ISSN 2456-3110
Vol 9 · Issue 7
July 2024

JAiMS
INTERNATIONAL

Journal of Ayurveda and Integrated Medical Sciences

www.jaims.in

JAIMS

An International Journal for Researches in Ayurveda and Allied Sciences

Maharshi Charaka
Ayurveda

Indexed

Journal of
Ayurveda and Integrated Medical Sciences
ISSN 2456-3110
REVIEW ARTICLE July 2024

Clinical review to develop Protocol for Ankle Sprain in *Ayurveda*

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ABSTRACT

Sports-related acute musculoskeletal sprains and injuries typically occur in the ankle. Acute ankle trauma accounts for ten to thirty percent of sports-related injuries in young athletes. Ankle sprain is characterized by pain, swelling with or without deformity of ankle joint. According to modern science treatment protocol available for ankle sprain is PRICE - Protocol i.e., Protection, Rest, Ice Compression and Elevation, ankle brace, below knee cast and ankle strap. Ankle sprains that are not adequately treated can result in long-term issues like discomfort, instability in the joint, and reduced range of motion. Acharya Sushruta advocates *Alepa* with *Shophahara Dravya* and *Sandhaniya Dravya*. These *Dravyas* when used in the form of *Lepa* have the properties of *Sandhaniya, Shophahara* and *Vedanasthapaka* action. It's time to develop fresh, creative, accessible, patient-friendly, and time-saving methods that have the same impact. Hence this study is taken up to develop the *Ayurveda* protocol for ankle sprain. Such kind of ayurvedic protocol weren't in use till date which makes it unique. This protocol helps in reducing oedema, pain and immobilization like any other ankle brace or ankle binder and also accelerates the time of healing.

Key words: *Ankle Sprain, Ayurveda, ankle sprain protocol, Ankle Brace.*

INTRODUCTION

Ankle sprain is an injury of the lateral ligament complex of the ankle joint. The injury is graded on the basis of severity. Grade I is a mild stretching of the ligament complex without joint instability; grade II is a partial rupture of the ligament complex with mild instability of the joint (such as isolated rupture of the anterior talofibular ligament); and grade III involves complete rupture of the ligament complex with instability of the joint. This gradation has limited practical consequences since both grade II and III injuries are treated similarly, and grade I injuries need no specific treatment after diagnosis. Unless otherwise stated, studies included in this review did not specify the grades of injury included, or included both grade II and III.[1]

The health and social benefits of undertaking exercise are extensive. However, sports are the second highest cause of injuries after home and leisure accidents, and a major cause of pain, loss of mobility, disability and even death.[2]

Approximately 40% of all traumatic ankle injuries and nearly half of all ankle sprains occur during athletic activity,[3,4] with basketball (41.1%), American football (9.3%), and soccer (7.9%) having the highest incidence.[5,6]

Although nonoperative treatment is often successful in achieving satisfactory outcomes, correct diagnosis and

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Submission Date: 13/05/2024 Accepted Date: 21/06/2024

Access this article online

Quick Response Code

Website: www.jaims.in

DOI: 10.21760/jaims.9.7.31

ISSN: 2456-3110 REVIEW ARTICLE July 2024

treatment is important at the time of initial evaluation to mitigate the risks of recurrent instability. Appropriate treatment can limit the impact of long-term detrimental effect such as chronic recurrent ankle instability, arthritic progression, and long-term disability.[7,8]

In Ayurved, *Snayu* (Ligament) is described as important structure in body which binds *Mamsa* (muscle) and *Asthi* (bone) thereby helps in weight bearing of body.[9]

In Ayurveda literature, *Snayu* has been also considered as *Vatavahanaadi*. Injury to *Snayu* leads to severe pain when compared to any other structure in the body. Injury to *Snayu* causes pain which is merely due to vitiation of *Vata* and without *Vata* there is no pain. *Sandhi* (joint) is important structure for locomotion and other vital functions.

The strength of the joint depends upon *Snayu* (Ligament), *Asthi* (bone) and *Mamsa* (muscles). *Snayu* (Ligament) maintains the stability of joints during movement of the body. Any traumatic injury to the joint causes severe pain, swelling, sprain and improper movement of the joint. Sprain is commonly caused by excessive stretching of ligaments and is classified into first, second and third grade. The most common type of foot and ankle injury is ankle sprain.

Utpatti of *Snayu*

Snayu is described in Sushruta Samhita in the 4th chapter "*Garbha Vyakaran Sharir*" of Sharir Sthana. *Snayu* is formed in foetus from the result of the *Khara Paka* of *Meda Dhatu* by *Pitta* (*Tejas*). *Khara Paka* means *Ruksha Guna* of *Vayu* in *Meda Dhatu* gives strength to *Meda Dhatu* and *Snayu* (Ligament) forms.[10] *Vayu* contributes in formation of *Snayu* (Ligament) that why any injury to *Snayu* causes pain.

Pratanvati Snayu is present in ankle joint. *Pratanvati Snayu* are branched and tendril-like structure. These are present in all the *Shakha* (extremities) and the *Sandhi* (joints) of the body. [11]

Importance of *Snayu*

Acharya Sushruta has also described the importance of *Snayu* that injury to the bones, muscles, veins, joints does not kill the person whereas injury to *Snayu* can be a lethal one and can cause complete laxity of ankle joint. *Snayu Aghata* (Ligament injury) is very much disturb patient lifestyle. Patient can't properly walk, because all body weight comes on ankle joint. A boat consisting of planks becomes capable of carrying load of passengers in river only when it is tied properly with bundle of ropes. Similarly, when all joints in the body are tied with many ligaments then only the person's body is capable of bearing load.

Acharya Sushruta belonged to the school of surgeons, elaborated information about every *Marma* in the body as available in Sushruta Samhita. There is a total of 107 *Marma* in the body. *Marma* means vital point in the body which must be protected from any type of injury. If injury causes to this vital point i.e., *Marma*, there must be vital consequences happen. These *Marma* are of five types i.e., - *Mamsa Marma, Sira Marma, Snayu Marma, Asthi Marma, Sandhi Marma* in which *Snayu Marma* are 27 in number. These are 4 *Aani*, 2 *Vitapa*, 2 *Kakshadhara*, 4 *Kurcha*, 4 *Kurcha Sira*, 1 *Vasti*, 4 *Kshipra*, 2 *Amsa*, 2 *Vidhura*, and 2 *Utkshepa*. *Snayu Marma* are the specific vital points where *Snayu* predominance occurs.

Ayurveda view of *Gulpha Sandhi* (Ankle joint)

In Ayurveda the ankle joint is called as *Gulpha Sandhi* which is derived from "*Gal*" *Dhatu* (root) "*Fuk*" *Prateya* (affix). *Gulpha* is that part of the body where the foot is connected to the leg. According to Dr. Ghanekar, *Gulpha* is ankle joint. *Gulpha Marma* is located at the junction of *Pada* (foot) and *Jangha* (leg). *Gulpha Marma* is *Shakhagata Marma*. It is 2 in number one in each lower limb. *Acharya* have explained its dimension as 2 *Angula*. Trauma to this *Gulpha Marma* causes pain, restricted movement and limping. *Gulpha Sandhi* consist of *Snayu* (Ligaments), *Mamsa* (muscle), *Sira* (vessels), *Asthi* (Bone). *Snayu* and *Mamsa* gives strength for locomotion and weight bearing of body. Any injury to these *Sandhi* (Joint) causes gross deformity i.e. pain, swelling.

Etiology

Ankle sprains most commonly involve injury to the anterior talofibular ligament (ATFL) and/or the

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calcaneofibular ligament (CFL). Ankle sprains vary depending on the mechanism of injury (high- versus low-energy injuries), position of the foot, and rotational force on the joint and stabilizing ligamentous structures. Low grade injuries (grade I and II) result in stretching or microscopic tears of the stabilizing ligaments, while a high grade (grade III) ankle sprain compromises the syndesmotic structures.[12] According to Acharya Charak ankle sprain closely corelated to *Snayugata Aaghataja Shoth*. Acharya Charak said that in *Trishotiya Adhyaya, Shotha* cause by *Agantuj Hetu* like *Prahar, Banjan, Pidan* by external any injury. *Shotha* cause by *Aaghata* in ankle joint closely corelated to ankle sprain.[13]

Epidemiology

Over two million ankle sprains are treated in the emergency departments alone in the United States and United Kingdom.[14] Ankle sprains are the most frequent injury sustained in sports.

When comparing the incidence rate of ankle sprains in male and female athletes, there is a different distribution depending on the particular sport participation. Ankle sprains are common in both male and female athletes, according to numerous research comparing sex-comparable sports. For instance, in sex-comparable sports, male athletes had a greater total injury rate than female athletes, according to a 2017 epidemiology research of high ankle sprain injury rates.[15]

Pathophysiology

Evaluation

The Ottawa ankle rules have been demonstrated to be accurate in predicting which patients with ankle injuries require x-rays to exclude fractures in both adult and children older than five years.[16] The Ottawa ankle rules suggest ankle radiographs should be obtained in the setting of pain in the malleolar region and any of the following:

- Tenderness over the posterior edge of the distal 6 cm or tip of the lateral malleolus
- Tenderness over the posterior edge of the distal 6 cm or tip of the medial malleolus
- Inability to bear weight immediately after the injury and for four steps at the time of evaluation.

A foot series is indicated in patients with midfoot pain and any of the following:

- Tenderness of the base of the fifth metatarsal
- Tenderness over the navicular bone
- Inability to bear weight immediately after the injury and for four steps at the time of evaluation

These rules should not be used in the presence of a distracting injury, intoxication, conditions causing diminished lower extremity sensation, and those with head injury or other conditions that would make cooperation difficult. The Ottawa ankle rules have been found to have only moderate specificity but a high sensitivity for ankle fractures. Less than 2% of those in whom no imaging was recommended by these rules have been found to have a fracture.

A typical ankle x-ray series would include anteroposterior, lateral, and mortise views. Standard views with a foot series include anteroposterior, lateral, and oblique views.

DISCUSSION

Anatomically *Pratanvati Snayu* is like the ligaments which are fibrous thread like structure are present in joints and connects the adjacent bones. Ligament is the strong fibrous band which connects bones especially at joints. Ligament injury called sprain occurs when ligament is stretched beyond its normal limit. Symptoms of sprain are same as the symptoms of vitiated *Snayugata Vata* specially *Pratanvati Snayugat Vata* like stiffness, severe pain, restricted movement and sprain.

Ankle sprain is the most common sprain. Sprain is classified according to its severity. It is classified into three grades e.g. first grade, second grade and third grade.

According to Ayurved ankle sprain is corelated to *Snayugata Aghataj Shota* in which *Snayu Bhagna* occurs i.e., rupture of ankle ligament complex. In Sushruta Samhita when any *Shotha* occurs due to

ISSN: 2456-3110 **REVIEW ARTICLE** July 2024

Aghatha or accidental injury (external injury) there always *Pitta, Rakta Prakop* i.e., increase in inflammation at location of injury. Microscopic injury, tear occurs at ankle joint due to accidental injury. *Snayu Bhagna* occurs at ankle joint. Direct injury to *Snayu* causes tearing of *Snayu* and *Snayu Shotha* (oedema) occurs.

In acute phase of ankle sprain there is mild, moderate, severe odema with pain present.

Ayurveda recommends *Pitta Shamak Lepa* for reducing inflammation e.g. *Chandhanadhi Lepa*, *Nishadhi Lepa*. In acute phase for 3 days, we reduce oedema by applying *Shita Lepa*. This *Lepa* reduce inflammation and pain at injured site. After reducing oedema and pain we apply oil for healing of ligament tear. We apply *Mahanarayan* oil, *Gandha Taila* at ankle joint. *Ayurveda* medicated oil heals ligament quickly. *Taila* gives nutrition to ligament cells and healing start too early. Oil is absorbed through skin. Rest advice to patient.

Ayurveda already given protocol of *Snayu Bhagna, Snayugata Shotha.*

In acute phase gives *Shita Lepa* for reducing oedema and pain. After reducing pain and oedema, Ayurved recommends healing of ligament by giving proper nutrition with help of medicated oil.

CONCLUSION

Protocol for ankle sprain according to *Ayurveda* is *Shita* (Cold) *Lepa* for initial 3 days, after subside of edema, ligament is repair by application of *Taila* (Oil) and internally anti-inflammatory and muscle, ligament repair medicine is given. We give *Nishadhi Lepa* for 3 days and after that Gandha *Taila* Patta Bandhan for 10 to 15 days based on grading of ankle sprain.

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How to cite this article: Sunil Kumar, Swapnil Khandagale, Sarvesh Kumar Agrawal, Narinder Singh. Clinical review to develop Protocol for Ankle Sprain in Ayurveda. J Ayurveda Integr Med Sci 2024;7:207-211. http://dx.doi.org/10.21760/jaims.9.7.31

Source of Support: Nil, **Conflict of Interest:** None declared.

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