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Ayurvedic Management of Delayed Fracture Union: A Comparative Study of Asthi-sangharadi Churna and Pancharasa Therapy

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ABSTRACT

Background:

Delayed fracture union is associated with prolonged morbidity and impaired functional recovery. Ayurvedic management of *Bhagna* incorporates internal medications and local therapeutic measures intended to support *Asthi-sandhana* and alleviate associated symptoms.

Objective:

To compare the clinical and radiographic outcomes of *Asthi-sangharadi Churna* and *Pancharasa* therapy in delayed fracture union.

Materials and Methods:

Thirty patients aged 21–70 years with delayed fracture union were enrolled in a comparative clinical study and divided into two groups of 15. Group A received *Asthi-sangharadi Churna*, 6 g with 10 g *Ghrita* and cow milk, orally once daily after food for 45 days. Group B received local *Pancharasa* application with gentle massage and hot-air treatment for 15–20 minutes daily in seven-day treatment periods separated by seven-day intervals over 45 days. Pain, swelling, joint movement, muscle power and radiographic callus formation were assessed at baseline and on days 15, 30 and 45.

Results:

Both groups showed improvement in pain, swelling, joint movement and muscle power over 45 days. At the final assessment, complete relief from pain and swelling was recorded in 14/15 patients (93.3%) receiving *Pancharasa* therapy and 13/15 patients (86.7%) receiving *Asthi-sangharadi Churna*. The highest joint-movement category was attained by three patients in the *Pancharasa* group and none in the *Asthi-sangharadi* group. Among the 12 patients per group included in the radiographic tables, hard-callus formation was recorded in 10 patients (83.3%) receiving *Asthi-sangharadi Churna* and two patients (16.7%) receiving *Pancharasa* therapy.

Conclusion:

Clinical improvement was observed with both *Asthi-sangharadi Churna* and *Pancharasa* therapy in patients with delayed fracture union. *Pancharasa* therapy showed favourable outcomes in pain, swelling and joint movement, whereas hard-callus formation was more frequent in the radiographically assessed *Asthi-sangharadi* group. These preliminary findings warrant further evaluation in larger, methodologically rigorous studies.

Keywords: *Bhagna*; delayed union; *Asthi-sangharadi Churna*; *Pancharasa*; callus formation; Ayurveda.

INTRODUCTION

Bhagna is an important clinical entity in *Shalya Tantra*, encompassing traumatic disruption of bones and joints. *Acharya Sushruta* classifies *Bhagna* into *Kanda-bhagna* and *Sandhimukta*, corresponding broadly to fractures and dislocations. The classical description identifies external trauma as its principal cause and recognizes pain, swelling, tenderness, crepitus and abnormal mobility among its clinical manifestations.[1] *Acharya Vagbhata* also discusses skeletal injuries and their management in the *Bhanga Pratishedha* chapter of *Ashtanga Hridaya*, reflecting the importance of fracture care within the Ayurvedic surgical tradition.[2]

The Ayurvedic management of *Bhagna* combines restoration of alignment, maintenance of stability, local treatment and nutritional support. *AcharyaSushruta* describes reduction manoeuvres, appropriate splintage and bandaging, together with internal preparations and nourishing dietary measures. The text also recognizes that inadequate nourishment, associated illness and disturbance of the injured part may adversely influence recovery.

Furthermore, satisfactory healing is described in terms of freedom from pain, restoration of contour and recovery of movement.[3] These observations provide a classical basis for evaluating fracture recovery through structural and functional outcomes.

The therapeutic concept of *Sandhana* is also reflected in *Charaka Samhita* through the description of *Sandhaniya Mahakashaya*, a group of drugs classified according to their union-promoting action.[4] This classification provides a conceptual basis for investigating Ayurvedic interventions intended to support tissue repair. However, a classical *Sandhaniya* indication should be distinguished from experimentally demonstrated osteogenic activity, and the clinical contribution of a particular formulation requires systematic assessment.

In contemporary orthopaedics, fracture healing is understood as a coordinated regenerative process involving inflammation, tissue formation, mineralization and remodelling. Its progression depends on the interaction of local biological activity, vascular supply, soft-tissue integrity and mechanical stability.[5]

Delayed union occurs when healing progresses more slowly than expected for the fracture site and clinical circumstances. Mechanical, biological and systemic factors may contribute, making evaluation of the original injury, stabilization and patient-related conditions essential.[6] Consequently, pain relief and improved movement should be assessed alongside serial radiographic changes rather than treated as independent confirmation of union.

Asthi-sangharadi Churna was selected in the present study as an internal formulation relevant to *Asthi-sandhana*. *Bhavaprakasha* describes the administration of *Asthi-sanghara, Laksha, Godhuma and Arjuna* with *Ghrita* and *Kshira* in the context of skeletal injuries.[7] This formulation-level reference provides a direct classical rationale for its investigation in fracture recovery.

The constituent descriptions in *Bhavaprakasha Nighantu* further support this selection. *Asthi-sanghara* is associated with skeletal union;[8] *Laksha* is described as *Balya* and *Snigdha*;[9] *Godhuma* as *Balya, Brimhana and Sandhanakrit*;[10] and *Arjuna* in relation to *Kshata* and *Vrana*.[11] *Ghrita* is characterized *as Snigdha and Balya*,[12] while *Kshira* is described as *Brimhana and Balya*.[13] These traditional attributes provide a therapeutic rationale, rather than proof of efficacy in delayed union.

Pancharasa therapy was evaluated as a local preparation containing butter, cow ghee, Eranda taila, honey and cow milk. *Eranda taila* is described in *Bhavaprakasha Nighantu* in relation to *Shula, Shotha and Katigraha*.[14] Separately, Charaka describes appropriately administered *Snehana and Swedana* as measures that promote softness and flexibility.[15] These descriptions informed the rationale for examining a local oleaginous preparation with gentle massage and controlled heat. Nevertheless, general ingredient properties and descriptions of Snehana–Swedana cannot independently establish the effectiveness of this particular external regimen.

The two interventions therefore represent different therapeutic approaches: an orally administered formulation selected for its classical relevance to *Sandhana* and a local regimen intended to address discomfort and restricted movement during recovery. Their comparative assessment requires consideration of symptomatic relief, functional improvement and radiographic progression. Accordingly, the present study was undertaken to compare *Asthi-sangharadi Churna and Pancharasa* therapy in patients with delayed fracture union, using pain, swelling, joint movement, muscle power and radiographic callus formation as outcome measures over 45 days.

MATERIALS AND METHODS

Eligibility and diagnostic assessment

Eligible participants were patients of either sex aged 21–70 years, diagnosed with delayed union after initial treatment of a fracture and with persisting functional difficulty. The study addressed a complication of fracture rather than initial reduction and immobilization. Other fracture complications and chronic systemic illnesses, including uncontrolled diabetes, tuberculosis and HIV, were listed as exclusions.

Interventions

Thirty patients were divided into two groups of 15 patients each. Group A received oral Asthi-sangharadi Churna, whereas Group B received local Pancharasa therapy. The treatment period was 45 days in both groups.

Table 1. Composition and administration of the study interventions

Parameter	**Group A** **Asthi-sangharadi Churna**	**Group B** **Pancharasa therapy**
Participants	15	15
Composition	Asthi-sanghara 1.5 g Laksha 1.5 g Godhuma 1.5 g Arjuna Twak 1.5 g	Butter 1 part Cow ghee 2 parts Eranda taila 3 parts Honey 3 parts Cow milk 5 parts
Dose or application	6 g Churna mixed with 10 g Ghrita; cow milk as Anupana	Local application over the affected region with gentle massage and hot-air treatment
Route	Oral	External
Frequency and timing	Once daily after food	Once daily; 15–20 minutes per session
Treatment schedule	Daily for 45 consecutive days	Seven consecutive treatment days followed by a seven-day interval, repeated over 45 days
Storage or preparation	Powder stored in an airtight container	Freshly prepared for use
Post-procedure advice	Not specified	Active movements within the patient's available capacity after each session

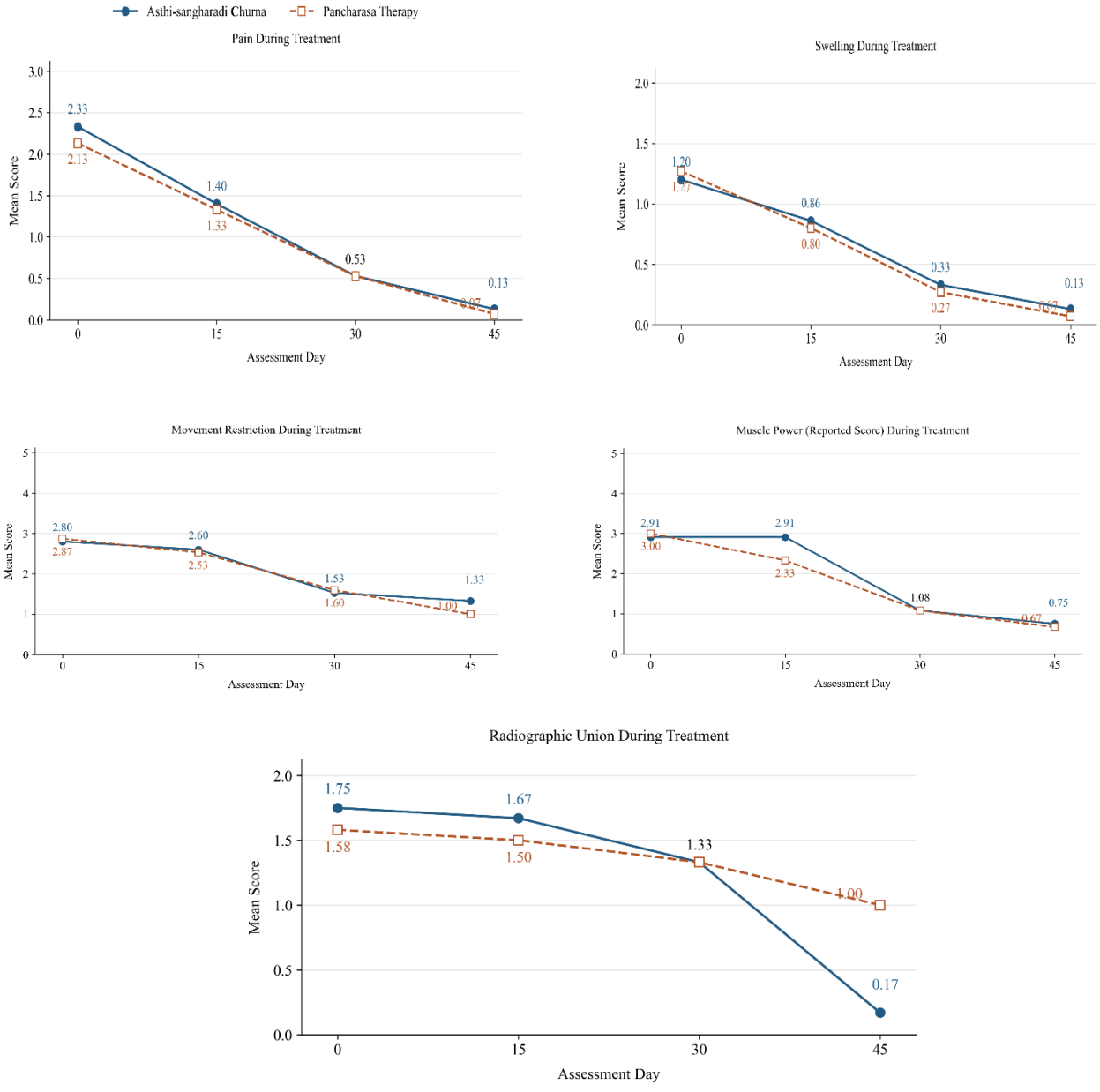
Assessment criteria

Clinical and radiographic assessments were performed at baseline and on Days 15, 30 and 45 using the criteria summarized in Table 2.

Table 2. Outcome assessment criteria

Parameter	Assessment and scoring
Pain	0: absent; 1: mild (1–4); 2: moderate (5–7); 3: severe (8–10)
Swelling	Circumference difference from the contralateral region: 0: absent; 1: ≤1 cm; 2: >1 cm
Joint movement	Goniometric grading: 0: no movement; 1: ≤20°; 2: 21–40°; 3: 41–60°; 4: 61–80°; 5: >81°*
Muscle power	Medical Research Council scale, graded 0–5
Radiographic assessment	Study-defined categories: 0: no callus; 1: soft callus; 2: hard callus

RESULT:



At day 45, pain and swelling were absent in 13/15 participants (86.7%) receiving *Asthi-sangharadi Churna* and 14/15 (93.3%) receiving *Pancharasa* therapy. Joint-movement and muscle-power grades showed descriptively more favourable distributions in the *Pancharasa* group. Hard callus was recorded in 10/15 participants (83.3%) in the *Asthi-sangharadi Churna* group, compared with 2/15 (16.7%) in the Pancharasa group.

DISCUSSION

Both groups showed clinical improvement over 45 days, although their outcome patterns differed. Pancharasa therapy showed descriptively more favourable symptom and functional outcomes, whereas hard-callus formation was more frequent in the *Asthi-sangharadi Churna* group.

The radiographic findings in the *Churna* group may be interpreted through the formulation's classical Sandhana-oriented rationale. Its ingredients, administered with *Ghrita* and *Kshira,* provide a traditional basis for supporting tissue repair and nourishment.[7–13] However, the observed callus formation cannot establish a specific mechanism of action or be attributed to an individual ingredient.

In the *Pancharasa* group, local application, gentle massage, heat and advised active movement may have contributed to reduced discomfort and improved mobility. This interpretation is consistent with the intended effects of *Snehana and Swedana* on stiffness and flexibility.[15] Since these measures were administered together, their individual contributions cannot be distinguished.

The differing clinical and radiographic patterns emphasize that symptomatic relief and structural healing should be assessed separately.[5,6] Improved movement does not independently confirm union, while hard-callus formation alone does not establish complete functional recovery.

The small sample, heterogeneous fracture sites, short follow-up and unexplained outcome denominators limit interpretation. Inconsistencies in the source statistical summaries also prevent reliable claims of comparative superiority. Larger studies with verified data and standardized assessments are required.

CONCLUSION

Both regimens were associated with clinical improvement. *Pancharasa* therapy showed descriptively more favourable symptom and functional outcomes, while hard-callus formation was more frequent in the *Churna* group. These preliminary observations warrant further investigation in larger controlled studies before definitive conclusions regarding comparative efficacy can be drawn. These findings do not establish overall superiority of either treatment.

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