot in a dorsi-flexed pronated position (eg. in collision sports and those with a high, rigid boot such as skipping and hockey). Also a severe inversion sprain or eversion caused by a blow to the lateral aspect of the leg or knee with the foot fixed to the ground.

## DIAGNOSIS

1.History A careful history is crucial as it can elicit the severity of the injury and the nature of the deforming force.

2. Physical examination.

The optimal time to examine an ankle joint is immediately after the injury. At this point, there has been very little reaction to the soft tissue damage, and all the ligaments can be palpated. The physical examination usually reveals swelling, ecchymosis and tenderness around the lateral malleolus. The examiner should always begin at the proximal fibula and look for a Maisonneuve fracture, which may not be seen on X-ray of the ankle. The mid shaft of the fibula should be squeezed (WestPoint sign )for syndesmosis injury. The anterior syndesmosis should be palpated for evidence of high ankle sprain. The sinus tarsi and anterior lateral malleolus should be checked for AFTL damage. Also

check the anterior process of calcaneus for an avulsion fracture.

The exact location of tenderness is important as it indicates the structure which has injured. Tenderness directly on the lateral malleolus or epiphysis indicates a fracture instead of sprain. The tenderness On the tip of malleolus is present when the CFL is injured or when an avulsion fracture is present. Tenderness posterior to lateral malleolus may indicate a Shepherded fracture of posterior process or peroneal subluxation.. Tenderness is the basis of the metatarsal indicates a tubercle fracture.

## Tests for ankle sprain

- I. 1.Anterior drawer test
- II. 2.Talar tilt test
- III. 3.Frontal plane or inversion stress test
- IV. 4.Diastasis test
- 3.Ankle Goniometry
- 4.Investigations
- I. Radiographs
- II. Stress X-rays
- III. Ultrasound
- IV. CT and MRI
- V. Arthrography
- VI. Arthroscopy

## Differential diagnosis

- I. Fractures of the ankle and foot
- II. Osteo-chondral fractures
- III. Other ligament injuries
- IV. Tendon injuries
- V. Nerve injury

## Treatment

Prevention of injury can be the best treatment. Various investigators have examined the use of footwear and bracing to prevent ankle sprains. However, it remains controversial as to what is the best method for prevention. The principle of treatment is based on the grades of ligament tear.

## Grade 1 & Grade 2 ankle sprain

The treatment of grade 1 and 2 ankle sprains is straightforward, and conservative management remains the norm-short period of rest, ice, compression and elevation (RICE) followed by protective taping or bracing and functional rehabilitation. The average disability is approximately 8 days and 15 days for grade I ankle sprains and grade 2 ankle sprains, respectively.

Rest-Do not place weight on foot, if it is very tender. Avoid walking long distance.

Ice therapy: Ice helps to decrease pain and swelling. Cover the ankle with a wet towel and place a plastic bag full of ice over it. One or two pound package of frozen corn or peas makes an excellent ice pack.

**Compression-** A compressive dressing that applied around the ankle helps to relieve pain and improve function.

**Elevation-elevate** the ankle above the level of heart to reduce the fluid in the after sprain during the first 48hours.

### Grade 3 ankle sprain

For grade 3 ankle sprains, the treatment is less standardised. Good results have been reported for these injuries with acute repair, cast immobilization and functional rehabilitation. The choice of conservative or surgical treatment depends upon the factors like age,occupation and athletic activity.

### Conservative treatment

Elderly, non athletes managed by lightly padded below-knee plaster cast applied with the foot at right angles to the leg ,the heel being in neutral position or slightly everted .It may be necessary to renew the cast after two weeks if loosening occurs and immobilization for not less than six weeks. It should be continued minimum for three weeks in non-weight baring and six weeks in weight bearing joints.

### Surgical management

#### Indications

- I. Injuries associated with irreducible joint subluxation
- II. Ligament ruptures with suspected soft tissue interposition
- III. Complete rupture of lateral ligament in young athletes
- IV. Persistent symptomatic mechanical instability and failed functional rehabilitation

### Contraindications

- I. Pain without instability
- II. Peripheral vascular disease
- III. Peripheral neuropathy
- IV. Inability to comply with a postoperative regimen.

### CONCLUSION

The human foot is adapted to allow orthograde bipedal stance and locomotion. Ankle joint ,the woodwork joint is a synovial simple hinge diarthrodial joint injury is the most common. Ankle sprain and ankle fractures are the most common ankle joint injuries .After a sprain, persistent symptoms remain in up to 30% individuals. Sequelae after ankle injuries highlight the importance of effective treatment for these conditions.

### REFERENCES

1. Elaine Marieb.R.N.Human Anatomy & Physiology, 4th ed. California: Benjamin/Cummings Science Publishing, 1998.
2. Kent M. Van De Graaff. Human Anatomy. 5th ed. New York: WCB McGraw Hill, 1997; 57. Shahla Khan, Gulam S. Hashmi.Histology and functions of connective tissue: A review article. University J

Dent Scie, 2015; 1(1): 1-2.<https://www.researchgate.net/publication/315675450> (accessed 20 August 2018)

3. Colin Woon, Derek Moore.Ligaments. [Internet] 2018 [cited 2018 august]. Available <https://www.orthobullets.com/basic-science/9016/gaments>
4. C. B Frank. Ligament structure, physiology and function. J Musculoskel Neuron Interact, 2004; 4(2): 199-201. <https://www.ismni.org/jmni/pdf/16/21FRANK.pdf?q=ligament> (accessed 17 July 2018)
5. Gergad I Tortora, Bryan Derrickson. Principles of anatomy and physiology. 11<sup>th</sup> ed. USA: John Wiley and Sons, Inc; 2006. 161. Benjamin M, Toumi H, Ralphs JR, Bydder G, Best TM, Milz S. Where tendons and ligaments meet bone: attachment sites ('enthesis') in relation to exercise and/or mechanical load, 2006 Apr; 208(4): 471-90. DOI:10.1111/j.1469.
6. Edward V. Craig. Clinical Orthopaedics. London: Lippincott Williams & Wilkins, 1999.Benjamin M, Toumi H, Ralphs JR, Bydder G. Best TM, Milz S. Where tendons and ligaments meet bone: attachment sites ('enthesis') in relation to exercise.
7. Benjamin M. Toumi H, Ralphs JR. Bydder G, Best TM, Milz S. Where tendons and ligaments meet bone: attachment sites (enthesis) in relation to exercise and/or mechanical load, 2006 Apr; 208(4): 471-90. DOI:10.11116.1469 7580.2006.00540.x.
8. Colin Woon, Derek Moore Ligaments [Internet] 2018 [cited 2018 august]. Available <https://www.orthobullets.com/basic-science/9016/ligaments>
9. Susan Standring, editor. Grays Anatomy, 41<sup>st</sup> ed. London: Elsevier; 2016 168. Gerqad) Tortora, Bryan Derrickson. Principles of anatomy and physiology. 11<sup>th</sup>ed. USA: John Wiley and Sons, Inc, 2006; 169. Kent M. Van De Graaff. Human Anatomy. 5 ed. New York: WCB McGraw Hill, 1997.
10. Elaine Marieb.R.N.Human Anatomy & Physiology. 4<sup>th</sup> ed. California: Benjamin/Cummings Science Publishing, 1998.
11. S.Poddar, Ajay Bhagat Handbook of Osteology. 13 ed. Patna:Scientific Book Company, 2010.
12. Steven I. Subotnick. Sports medicine of the lower extremity, ed. 2. Churchill Livingstone, 1999.
13. Aneesh.T, Swati S.Bedekar, B.G Kulkarni. Varun Vinayak, Visakh S.Ravi Ayurvedic Understanding of Biomechanical Dysfunction of Ankle Joint with special reference to Gulpha Marma Abhighatha. International Journal of Ayurveda and Pharma Research, 2016; 4(7): 74-77.