

**ISSN**INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIAISSN No. : 2584-2757
Volume : 02
Issue : 04Publisher
**ROGANIDAN VIKRUTIVIGYAN PG ASSOCIATION
FOR PATHOLOGY AND RADIOIDGNOSIS**
Reg. No. : MAHA-703/16(NAG) Year of Establishment – 2016

DOI : 10.5281/zenodo.16041062

Impact Factor : 1.013

INTERNATIONAL JOURNAL OF DIAGNOSTICS AND RESEARCH**Fracture Management: A Holistic Review Of Sushruta's Bhagna Chikitsa**Dr. Dwivedi Amarprakash¹, Dr. Aniruddha Pawar², Dr. Usman Gani Dhange³¹Professor, Shalya Tantra Department, D. Y. Patil School of Ayurved, Navi Mumbai, Maharashtra, India.²Assistant Professor, Shalya Tantra Department, D. Y. Patil School of Ayurved, Navi Mumbai, Maharashtra, India³P G Scholar, Shalya Tantra Department, D. Y. Patil School of Ayurved, Navi Mumbai, Maharashtra, India.

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Article Info: Published on : 15/07/2025

Cite this article as: - Dr. Aniruddha Pawar (2025) ; Fracture Management: A Holistic Review Of Sushruta's Bhagna Chikitsa ; Inter.J.Dignostics and Research 2 (4) 107-114 , DOI : 10.5281/zenodo.16041062

Abstract

Background: Acharya Sushruta, the pioneer of surgical science in *Ayurveda*, described *Bhagna Chikitsa*-a detailed and structured approach to the management of fractures (*Asthi Bhagna*) and joint dislocations (*Sandhi Moksha*)-centuries ago. His principles, developed through direct clinical observation, continue to hold practical relevance in the modern orthopaedic landscape.

Objective: This review aims to explore the foundational principles of Sushruta's *Bhagna Chikitsa*, understand their physiological rationale, and assess their relevance and integration potential in contemporary fracture care.

Methods: An analytical review of classical Ayurvedic texts including *Sushruta Samhitā*, *Aṣṭāṅga Hṛdaya*, and supportive Nighaṇṭu literature was conducted, along with comparison to modern orthopaedic principles. Key therapeutic strategies, anatomical classifications, and post-fracture rehabilitation methods were identified and interpreted in the context of biomechanics and healing physiology.

Results: Sushruta's fourfold treatment sequence—*Anchana* (traction), *Pidana* (compression), *Sankshepana* (alignment), and *Bandhana* (immobilisation)—provides a biomechanically sound approach to fracture management, remarkably aligned with modern reduction and stabilisation protocols. His use of herbal formulations (*Asthi-sandhaniya dravyas*) and natural splint materials reflect both clinical ingenuity and ecological adaptability. The emphasis on diet, rest, and graded physiotherapy (mud ball, rock salt, stone lifting) reflects an early appreciation for holistic rehabilitation.

Conclusion: Sushruta's *Bhagna Chikitsa* represents not just a historical account, but a timeless clinical framework with strong anatomical, biomechanical, and therapeutic foundations. Its integration into modern fracture care, particularly in conservative or resource-limited settings, offers a promising, patient-centred approach for fracture management.

Keywords : *Bhagna*, *Laksha Churna vati*, *Sushruta*, Integrative Fracture Management

Introduction :

Fractures, or the disruption of bone continuity due to mechanical trauma or pathological weakening, represent a significant burden in both emergency care and rehabilitative medicine. Epidemiological studies suggest that the prevalence rate of fractures annually exceeds more than 178 million per year, with incidence projected to rise due to increasing road traffic accidents, aging populations, and sports-related injuries ^[1,2].

In classical Ayurvedic literature, fractures are broadly explained under the term Bhagna, which includes both bone fractures or *Asthi-bhagna* and joint dislocations or *Sandhi-moksha*. Acharya Sushruta has provided a detailed description of fracture classification, pathogenesis, and holistic management. Trauma (*Abhighāta*) or weakness in *Asthi dhātu* (bone tissue) due to improper nutrition or underlying disease leads to the manifestation of fracture or dislocation. Importantly, proximity of fractures to vital anatomical landmarks (*Marma sthāna*) further determines the prognosis of bhagna.

^[3] These include procedures such as *Bhagna sthāpanā* (realignment), *Bandhana* by using splinting using organic materials like bark, cloth, or grass etc, and adjuvant oral administration of promoting bone healing formulations such as *Laksha*, *Ashwagandha*, *Guggulu*, and various medicated ghrita preparations ^[4,5].

Similarly modern orthopaedics categorises fractures based on anatomical location, pattern, and extent of displacement, guided primarily by radiological imaging. Although surgical stabilization and internal fixation have revolutionized fracture care, complications such as delayed union, malunion, and infection remain concerns. Moreover, limited

access to high-cost surgical care in many rural settings highlights the need for a safe, conservative, and evidence-based alternative management. ^[6] This review article aims to bridge the perspectives of traditional Ayurvedic and modern biomedical approaches to fracture management. Drawing from classical textual sources and recent clinical studies, we outline the integrative potential of Bhagna Chikitsā in the current orthopaedic stream.

2. Methods / Sources of Evidence :

This review compiles data from both classical Ayurvedic texts and contemporary biomedical literature to examine the multifaceted approach to the diagnosis and management of fractures (Bhagna).

2.1 Ayurvedic Literary sources -

Primary Ayurvedic content was extracted from original Sanskrit reference books, particularly:

- The *Sushruta Samhitā*, considered the authoritative text on surgical and traumatic conditions—especially *Bhagna* and *Sandhimoksha*—with comprehensive detail on types, symptoms, prognostic features, and stepwise therapeutic strategies. ^[7]
- The *Aṣṭāṅga Hṛdaya* of Vāgbhaṭa, which outlines medicinal formulations (*yogas*), dietary do's and don'ts (*pathya-apathya*), and practical procedures relevant to fracture healing. ^[8]
- Additional insights were drawn from the *Bhaiṣajyaratnāvalī* and classical *Nighaṇṭus* (Ayurvedic lexicons), which catalogue a wide range of *Asthi-sandhāna dravyas*-

herbal and mineral substances known for bone-regenerative properties—such as *Lakṣā* (*Laccifer lacca*), *Śankha bhasma*, *Godanti*, *Guggulu*, and *Asthiśṛṅkhalā* (*Cissus quadrangularis*).^[9,10]

All texts were reviewed using standard Hindi and English commentaries (e.g., *Dalhaṇa*, *Hemādri*) to ensure doctrinal accuracy and contextual interpretation. Where needed, cross-verification through modern Ayurvedic research journals (e.g., *AYUSHDHARA*, *AYU JOURNAL*) was performed.

2.2 Biomedical Literature Review :

Modern scientific evidence was obtained from:

- Peer-reviewed journals indexed in PubMed, Scopus, and Google Scholar, using keywords such as: “*Fracture management*,” “*Bone healing*,” “*Ayurveda in orthopaedics*,” “*Bhagna Chikitsa*,” and “*Integrative trauma care*.”
- Authoritative orthopedic texts such as *Rockwood and Green's Fractures in Adults*, which detail fracture classification, healing biology, surgical and conservative management.^[11]
- Current research articles and clinical reviews on fracture healing mechanisms—including osteoblast differentiation, callus formation, and the effects of herbal/mineral supplements on bone density and remodeling.^[12,13]
- Global trauma statistics and burden of disease data from the World Health Organization (WHO) and Centers for

- Disease Control and Prevention (CDC).^[14,15]

Inclusion criteria for selected biomedical literature:

- Articles in English, published between 2000 and 2024
- Clinical trials, observational studies, meta-analyses, or review articles focused on fracture healing, complications (non-union, malunion), and conservative/non-surgical interventions
- Reports involving integrative or alternative medical strategies in musculoskeletal or orthopaedic rehabilitation

2.3 Clinical Experience and Contextual Integration:

Where applicable, the review incorporates field insights from licensed Ayurvedic physicians and traditional bone-setters (e.g., *Bhagna Vaid*s) in India. Practices that reflect textual wisdom or represent region-specific innovations (e.g., *Droni*, *Kusha-bandhana*, oil fomentation) were compared with published case reports and observational studies.^[16] These sources were used cautiously, with emphasis on triangulation—ensuring consistency, historical grounding, and evidence for safety and efficacy.

3. Ayurvedic Management of Bhagna (Fracture) — Sushruta's Protocols and Rationale :

Acharya Sushruta describes a structured and stepwise protocol for the treatment of *Bhagna* based on the type, location, displacement, and complications of the fracture. These steps—*anchana* (traction), *pidana* (compression), *sankshepana*

(alignment), and *bandhana* (immobilization) are physiologically sound and closely parallel modern orthopedic principles.

3.1 Foundational Principles of *Bhagna Chikitsa* :

Acharya Sushruta has mentioned and outlined a four-steps protocol for the management of fractures (*Bhagna*): *Anchana* (traction), *Pidana* (compression or moulding), *Sankshepana* (precise approximation), and *Bandhana* (immobilization). Similarly, in modern orthopaedics fracture management emphasizes the same chronology i.e - restore length, correct alignment, obtain fragment contact, and lastly stabilize then joint before definitive fixation or casting.^[17,18] *Anchana* involves the gentle application of traction to the injured limb. By counteracting muscular spasm and separating overlapping fragments, traction facilitates accurate reduction while minimizing soft-tissues injury. Sushruta's description anticipates today's use of skin or skeletal traction as a preparatory step for long-bone fractures or for temporary fracture care when surgery is delayed. Once length is restored, *Pidana*—the judicious use of manual pressure—addresses any residual depression or elevation of bone fragments. This manoeuvre is comparable to closed manipulation performed under anaesthesia in current practice; it restores anatomical contour and reduces the risk of angular deformity, thereby optimizing the surface for callus formation. The third stage, *Sankshepana*, focuses on bringing the realigned fragments into direct contact. *Sushruta* advises individual handling of bone ends to achieve precise apposition, a concept that mirrors the modern principle that stable bone-on-bone contact accelerates consolidation and lowers the incidence

of delayed union. Finally, *Bandhana* secures the reduction. *Sushruta* recommends splints fashioned from the bark of trees such as *Ashwatha*, *Palāśa*, and *Bamboo*, selected for their firm yet slightly concave inner surfaces that cushion the limb. He also stipulates periodic re-bandaging based on climatic conditions to prevent skin maceration—guidance strikingly similar to modern cast checks and bivalving protocols. The underlying goal is the same: provide sufficient rigidity to prevent displacement while permitting the micro-movement essential for healthy secondary bone healing. Taken together, this quadripartite approach—traction, reduction, approximation, and immobilisation—illustrates a timeless surgical framework rooted in close clinical observation. Its enduring congruence with present-day fracture management underlines both the practical wisdom of classical *Ayurvedic* surgery and its potential value in integrative musculoskeletal care.^[19] The basic principle of *Bhagna Chikitsa* has been mentioned in Table No 1

Step	Description	Modern Rationale
Anchana	Gentle traction to elongate the limb and reduce muscular pull	Prevents overlapping of fragments, minimizes spasm
Pidana	Compression of the elevated part to restore contour	Similar to manipulation under anaesthesia (MUA)
Sankshepana	Approximation of fragments into their natural anatomical position	Ensures contact for callus formation
Bandhana	Splinting using tree bark (<i>Ashwatha</i> , <i>Vata</i> , <i>Palasha</i> , etc.)	Immobilisation—key for union, matches POP concept

3.2 Integrated therapeutic modalities in Bhagna

The ancillary Therapeutic Measures used in the management of *Bhagna* have been mentioned in table 2 along with its modern interpretation and probable *Ayurvedic* rationale. **Table No. 2**

Therapy	Details	Ayurvedic Rationale	Modern Interpretation
Parisheka (irrigation)	Continuous sprinkling of medicated liquids (e.g., Nyagrodhadhi decoction, Panchamula-siddha-dugdha, Chakra taila)	Alleviates pain, reduces inflammation, pacifies Vata	Cooling, analgesic, anti-inflammatory
Lepa (plaster)	Application of pastes like <i>Manjishthadi lepa</i>	Reduces swelling and pain, aids healing	Herbal poultices with anti-inflammatory and regenerative potential
Medicated Oils	<i>Gandha Taila</i> , <i>Bhagnasandhana Taila</i> , <i>Chakra Taila</i>	Promote <i>Asthi-dhatu</i> poshan, strengthen healing	Shown in studies to enhance osteogenesis
Asthisandhaniya Yogas	<i>Laksha Guggulu</i> , <i>Ashwagandha</i> , <i>Pravala Bhasma</i> , <i>Sudha Bhasma</i>	Enhance callus formation and union	Contain calcium, flavonoids, adaptogens—aid bone repair

3.3 Salutatory recommendations (Pathya-Apathya)

- Pathya (Wholesome): Milk, ghee, meat soup (*mamsa rasa*), Shali rice
- Apathya (To Avoid): Salt, sour/pungent foods, excessive exertion, sun exposure, sexual activity

These restrictions are intended to pacify *Vata*, reduce inflammation, and provide anabolic nourishment. Protein-rich and lipid-based diets are aligned with modern fracture healing guidelines requiring high protein, calcium, and vitamin D intake.

3.4 Rehabilitation Measures (Physiotherapy in Ayurveda) Sushruta prescribes gradual mobilization post-fracture union using:

- Mud ball holding (*Mṛitapinda*)
- Rock salt (*Lavana dharana*)
- Stone weights (*Pāṣāṇa dharana*)

This graded weight training mirrors modern physiotherapy protocols, starting from passive to active resistance exercises to restore muscle tone and joint mobility. ^[20]

4. Clinical Implications

The Ayurvedic approach to *Bhagna Chikitsa*, as detailed by Acharya Sushruta, offers a time-tested, biomechanically sound, and clinically adaptable framework for fracture management. Its continued relevance is evident not only in its structural logic but also in its therapeutic versatility, especially in contexts where access to advanced surgical care may be limited. The four foundational principles i.e *Anchana* (traction), *Pidana* (compression), *Sankshepana* (alignment), and *Bandhana* (immobilisation) are the essential pillars of modern orthopaedics, highlighting the deep empirical insight embedded in classical surgical literature. The use of splints made from natural materials, the timing of re-bandaging based on seasonal variation, and the emphasis on repositioning before immobilisation underscore *Sushruta's* pragmatic understanding of wound biomechanics, pressure care, and tissue perfusion issues still central to current fracture care protocols. Of particular significance is *Sushruta's* emphasis on post-union

physiotherapy, as seen in his recommendation of mud ball, rock salt, and stone lifting (*Sushruta Samhita, Chikitsasthana 3/70*). This graduated approach to muscle strengthening and joint mobility restoration resonates with the principles of modern physiotherapy. It supports the idea that recovery does not end with union but must be followed by progressive rehabilitation to achieve functional restoration. Additionally, the pharmacological arm of *Bhagna Chikitsa* through drugs like *Laksha*, *Asthishrinkhala*, *Ashwagandha*, *Guggulu* etc showcases potential for integrative rehabilitation management. Several of these herbs have demonstrated anabolic, osteogenic, and anti-inflammatory effects in both classical observations and preliminary modern research which can be seen in various drug clinical trials conducted such as use of *Laksha Churna Vati* in the management of *Avran Kand Bhagna*.^[21]

5. Conclusion :

In the context of contemporary fracture management by conventional *Ayurvedic* modalities of *Bhagna*, when applied with authentic approach can reduce dependence on surgical interventions, lower hospitalisation costs, and minimise complications such as infection. A synergistic, integrative model that combines modern diagnostic tools and fixation techniques with *Ayurvedic* internal medications, external therapies, and structured rehabilitation protocols offers a promising, patient-centered approach fracture management. To strengthen this integrative framework, further research is essential particularly in the form of randomised controlled trials, radiographic outcome studies, and biomechanical evaluations of traditional splinting and

herbal formulations. Ultimately, this review underscores the scope, strengths, and evolving evidence base of *Bhagna Chikitsa*, and advocates for its thoughtful integration into modern orthopaedic practice for safer, holistic, and accessible fracture management.

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ISSN: 2584-2757

DOI : 10.5281/zenodo.16041062

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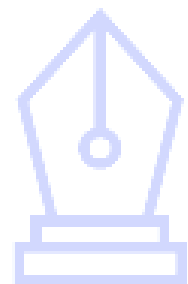


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