

SPORTS INJURIES : TREATMENT PROTOCOL AND COMMON CLINICAL PRACTICES

A review article

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Abstract :

Athletic performance is closely linked to physical health, endurance and injury prevention. Conventional sports medicine primarily focuses on physiotherapy, orthopedic interventions and rehabilitation. However, an integrated, holistic approach is required to optimize recovery and long-term well-being which forms the basis for Sports Ayurveda. Ayurveda offers personalized injury management for both acute and chronic sports injuries by following basic Ayurvedic treatment principles and also uses valuable insights by eminent physicians. This could be in the form of internal medication, various *kriyakrama* and dietary advices to aid in musculoskeletal healing. Ayurvedic rehabilitation strategies combined with modern techniques enhance recovery and promote overall well-being.

Keywords: Sports injuries, treatment protocol – Phase wise, common clinical practices. Sports Ayurveda.

Introduction

Athletic success is related to physical health, endurance, and mental strength. Athletes constantly push their bodies to extremes, making them highly susceptible to injuries, fatigue, and long-term musculoskeletal complications.

The prevalence of sports-related injuries among young adults in India has been reported to range between 46.5% and 73.4%, which is significantly higher compared to other countries. These injuries often occur due to acute trauma or repetitive stress sustained during sports and athletic activities^[1]

A sports injury is a physiological impairment or tissue damage that results from acute trauma or repetitive stress during athletic activities. It primarily affects the musculoskeletal system, including muscles, bones, ligaments, tendons, and joints. These injuries can be classified based on their cause, whether sudden or due to overuse, as well as their severity and the specific structures involved. Typically it results from acute trauma, repetitive stress, poor biomechanics, inadequate conditioning, improper equipment use or insufficient warm-up and stretching^[2] The underlying mechanisms often involve inflammation, tissue degeneration, or biomechanical dysfunction, all of which can impact an athlete's performance and recovery.

Sports medicine is a specialized medical field dealing with the prevention, diagnosis, and treatment of injuries and disorders related to sports and exercise, encompassing both medical and allied health professionals. The American Osteopathic Academy of Sports Medicine (AOASM) defines sports medicine as “that branch of the healing arts profession that uses an holistic, comprehensive team approach to the prevention, diagnosis, and adequate management (including medical, surgical and rehabilitative techniques) of disorders, dysfunctions, and exercise-related disease processes.” Widely, it focuses on enhancing physical fitness and endurance, preventing injuries through training, conditioning, and nutrition, treating acute and chronic sports-related injuries and promoting recovery through rehabilitation techniques. However, a holistic, preventive, and individualized healthcare system is required to ensure sustained athletic excellence. Ayurveda offers a comprehensive and holistic approach to sports medicine by incorporating individualized

treatments, lifestyle modifications, dietary regulations and Ayurvedic *Panchakarma* therapies. As a traditional medical science, it can also offer different types of management of sports injuries and safeguard the health of sports personnel.

Sports Ayurveda

The branch of Ayurveda that manages sports injuries by adopting Ayurvedic treatment principles is called Sports Ayurveda. It primarily focuses on treating injuries and optimizing performance through physiotherapy, orthopedic interventions, and rehabilitation techniques. This emerging field integrates Ayurvedic principles into global sports healthcare offering a unique combination of prevention, treatment and rehabilitation strategies. Sports medicine can also act as complementary system that incorporates preventive care, personalized treatments and therapeutic interventions to enhance performance and recovery by using the categorization of individuals based on their *Prakruti* (body constitution), *Saara* (tissue quality), *Samhanana* (body build), *Pramana* (body measurements) and *Satwa* (mental strength).^[3] This individualized approach allows for customized training programs, dietary recommendations, and injury prevention strategies tailored to each athlete's specific needs.

Types of sports injuries

Athletes often experience injuries such as sprains, strains, contusions, ligament tears, tendon injuries and fractures which often result in immediate pain, swelling, and loss of function. Other conditions like traumatic bursitis, synovitis, neuropraxia, osteochondral injuries, joint impingement, laceration, abrasion and puncture wound are also frequently treated. Sports injuries are broadly classified into acute and chronic types, each affecting various parts of the body based on the nature of the activity.

Acute injuries are those that occur due to traumatic events like fall, collision or improper movement. Dislocations, fractures, sprains and strains fall under this category. Growth plate fractures, which occur in the cartilage near the ends of long bones in children, can result from trauma or chronic stress, affecting bone development.

Dislocations and subluxation happens when bones forming a joint separate completely, are prevalent in contact sports like football and basketball. Sprains and strains, caused by stretching or tearing ligaments and tendons, are also common, particularly in the ankles, knees, and wrists. Additionally, acute injuries like tendon tears and bursitis can develop due to high-impact activities or falls, requiring immediate medical attention for proper healing and rehabilitation.

Chronic injuries, on the other hand, develop gradually over time due to repetitive stress on specific body parts. These injuries often result from overuse and are common among athletes who perform the same motions repeatedly. Conditions such as tendinitis, bursitis, and stress fractures fall into this category, typically presenting as persistent discomfort or pain during activity. Common chronic sports injuries include shoulder issues like rotator cuff injuries, impingement, and instability, which affect athletes engaging in overhead movements like tennis and swimming. Stress fractures, for instance, commonly affect weight-bearing bones like the femur, tibia, fibula, and foot bones, particularly in sports involving repetitive impact, such as running, gymnastics, and basketball.

Further we can extent to joint specific injuries. Elbow injuries such as tennis elbow, golfer's elbow, and little league elbow result from repetitive stress on tendons and ligaments due to throwing or racket sports. Knee injuries, including runner's knee, ligament tears and meniscal damage frequently occur in sports like cricket and football that involve sudden stops, pivots, or excessive pressure on the knee joint. Other chronic conditions include Achilles tendinitis and ankle sprains, which impact runners and individuals engaged in high-impact activities. The symptoms of sports injuries vary, with acute injuries often presenting as sudden, severe pain, swelling, and inability to bear weight, while chronic injuries typically cause persistent discomfort and swelling during and after activity. Understanding the distinction between these injury types is crucial for implementing effective treatment and prevention strategies, including proper warm-ups, strength training, rest, and using appropriate techniques to minimize stress on vulnerable body parts.

Ayurvedic Management of common sports injuries

Sports medicine in Ayurveda covers a wide range of treatments, including fitness training, diet planning, Ayurvedic medicines, physiotherapy and counseling. Individuals lacking access to coaching facilities for their sporting activities exhibit a higher incidence of sports injuries. This suggests that the absence of proper technical guidance elevates the risk of injury during sports participation. Ayurveda has two aspects injury management which synchronizes with the basic objective of Ayurveda as enhancing the health of healthy one and treating a diseases one^[4]. As a preventive aspect Ayurveda enhances strength, flexibility, and endurance, as well as accelerates recovery by *panchakarma* therapies, internal medications, nutritional diet and Yoga, which optimizes overall performance. While focusing on the other aspect, sports injury management promotes rapid healing through judicious combination of classical Ayurvedic methods, traditional *MarmaChikitsa*, modern bandaging techniques, orthopedic aids, sports nutrition, and physiotherapy ensures a comprehensive approach to sports injury management. Here we are emphasizing on injury management aspect of sports injury.

So the primary goal is to manage injuries and help athletes regain their physical and mental fitness for the next game. Initial treatment involves first aid measures like the RICE (Rest, Ice, Compression, Elevation) protocol^[5], mechanical correction, immobilization, and appropriate Ayurvedic medicines. Rehabilitation therapy, including physiotherapy and Ayurvedic procedures which plays a key role in restoring movement, strength, and flexibility.

Based on the treatment purpose Acute Sports injuries can be divided into as major and minor. In which major includes conditions such as fractures, dislocations, severe ligament tears, head injuries, and muscle ruptures, which require immediate medical attention through immobilization, surgery, pain management, and rehabilitation. Minor injuries, including sprains, contusions, tendonitis, and superficial cuts, can be managed with conservative treatments like RICE therapy, anti-inflammatory medications, physiotherapy, and proper wound care^[6].

In this two categories Ayurveda provides effective management in major injuries like closed fractures, dislocations, mild to moderate ligament injuries, without complications and for all other minor injuries. Chronic injuries, post-surgical complications, and fitness training are also part of the treatment scope.^[7]

The foundation of treatment lies in *MarmabhighataChikitsa*, *Bhagna* and *Sandhi Vislesha Chikitsa*. In acute cases, immediate *RaktakopaSamana* and *RaktaStambhanaChikitsa* are essential, followed by effective *VataSamana Chikitsa* for long-term recovery. Comprehensive care includes *MarmabhighataChikitsa*, along with potent *VataSamana* and *RaktaPrasadanaOushadhas*. Additionally, healing is supported by *Paka Hara* and *Sopha Hara Oushadhas* for reducing inflammation, *SulaHara Oushadhas* for pain relief, and *AsthiSandhanakaraOushadhas* for efficient bone healing. To strengthen the body, *AsthiBalyaOushadhas* enhance bone health, while *MamsaBalyaOushadhas* aid in muscle regeneration and overall recovery. Various procedures like *dhara*, *lepana*, manipulations like *Aanchana* (traction), *peedana* (depressing), *Sankshepa*, *bandhana* (bandaging), and internal medicines for promoting healing are advised.^[8] This includes cold *Grishtiksheera* (milk of cow which has delivered within 7 days), boiled with drugs of sweet taste and *laksha* added with ghee to be given every morning.^[7] Special treatments for *Savranabhagna* are also mentioned which includes *vraanaandbhagnachikitsa*^[7]. Dietary and lifestyle guidelines are also specified that patients with fracture should not indulge in foods which are salty, pungent, alkaline and sour, in copulation, sunlight, physical exercise and dry foods. *Sali* (rice), meat soup, soup of *sateena* (lentil) foods and drinks which are *brimhana* in nature should be given to them.^[9] Procedures like *Dhanyamladhara*^[10] and *Avagahasweda*^[11] help in relieving post fracture stiffness, swelling and pain. The rehabilitation and recovery stages are managed by bone strengthening procedures like *Shashtikapindasweda* and internal medicines which are conducive to bone healing and growth.

Proposed Ayurveda treatment protocols for management acute and chronic sports injuries.

TREATMENT PHASES:

4 phases of treatment can be identified in sports injuries – First aid phase, first phase, Second phase and recovery phase. The First Aid Phase involves the application of soothing *SitaDravya* (cold therapy) with proper elevation to minimize swelling and pain. The First Phase Treatment focuses on pain management and

therapeutic *Lepana*, secure bandaging, *Taila* application elevation, and optimal rest for stabilization. During the Second Phase Treatment, meticulous follow-up is conducted, including *Lepana*, rebandaging, prescribed medications and necessary procedures for optimal healing. Finally, the Recovery Phase Treatment ensures a smooth transition to normal function by removing the bandage, initiating early rehabilitation through physiotherapy, and integrating specialized Ayurvedic procedures to restore strength and mobility effectively.

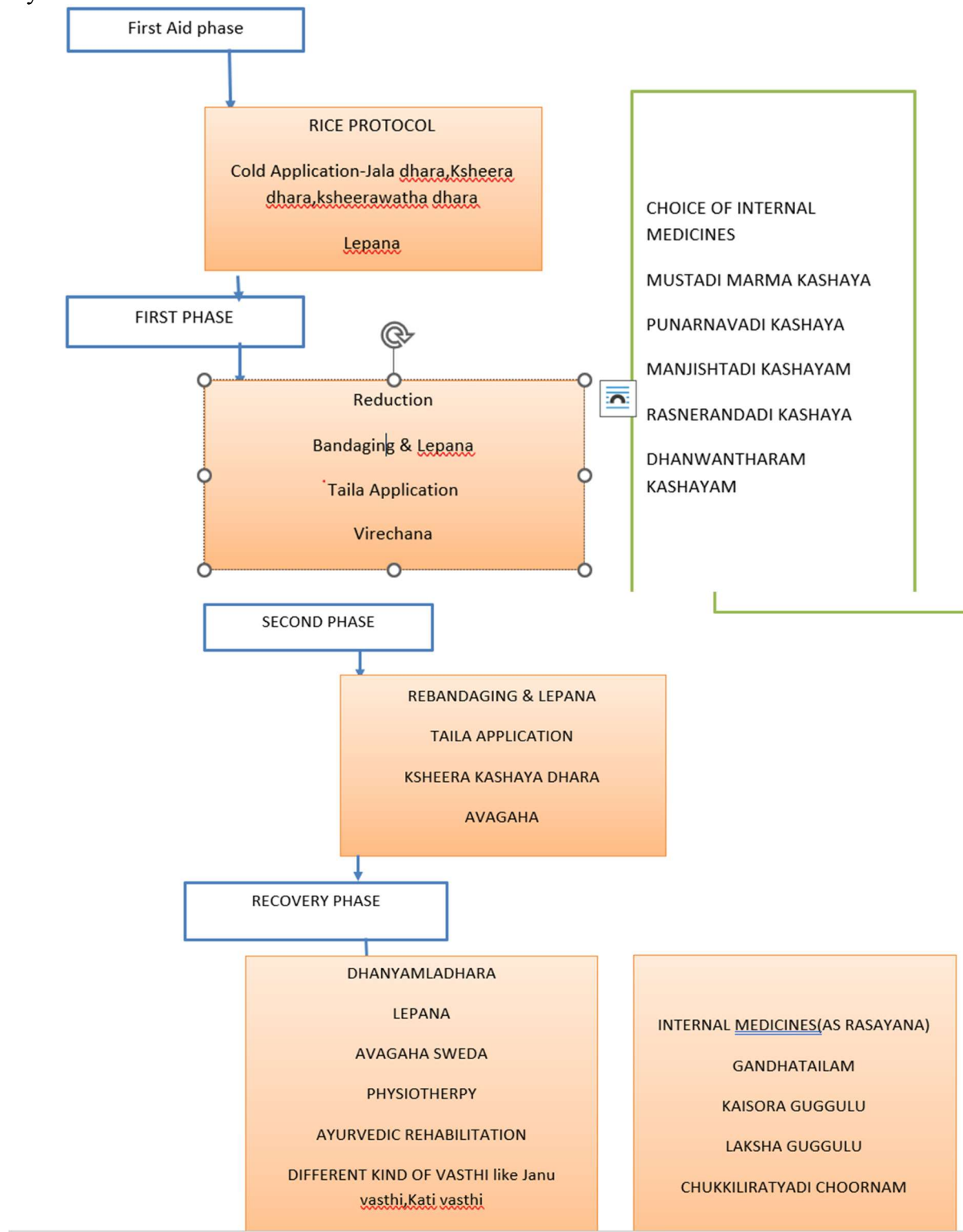


Figure 1 – Phases of management of sports injuries

First Aid phase

Kriyakramas in this phase include cold application and *lepana* in acute cases. Cold application plays a crucial role in first aid for acute injuries. Ice packs, *dhara* using cold water, milk or *KsheeraKashaya* are

used for stoppage of bleeding, reducing vascular congestion and immediate analgesic effect.^[12] *Ksheeradhara* provides multiple therapeutic benefits, including *Pitta Samana* (pacifying *Pitta dosha*), *RaktaStambhana* (stopping bleeding), *RaktaKopaSamana* (reducing vascular congestion), *DahaPrashamana* (relieving burning sensation), *Balya* (strengthening), *Jivana* (nourishing) and *OjoVardhana* (improving vitality) and *Sula Hara* (pain relief).^[13] *NyagrodhadiKsheeraKwatha*, *PanchavalkaKsheeraKwathaDhara* are effective in managing acute trauma.^[14]

Lepanatherapy is an essential approach for wound healing and orthopedic injuries. It provides effects such as *stambhana* (hemostasis), *snaihika* (lubrication), *prasadana* (soothing), *ropana* (healing) and *savarneekarana* (restoring skin tone).^[15] In sports injuries, *Lepana* plays a significant role in reducing inflammation and edema similar to its role in fractures. It also helps in pain relief and enhances the tissue healing process.^[16]

Phase One – Treatment (Soon After First Aid)

First phase treatment focuses on pain management which again can be categorized in two ways based on severity and possibility to re – enter to sports on the spot of injury or to continue treatment as per protocol for future betterment.

For re-entry to sports on the spot in minor sports injuries, athletes often need quick treatment that allows them to continue playing safely. *Marma* manipulation, trigger release techniques, Kinesio tapings can be utilized in this stage effectively. Proper Taping-and-Bracing provides support, stability and pain relief while allowing continued movement. Athletic taping (stirrups, figure-eight) or an ankle brace can stabilize the joint in Ankle strains. Kinesiology tape or rigid sports tape helps limit excessive movement in wrist strain. Buddy taping (taping the injured finger to an adjacent one) prevents further strain in finger injuries. McConnell taping or kinesiology taping supports the kneecap is used in Knee Pain (Patellar Issues). compression sleeves or wraps helps maintain circulation, provides support and prevents swelling. Before allowing an athlete to continue playing, check for pain level which should be minimal and tolerable. No significant weakness or loss of function indicates mobility and strength. If the joint or muscle is unstable or gives away, it indicates impaired stability. Confidence in movement should be noted by the athlete's hesitation or compensation for the injury. If pain persists or worsens, immediate removal from play and further evaluation is necessary.

If re-entry to sports at the spot of injury is not considered and plans for future prolong rehabilitation the following methods can be adopted like therapeutic *Lepana* combined with secure bandaging and *Taila* application. *Pakahara* and *sophahara lepa* are used in first phase treatment.

In practice, *lepana* is performed along with bandaging as *lepanabandhana* which is essentially a variant of *Upanaha*. While in *Upanaha*, the bandage is applied for twelve hours (from night to morning)^[17] in cases of fractures, *lepanabandhana* is applied for more than three consecutive days, typically between three to six days. *Nagaradilepachurna* is a traditional Tamil medicine commonly used for *lepana* in orthopedic injuries. It is also known as *ManikkuntirikkadiCurṇa*, as per old SiddhaYoga texts. It is beneficial in traumatic inflammations and edema, including fractures, dislocations, ligament injuries or tears, muscle sprains, and bone contusions. *Jadamayadichurna* which is used in conditions such as *Vataroga* and *Vatarakta* has also got the ability to reduce inflammation, oedema and pain.^[18] *GulucipatradiLepanaChurna* is indicated in traumatic oedema.^[19] Other traditional combinations like *Marmagulika* are also effective in acute injuries, traumatic pain and swelling, fractures, dislocations, sprains, ligament injuries and muscle injuries are effective in this phase.^[20]

Second Phase Treatment

In this phase, meticulous follow-up is conducted and procedures including *Lepana*, rebandaging, internal medications and *Dhara with Kshira Kashaya* should be adopted. Regular assessment for the presence of *ama* and *sopha* should be done and *amapachana*, *sophahara* treatment should be done, if needed. *Lepana* can be done with the powders like *Nagaradichurna* and *Jatamayadichurna* specified during the previous phase. *AsthisandhaanakaraLepana* which is specifically formulated for conditions such as pain (*sula*), swelling (*sopha*), fractures (*Asthibhagna*), and joint dislocations (*Asthicyuti*) can also be used internally and externally.^[21] Various medicated oils like *Murivenna*, *DhanwantaramTaila*, *KayatirumeniTaila*, *Siddha KayatirumeniTaila*, *KetakimuladiTaila* are used externally for pain relief and healing. *GandhaTaila* is a traditional and classical formulation known as a bone tonic. It is an exceptional restorative preparation for

fracture care and serves as an effective nutritional supplement for ligament injuries. It is a formulation with *Krishna Tila* (black sesame seeds) as the main ingredient.^[22] *Ksheerakashayadhara* involves the external application of medicated milk decoctions and includes specific preparations like *BrhatPancamoolaKshira Kashaya Dhara* which can be used in acute and subacute trauma cases and *KupeeluKshiraDhara* which is effective in subacute and chronic trauma^[23]. *DasamulaKshira Kashaya* is a highly effective formulation used in the treatment of painful conditions. It is commonly indicated for conditions related to trauma and injuries, especially those affecting vital organs and *marma* points. It is highly effective in managing neurological pain associated with *Vāta* disorders and is also beneficial in conditions such as *SandhigataVāta* (painful joint conditions) and rheumatologic disorders that present with significant pain.^[24] It can be used for *Avagaha* also.

Third Phase Treatment

This is the recovery and rehabilitation phase and involves external procedures and use of *rasyana* medicines. It includes removing the bandage, initiating early rehabilitation through physiotherapy. Orthopedic rehabilitation is essential for restoring normal life after injury. After removing the last bandage, various therapies are administered to aid recovery. If there is residual edema or stiffness, specific external applications (*lepa*) are advised. These include *KottamchukkadiChurna*, *NagaradiLepa*, and *GrhadhumadiLepaChurna*, each applied with suitable liquid media (*dravadravya*). *Lepana* should be done without bandage, while *Upanahash* should be performed with great caution, especially in conditions such as post-fracture stiffness and osteoarthritis. Once swelling subsides, *dhara* can be introduced. *Dhanyamladara* is advisable in the initial phase followed by *tailadhara*. *Asavenna [Sidha yoga]*, *Pindataila* or *taila* with *amla rasa* and *lavana rasa*, *Chinchadi* and *parinatakeriksheeraditaila* are better choices for reducing stiffness and promoting flexibility. *Matravasti* is found to be effective in *vatadoshashamana* and subsequent *brimhana*. External *vastis* such as *JanuVasti*, *KateeVasti*, and *UroVasti* are done depending on the site of treatment. Additionally, *ShashtikaAnnalepa* is also recommended. For better healing and nourishment, *Balya* and *Brmhanagunayuktataila* like *KottamchukkadiTaila*, *Asavenna*, *BalaswagandhadiTaila*, *DhanwantaramTaila*, *GandhaTaila*, *KetakimuladiTaila*, *LakshadiTaila*, *MahakukkuṭamamsaTaila*, *PrabhanjanamTaila* have to be selected. Selection of *Rasayan* depends on the structure or *dhathu* affected. *Gandhataila*, *Lakshachurnam*, *Mamsarasa* are used to promote healing and growth of bone, ligaments, tendons, fascia and bursae.

Rasayana are used as internal medications according to the tissue affected. *Laksha*, *Gandhataila*, *Mamsarasa* are choices of *rasayana*. *Chukkilirattiadichurnam* is a potent *rasayana* combination for strengthening *asthidhathu* and its *upadhathu*^[25]. *Vyayama* (Active Use and Exercise) is an important component of rehabilitation. This is described as a progressive three step process – *mritpinda*, *lavanapinda* and *pashanapindadharana*.⁽²⁶⁾ Mobilization: Using *mritpindadharana* (soft mud) allows gentle movement and mobilization. Active Use and Exercise against Resistance: This stage involves using *lavanapindadharana* to provide controlled resistance, similar to resistance bands or therabands in physiotherapy. Active Use and Exercise with Weight Bearing: Progressing to *pashanapindadharana* introduces weight bearing, simulating real-life activities and strengthening muscles.

Chronic orthopedic injuries

Chronic orthopedic injuries include various conditions such as chronic recurrent injuries, chronic overuse injuries, chronic ligament weakness, tear or sprain, chronic dislocation, chronic traumatic pain, chronic muscle weakness, chronic tendinopathies, chronic bursitis and cases of non-union or malunion. From a pathological perspective, these conditions are primarily associated with *Vatakaphajadoshas* or *Kaphavarana*. The resulting pathology often leads to an increase in *Vatadosha* and *Dhatukshaya*, with *Vatadhikaabhighata* or *marmmakshata* being common occurrences. The involvement of *snayu* (ligaments), *kandara* (tendons), and *nadee* (nerves) leads to conditions like *Sandhigata* (joint-related) and *Asthigata* (bone-related) *Vata* disorders. Additionally, *dhatwagnimandya* and *dhatukshaya* pathology contribute to the chronic nature of these conditions. The treatment principles focus on addressing *KaphavaranaVataCikitsa*, followed by interventions for *dhatukshaya* or *kevalaVatakopa*. The approach includes therapies for *stambhahara* (reducing stiffness) and *sulahara* (pain management). Enhancing *dhatwagni* (tissue metabolism) and promoting *dhatuparinama* (proper tissue nourishment) are essential, along with *Rasa-Rakta-Mamsaprasadana* (*Balya*) and nourishing (*Brmhana*) treatments play a crucial role. Proper

kriyakramas, along with physiotherapy, form an integral part of the management plan to restore function and alleviate symptoms. Among these, different types of *pindasweda* like *jambirapindasweda*, *shashtikspindasweda*, *godhumapindasweda* are used as penetrating and nourishing to bones and related structures. In specialized treatments, *Agnikarma* is effectively employed for chronic tendonitis cases, providing precise and targeted relief.^[27] *Virechana*, a powerful detoxification therapy, aids in internal purification, while various *Vasti* treatments contribute to systemic balance. These include *BalamoolaKsheeraVasti*, *DwiPanchamooladiVasti*, *PanchatiktaKsheeraVasti*, *GuggulutiktakaKsheeraVasti*, and *RajayapanaVasti*.



Figure 2 – Agnikarma

[Source - <https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.dhanwanthralaya.com%2Fagnikarma%2F&psig=AOvVaw2FAEgagoNFej5N8pDF69Wl&ust=1742115079086000&source=images&cd=vfe&opi=89978449&ved=0CBcQjhxqFwoTCKCz8abai4wDFQAAAAAdAAAAABAE>]

Importance of Nutrition and Yoga in sports injury

Proper nutrition reduces injury risk, manages inflammation, and accelerates recovery in athletes. Protein, calcium, and vitamins support muscle repair, bone strength, and tissue regeneration. Anti-inflammatory foods like omega-3s, antioxidants, and turmeric aid healing, while hydration and electrolytes maintain cellular function. A balanced diet ensures faster recovery, prevents muscle loss, and optimizes performance.^[28]

Yoga enhances flexibility, strength, and balance, reducing sports injuries while promoting faster recovery. It improves focus, mental resilience, and stress management, boosting athletic performance. Breath control and meditation enhance endurance, concentration, and emotional stability. Integrating yoga into training fosters confidence, preventing injuries and optimizing overall well-being.^[29]

Conclusion

The diagnosis and management of sports injuries, as outlined in Ayurveda, are an extension of the principles mentioned under *BhagnaChikitsa* in the *Brihattrayi*. Ayurveda provides a structured and holistic approach that not only focuses on immediate injury care but also emphasizes long-term recovery, rehabilitation, and overall musculoskeletal well-being. The integration of Ayurvedic principles with modern orthopedic management allows for a comprehensive and patient-centric treatment strategy that enhances healing outcomes. The four-phased approach—First Aid, Primary Treatment, Secondary Treatment, and Recovery—ensures a systematic method for addressing both acute and chronic sports injuries. Ayurvedic procedures such as *Lepana* (herbal paste application), *Dhara* (medicated liquid pouring), and *Swedana* (sudation therapy) play crucial roles in reducing inflammation, relieving pain, and promoting tissue repair. Additionally, the use of internal medications targeting *Vata* and *Rakta* imbalances, along with specialized treatments like *MarmabhighataChikitsa*, *Agnikarma*, and *Rasayana* therapies, significantly contribute to faster healing and long-term joint and bone strength. Furthermore, Ayurvedic dietary and lifestyle recommendations provide an essential foundation for recovery. The emphasis on *Brimhana* (nourishing) foods, restricted movement, and progressive rehabilitation exercises ensures that athletes regain their

functional strength efficiently. The phased approach also highlights the importance of continuous monitoring and assessment, enabling tailored interventions at each stage of recovery. By bridging traditional healing approaches with contemporary medical advancements, Sports Ayurveda has the potential to redefine sports healthcare.

References

1. Champawat VS, Santoshi JA, Tiwari A, Behera P, Selvanayagam R, Verma VK. Sports-related musculoskeletal injuries in medical students. Indian journal of occupational and environmental medicine. 2024 Jan 1;28(1):65-70.
2. Sonia Meend& Sunil Kumar: Sport Injuries And Its Management Through Ayurveda. International Ayurvedic Medical Journal {online} 2021 {cited May, 2021} Available from: http://www.iamj.in/posts/images/upload/1116_1120.pdf
3. Vaidya JadavjiTrikamji Acharya, Charakasamhita by Agnivesha revised by Charaka and Dridabala with the Ayurveda Dipika commentary of Chakrapanidutta, ChaukhambhaPrakasan, 2013, on VimanaStana, Chapter 8, Sloka No. 102-116
4. Vaidya JadavjiTrikamji Acharya, Charakasamhita by Agnivesha revised by Charaka and Dridabala with the Ayurveda Dipika commentary of Chakrapanidutta, ChaukhambhaPrakasan, 2013, on SootraStana, Chapter 30, Sloka No. 26
5. Brassington R, Neveling N, Smith L, Mason B. The Efficacy of Rice Therapy in Treating Exercise-Induced Muscle Damage. Journal of Australian Strength and Conditioning. 2023;31(03)
6. https://www.physio-pedia.com/Sport_Injury_Classification
7. AmbikadattaShastri, Sushruta Samhita Ayurvedatatvasandeepika Hindi commentary/ Sushruta Samhita, ChikitsaSthana, Chapter 3 verse 14-15 / Chaukhamba Sanskrit Sansthan/ Varanasi/ 2014/ Reprint 2nd edition.
8. AcāryaSushrutha: Sushruthasamhita with Nibandhasangraha commentary of Dalhanaācārya and Nyayachandrika of Gayadasa, Chaukhambhaorientalia, reprint edition, Chikisthasthana, 3rd chapter verse, 2014; 18: 824-416
9. Susruta, Susruta Samhita with the Nibandhasangraha Commentary of Shri Dalhanacharya and the NyayachandrikaPanjika of Shri Gayadasacharya on Chikitsasthana, edited by Vaidya YadavjiTrikamji Acharya, Chikitsa Sthana3/ 4,5 ChaukhambaSubharatiPrakshan, Varanasi, Edition 2018
10. C. H. Rajani& Santosh N. Belavadi:Practical Application Of Dhanyamladhara. International Ayurvedic Medical Journal {online} 2019 {cited September,2019}
11. Pavana J, KeraliyaChikitsapaddhati: Padmasri.DR.K.Rajagopalan Ayurveda Series-3; p.39
12. Vaidya LaxmipatiShastri,Yogaratanakara ‘Vidyotini’, ChaukhambaPrakashana, Varanasi.
13. AshtangaHridaya, edited by Pt. Hari SadashivaShastri, ChaukhambhaSurabharatiPrakashan,Varanasi,UP 2010, Chikitsasthana chapter 22, Verse23
14. Pavana J, KeraliyaChikitsapaddhati: Padmasri.DR.K.Rajagopalan Ayurveda Series-3; p.34
15. ShrivastavaShailaja, Shargadharasamhita, Uttarahanda, Jeevanprada Hindi Commentary, 4thedition, Varanai, ChaukhambhaOrientalia, 2005; 424: 11-1-2
16. Susruta, Susruta Samhita with the Nibandhasangraha Commentary of Shri Dalhanacharya and the NyayachandrikaPanjika of Shri Gayadasacharya on Chikitsasthana, edited by Vaidya YadavjiTrikamji Acharya, Chikitsa Sthana3/ 4,5 ChaukhambaSubharatiPrakshan, Varanasi, Edition 2018
17. AshtangaHridaya, edited by Pt. Hari SadashivaShastri, ChaukhambhaSurabharatiPrakashan,Varanasi,UP 2010, Sootrasthana chapter 17, Verse 5

18. Dev D. A CLINICAL STUDY ON JATAMAYADI UPANAHA SWEDA IN JANU SANDHIGATAVATA (OSTEOARTHRITIS OF KNEE JOINT). JAHM [Internet]. 2021Apr.15 [cited 2025Mar.20];3(6). Available from: <https://jahm.co.in/index.php/jahm/article/view/275>
19. Vaidya JadavjiTrikamji Acharya, Charakasamhita by Agnivesha revised by Charaka and Dridabala with the Ayurveda Dipika commentary of Chakrapanidutta, ChaukhambhaPrakasan, 2013, on Chikitsasthana, Chapter 29, Sloka No. 21
20. SahasrayogamGulikaprakarana 53, AFI VOL 1
21. ChakrapaniDatta, Chakradatta with SavimarshaBhaavarthaSandeepani Hindi commentary by JagadeeshwarprasadTripathi. Chapter 49, Verse 9. Reprint ed. 2012; Varanasi: Chaukhamba Sanskrit Series: p 371
22. AshtangaHridaya, edited by Pt. Hari SadashivaShastri, ChaukhambhaSurabharatiPrakashan,Varanasi,UP 2010, Uttarasthana 27th chapter, Verse36-41 Page no -876.
23. NeethiRajan, C.K Krishnan Nair. A Case Report on Ayurvedic Management of DushtaVrana. International Journal of Ayurveda and Pharma Research. 2021;9(11):19-22. <https://doi.org/10.47070/ijapr.v9i11.2174>
24. AshtangaHridaya, edited by Pt. Hari SadashivaShastri, ChaukhambhaSurabharatiPrakashan,Varanasi,UP 2010, Chikitsasthana 22 chapter, Verse 23
25. Sahasrayogam:A Popular Textbook On Keraliya Tradition Of Ayurvedic Treatment(Text With English Translation)-Nishteshwar,K&Vidyanath,R-ChurnaPrakarana 31)
26. Susruta, Susruta Samhita with the Nibandhasangraha Commentary of Shri Dalhanacharya and the NyayachandrikaPanjika of Shri Gayadasacharya on Chikitsasthana, edited by Vaidya YadavjiTrikamji Acharya, Chikitsa Sthana3/ 34,35 ChaukhambaSubharatiPrakshan, Varanasi, Edition 2018
27. Mahanta V, Dudhamal TS, Gupta SK. Management of tennis elbow by Agnikarma. J Ayurveda Integr Med 2013;4:45-7.]
28. Turnagöl HH, Kosar SN, Güzel Y, Aktitiz S, Atakan MM. Nutritional Considerations for Injury Prevention and Recovery in Combat Sports. Nutrients 2022, 14, 53 [Internet]. 2021
29. Krishnamurthy MN. Yoga as part of sports medicine and rehabilitation. International Journal of Yoga. 2023 May 1;16(2):61-3.