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## Fracture Rehabilitation in Ayurveda

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### ABSTRACT

Rehabilitation of fracture is the act of restoring an injured part to its former state through proper therapy and training, so as to improve the quality of life. After proper union of fracture, it is desirable that the joints regain normal functions and shape, which is why rehabilitation is an inevitable treatment principle in fracture management 1. Acharya Sushruta, the pioneer in surgery, holds novelty in devising rehabilitative techniques for fracture management. These principles when properly implemented can effectively heal the post fracture complications like pain, restricted mobility and joint stiffness 2. An attempt has been made to explore the concept of rehabilitation in Ayurveda in light of conventional modalities.

**Keywords:** Rehabilitation, Bhagna Chikitsa, Post Fracture Complications

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## INTRODUCTION

Rehabilitation is defined as a set of measures that assist individuals who experience or are likely to experience disability, to achieve and maintain optimum functioning in interaction with their environments. Rehabilitation measures are aimed at achieving the following broad outcomes:

1. Prevention of loss of function
2. Slowing the rate of function
3. Improvement or restoration of function
4. Compensation for lost function
5. Maintenance of current function <sup>12</sup>.

It is offered to patients to assist them in achieving their maximum level of independence after an injury or illness. According to WHO reports, RTA cases in Kerala accounts to 35124 incidences in the year 2017. Following this fracture cases are the second most common nature of injury accounting to 53% of cases. Effective rehabilitation is required in 78% of these cases <sup>3</sup>, which announces the increasing urge to consider the impact of fracture management and role of rehabilitation in this scenario.

## METHODOLOGY

Thorough literary search was done using both offline and online literatures. Ayurvedic scriptures namely Charaka samhita, Ashtanga Hrudaya, Susruta samhita, Bhava prakasha and modern textbooks like Harrison's textbook of medicine, Davidson's textbook of medicine, Adam's outline of orthopedics were referred. Online databases like PubMed, Scopus, Cochrane database, Ayush portal and Dhaara were explored for a better understanding. A total of 18 literatures were thoroughly reviewed to gain necessary insights on rehabilitative techniques in Ayurveda, which are being cited below.

### Fracture Rehabilitation:

A fracture may be a complete break in the continuity of a bone or it may be an incomplete break or crack <sup>4</sup>. A fracture begins to heal soon

after it occurs, through a continuous series of stages. These are

- 1) stage of hematoma
- 2) stage of granulation tissue
- 3) stage of callus
- 4) stage of remodelling (formerly called consolidation)
- 5) stage of modelling (formerly called remodelling) <sup>5</sup>

The treatment of fracture can be considered in three phases.

Phase 1 - emergency care

Phase 2 - definitive care

Phase 3- Rehabilitation <sup>6</sup>

The importance of fracture rehabilitation can be attributed to the stages of remodelling and the stage of modelling, where the bone is restored to its pre injured strength and shape. It consists of

- joint mobilisation,
- muscle exercises during immobilisation,
- muscle exercises after removal of immobilisation
- advice regarding the mobilisation of injured limb <sup>7</sup>.

General principles of rehabilitation of fracture are divided into 2 stages (MacDermid 2004)

Stage1: Early rehabilitation which includes, protecting the healing fracture, minimising pain and oedema, restoring normal motion and tissue extensibility, monitor patients for associated injuries or complication, prevent therapy induced complication, to assist the patient in dealing with their injury, using appropriate coping mechanism and avoidance of patterns that increase the risk of developing chronic pain/ disability syndromes and to help patients to understand their injury, the role of health care providers and how to take an active role in their rehabilitation.

Stage2: Later rehabilitation, which includes amelioration of joint contracture, restoration of hand and arm strength, adaptation to residual

physical impairments, transitioning of normal work or activity and to teach the prevention strategies to reduce the risk of second fracture.<sup>9</sup>

## IMPORTANCE OF FRACTURE REHABILITATION IN AYURVEDA

Ancient scholars of Ayurveda have given peerless descriptions on fracture management, which are analogous to modern principles giving equitable results. The line of treatment comprises of three important steps: Bhagna Sthapana (Reduction), Kusha Bandhana (Retention) and Karmavarthana/ Bhagna puna chestha sthapana (Rehabilitation)<sup>5</sup>. The measures for Karmavarthana can be described in two stages, as in the principles of modern rehabilitation of fracture. Under early rehabilitation, the usage of Sandhana (binding) and Skandhana (coagulative) drugs are indicated, to protect the site of injury, arrest internal hemorrhage and prevent further damage to the underlying veins and arteries. Parisheka (local irrigation) using Nyagrodhadi Kashaya (decoction) and panchamooli-ksheera kashaya (milk decoction) have been advised to pacify the pain, reduce inflammation and arrest fluid accumulation. Usage of medicinal oils like Chakra taila and Ghritha therapy (oleation) have been known to improve tissue extensibility and intractable neurological complaints. In conditions like Uneven or Hackly fractures, it has been mentioned that proper excision of the jagged edges has to be done. Once the surfaces are regular, and well aligned, the fracture can be managed accordingly. Acharya Sushruta has mentioned the same principle in the management of malunion as well, where the bone is set in position by breaking it, after which fracture management and rehabilitation can be efficiently done.

The importance of Physiotherapy and rehabilitation in limb injury was also appreciated by Acharya Sushruta. In the context of fracture of the carpal, metacarpal and phalangeal joints (tala bhagnam), following removal of bandage, a Mrit pinda [Clod] should be held in hand,

consequently a piece of Lavana (Rock salt) should be used for strengthening. Finally when the strength is restored, a piece of Pashana pinda (Stone) should be held and rehabilitated<sup>13</sup>. This comes under late rehabilitation of fracture. In this context, Jejjeta interprets that the term "ubhetale" refers to the palm and soles. Gaya interprets the same as palms. Moreover it has been quoted that exertion of fractured part is not advisable, as it may result in dislocation of the associated joint<sup>10</sup>.

Apart from these, medicated oil described in the treatment of vata-vyadhi (disorders of vata) should be made use of in therapies like Pana (drinking), Abhyanga (massage), Nasya (nasal inhalation) and basti (enema), which give strength to the body and offer rehabilitation<sup>11</sup>. These throw light on the scientific rationality of the ancient practises, which give evident results even today. One can also adopt formulations and techniques mentioned by Acharya for the restoration of normalcy to bones and soft tissues<sup>16</sup>. Some other formulations that enhance healing of fracture and strengthen the bones have also been mentioned in the compendia. Some of these are:

- Milk boiled with Pancha moolam for pacifying pain<sup>14</sup>
- Vataghna drugs like Bhadradarvadi, Madhura ganas like Kakolyadi processed with ghritha can be used.
- Sandhaneeya drugs like Nyagrodhadi gana with ghee and honey can be given for internal and external application<sup>15</sup>
- Abha churna with honey when consumed for 3 days heals to unite the fracture and makes the bone strong like a diamond.

### Pathya and Apathya

The patient should consume in proper quantities foods such as rice, ghee, juice of meat, milk etc, which are nourishing to the body and which do not cause heartburn.<sup>10</sup> This stands true even in modern orthopedics, where

calcium rich foods like milk, and meat are advocated to support fracture healing.

In Bhava prakasha, it has been mentioned that Avidahi annam, pishtaannam( foods that are difficult to digest) are also contraindicated. Lavana[salty],katuka[pungent],kshara[alkaline],

amla[sour],maithunam[copulation],aathapa seva [exposure to sunlight], ruksha [dry foods or non fatty foods]<sup>10</sup> are also not advised in such conditions.

## Yogas Mentioned

Kashaya Yogas	Mustadi marma kashayam Nadi kashayam Dhanwantharam kashayam Bhadradi kashayam
Arishta Yogas	Dhanwanthararishtam Vasarishtam Aswagandharishtam Balarishtam
Choorna yogas	churna I/A di choornam I/A di churna E/ A ( SY) gulika ( SY) Karutha Vattu
Guggulu prayoga	Laksha Guggulu Abha Guggulu
Taila Yogas	di tailam tailam nna ( Arogya kalpadruma) sneha
Ghritha yogas	Guggulu tiktaka Ghritham Brihat Chagaladi ghritham Panchatiktam
Lehya kalpana	shwagandhadi lehyam ushmanda rasayana arasimha rasayanam natavari gulam
Bhasma kalpana	ukkuta twak Bhasma avala Bhasma aratika Bhasma

## RESULTS

Rehabilitation outcomes are the benefits and changes in functioning of an individual over time that are attributable to a single measure or set of measures. Traditionally rehabilitation outcome measures have focussed on individual impairment level. Where fracture is the discontinuity of bone, rehabilitation is the process to bring about, and maintain continuity of fractured bone. To avoid complications of a fracture, especially joint stiffness, rehabilitation is essential. In case of joint stiffness, if rehabilitation is not done, it may result in complications like osteo arthritis. A proper understanding of the condition of the patient, involvement of doshas, and the severity of the injury, is essential in arresting the pathology.

By adopting the measures of rehabilitation, either alone or in conjunction with conventional rehabilitative methods, it offers a novel approach for improving the quality of life and sustaining normalcy. A proper adaptation of the wholesome diet and regimen will also help in de accelerating the complication of fracture. Thus exhibiting the potentiality of Ayurveda as an integral system of medicine, with scope for further research, in its conventional treatment strategies.

## DISCUSSION AND CONCLUSION

Any injury will initiate an inflammatory response in the body, which activates the tissues to restore normal functioning and to combat the pathogens. This mechanism is followed by anti inflammatory reaction to support homeostasis. Mechanism of inflammation, monitored by proteins such as cytokines and interleukins is thereby counter acted to restore normal functioning of tissues. It is in this phase that hot therapies come into action which supports the innate counter regulatory action of body. Pain is associated with substance P( P factor )and similar metabolites ,which are seen during an inflammatory response. Hence when hot therapies are deployed there will be vasodilation resulting in increased perfusion and improved collateral circulation. It

will then drain the inflammatory proteins accumulated in the vessels, to pacify the pain and the associated metabolites.

This justifies the administration of hot applications like Seka( local irrigation) and Pradeha (cataplasm). Moreover rehabilitation also requires systematic monitoring and strengthening of the affected tissues as the healing advances. This explains why Acharyas have advised the usage of clod, rock salt and stone according to their progressive compactness, in improving the strength and tissue tensibility.

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