

COMPARATIVE ASSESSMENT OF ANATOMICAL SITE FOR SIRAVEDHA (VENEPUNCTURE) – ABOVE AND BELOW KNEE JOINT IN THE MANAGEMENT OF GRIDHRASI (SCIATICA): RANDOMISED CONTROLLED TRIAL

Rahul R. Phate¹, Manju Agarwal², Mukesh Kumar Sharma³, Riju Agarwal⁴

¹PG Scholar, Postgraduate Department of Rachana Sharir, Ch. Brahm Prakash Ayurved Charak Sansthan, Khera Dabar, New Delhi, India

²Professor and Head, Department of Shalya Tantra, Ch. Brahm Prakash Ayurved Charak Sansthan, Khera Dabar, New Delhi, India

³Associate Professor, Postgraduate Department of Rachana Sharir, Ch. Brahm Prakash Ayurved Charak Sansthan, Khera Dabar, New Delhi, India

⁴Professor and Head, Department of Shalaky Tantra, Ch. Brahm Prakash Ayurved Charak Sansthan, Khera Dabar, New Delhi, India

ABSTRACT:

Raktamokshana is an important Ayurvedic therapeutic procedure, and *Siravedha* is its principal method of controlled bloodletting. In *Gridhrasi*, *Acharya Sushruta* specifically advises *Siravedha* to be performed four *Angula* above or below the *Janu Sandhi*. As *Siravedha* is an invasive procedure, its clinical effect depends not only on selecting the prescribed level but also on identifying a suitable superficial vein without damaging the adjacent neurovascular structures. The present study was conducted to compare the clinical response to *Siravedha* performed at four patient-specific *Angula* above and below the knee joint in patients with *Gridhrasi*. This single-centre, parallel-group randomised controlled trial enrolled 24 patients aged 25–45 years with clinically diagnosed *Gridhrasi/sciatica*. Participants were allocated through a computer-generated simple random sequence. Two participants from each group did not complete the study, leaving 20 participants for complete-case analysis. Group A received *Siravedha* four *Angula* above the knee joint, whereas Group B received *Siravedha* four *Angula* below the knee joint. A single procedure was performed on Day 7 using a sterile 20-G needle or scalp-vein set, with removal of approximately 30–40 mL of blood. Pain, Straight Leg Raise restriction, *Ruka*, *Stambha*, *Toda*, *Aruchi*, *Tandra*, *Gaurava*, and *Suptata* were assessed up to Day 28. Within-group changes were analysed using the Wilcoxon signed-rank test, while post-treatment comparisons between the groups were performed using the Mann–Whitney U test. Both groups demonstrated statistically significant within-group changes in all nine outcomes. For pain, Straight Leg Raise restriction, and *Ruka*, the median score changed from 2.00 to 0.50 in Group A and from 2.00 to 0.00 in Group B; the within-group p-value was 0.004 in both groups. None of the post-treatment intergroup comparisons were statistically significant. Group B showed a better descriptive clinical trend in pain, Straight Leg Raise restriction, *Ruka*, *Tandra*, and *Suptata*, but its superiority was not established. Both *Sushrutokta* levels were associated with clinical improvement in *Gridhrasi*, while the below-knee level showed only a comparatively favourable descriptive trend. At either level, *Siravedha* should be performed only after identifying a suitable superficial vein and avoiding deeper arterial and neural structures.

KEYWORDS: *Gridhrasi*; *sciatica*; *Siravedha*; *Raktamokshana*; *Janu Sandhi*; *Angula*; venepuncture; Straight Leg Raise.

1. INTRODUCTION

Gridhrasi is described under *Vatavyadhi* and is characterised by pain, stiffness, pricking sensation, and restricted movement of the affected lower limb. *Charaka* explains that the symptoms may begin in the *Sphika* and extend sequentially through *Kati*, *Prishtha*, *Uru*, *Janu*, *Jangha* and *Pada*:

“स्फिकपूर्वा कटिपृष्ठोरुजानुजङ्घापदं क्रमात्।

गृध्रसी स्तम्भरुक्तेर्देहृक्काले स्पन्दते मुहुः॥”

Charaka also includes *Siravedha*, *Basti*, and *Agnikarma* among the therapeutic measures recommended for *Gridhrasi*.^[1]

Madhava further describes the clinical features of *Gridhrasi* and includes restriction in active elevation of the affected lower limb, expressed as *Sakthikshepa Nigraha*, in its clinical presentation.^[2]

Siravedha occupies an important position among the methods of *Raktamokshana* described by *Sushruta*. For *Gridhrasi*, *Sushruta* provides a disease-specific anatomical instruction:

“जानुसन्धेरपर्यधो वा चतुरङ्गुले गृध्रस्याम्”

This statement advises *Siravedha* four *Angula* above or below the *Janu Sandhi*, thereby identifying two anatomical levels for the same disease.[3]

Later Ayurvedic texts also retain *Gridhrasi* within the broader framework of *Vatavyadhi* and describe therapeutic measures aimed at relieving *Vata*-related pain, stiffness, and functional restriction.[4]

Sciatica is a clinical syndrome in which pain radiates from the lower back or gluteal region into the lower limb, usually following irritation or compression of one or more lumbosacral nerve roots.[5] Reported prevalence varies considerably because studies use different definitions, populations, and diagnostic criteria.[6] Mechanical compression and inflammatory changes may coexist, and symptom intensity does not always correspond directly with the degree of visible structural change.[7]

Lumbar disc herniation is a frequent cause of sciatica, although spinal stenosis, degenerative changes, spondylolisthesis, and other spinal conditions may produce a similar pattern.[8] Low back pain with radiating leg symptoms can restrict mobility, occupational activity, and routine daily functioning.[9] The high prevalence of low back pain in the general population makes clinically relevant and accessible management strategies important.[10]

The Straight Leg Raise test is commonly used during clinical examination to assess lumbosacral nerve-root irritation in patients presenting with radiating lower-limb pain.[11]

The regions above and below the knee differ in their muscular bulk, fascial arrangement, and relationship of superficial and deep neurovascular structures.[12] The distal thigh contains substantial muscle mass and a thicker soft-tissue envelope, whereas the proximal leg contains a variable superficial venous network overlying the deep fascial and muscular compartments.[13] Important nerves around the knee include the saphenous nerve medially, the common fibular nerve around the neck of the fibula, and the tibial nerve in the deeper posterior region.[14] Superficial veins and their tributaries show considerable individual variation; therefore, a classical surface level should not automatically be equated with a fixed named vein.[15]

Although previous studies have examined *Siravedha* in *Gridhrasi*, direct clinical comparison of the two levels described by *Sushruta* remains limited. The present study was therefore undertaken to compare *Siravedha* performed four *Angula* above and below the knee joint.

1.1 Aim

To assess and compare the anatomical sites of *Siravedha* above and below the knee joint in the management of *Gridhrasi* with special reference to sciatica.

1.2 Objectives

1. To assess the clinical response to *Siravedha* performed four *Angula* above the knee joint.
2. To assess the clinical response to *Siravedha* performed four *Angula* below the knee joint.
3. To compare both levels using pain, Straight Leg Raise restriction, and the cardinal symptoms of *Gridhrasi*.
4. To interpret the findings with reference to the anatomical characteristics of the regions above and below the knee.

1.3 Hypothesis

Null hypothesis: There is no statistically significant difference between *Siravedha* performed above and below the knee joint.

Alternative hypothesis: There is a statistically significant difference between *Siravedha* performed above and below the knee joint.

2. Materials and Methods

2.1 Study Design and Setting

This was a single-centre, parallel-group, randomised comparative clinical trial conducted over 12 months in the Postgraduate Department of Rachana Sharir and the OPD/IPD of the Department of Shalya Tantra, Ch. Brahm Prakash Ayurved Charak Sansthan, Khera Dabar, New Delhi.

2.2 Ethical Approval and Trial Registration

The study was approved by the Institutional Ethics Committee of Ch. Brahm Prakash Ayurved Charak Sansthan under approval number CBP-IEC/2024/RS/MD/04. The trial was prospectively registered with the Clinical Trials Registry–India under registration number CTRI/2024/12/078778. Written informed consent was obtained from every participant before enrolment.

2.3 Participants

Patients aged 25–45 years with a clinical diagnosis of *Gridhrasi*/sciatica were screened for eligibility. Patients of either sex who were willing to participate and complete the scheduled follow-up were included.

Patients were excluded if they had another identifiable cause of low back pain, a major debilitating systemic disorder, coronary artery disease, hypertension, diabetes mellitus, tuberculosis, HIV, or hepatitis B infection. Pregnant and lactating women were excluded. Other exclusion criteria included haemoglobin below 10 g/dL, deranged bleeding or clotting time, spinal malignancy, spinal infection, inflammatory spondylitis, congenital vertebral deformity, traumatic *Gridhrasi*, postoperative complications, and systemic or metabolic causes of radiating pain.

2.4 Sample Size and Randomisation

The planned evaluable sample was 20 participants, with 10 participants in each group. The sample size was calculated using OpenEPI for two independent groups. To account for possible attrition, 24 participants were enrolled.

Participants were allocated in a 1:1 ratio through a computer-generated simple random sequence:

- **Group A:** *Siravedha* four *Angula* above the knee joint.
- **Group B:** *Siravedha* four *Angula* below the knee joint.

Twelve participants were allocated to each group. Two participants from each group did not complete the study, leaving ten participants per group for the final complete-case analysis.

2.5 Materials Used

The materials used during the standardised *Siravedha* procedure included a sterile 20-G scalp-vein set or needle, tourniquet, sterile gloves, measuring glass beaker, kidney tray, antiseptic solution, sterile cotton pads, dressing material, and bandage.



Figure 1. Materials and instruments used for the standardised Siravedha procedure.

2.6 Measurement of *Angula*

The participant's right hand was placed flat on a firm surface with the palmar surface facing downward. The linear span was measured from the lateral point of the proximal interphalangeal joint of the index finger to the medial point of the distal interphalangeal joint of the little finger.

Three measurements were obtained with a measuring scale, and their average was calculated. This average represented four *Angula* for that participant and was divided by four to derive one *Angula*. The individualised four-*Angula* distance was then marked above or below the knee according to group allocation.

2.7 Pre-procedure Preparation

Before the procedure, the participant underwent general and systemic examination. Laboratory screening included haemoglobin, bleeding time, clotting time, random blood glucose, HIV I and II, hepatitis B surface antigen, and anti-HCV testing.

The procedure was explained to the participant, vital signs were recorded, and the selected area was exposed. The skin was prepared using an antiseptic solution under aseptic precautions.



Figure 2. Cleaning and preparation of the selected area before Siravedha.

2.8 Intervention

Siravedha was performed once on Day 7 (single sitting). The participant was seated with the affected limb in a dependent position. After cleaning the area, a tourniquet was applied proximal to the selected region to make a suitable superficial vein prominent.

Within the allocated four-*Angula* level, the operator selected a visible or palpable superficial vein. The protocol did not assign a fixed named vein, and the identity of the punctured vessel was not confirmed by ultrasonography.

A sterile 20-G needle or scalp-vein set was introduced into the selected superficial vein. Approximately 30–40 mL of blood was collected in a measuring glass or kidney tray.

Group A: four *Angula* above the knee



Group B: four *Angula* below the knee



Figure 3. Clinical performance of *Siravedha*: (A) four *Angula* above the knee joint and (B) four *Angula* below the knee joint.

After the required amount of blood had been collected, the tourniquet was released, the needle was removed, and firm local pressure was applied. The puncture area was dressed and bandaged. The participant was advised to keep the limb elevated following the procedure. Standard aseptic and phlebotomy precautions were followed.[16]



Figure 4. Post-procedure compression and bandaging for haemostasis.

2.9 Assessment Schedule

Clinical assessment was performed on:

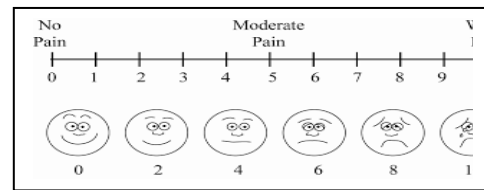
- Day 0
- Day 7
- Day 14
- Day 21
- Day 28

The principal statistical analysis compared the recorded before-treatment score with the final after-treatment score.

2.10 Outcome Measures

Pain was recorded on a 0–10 Visual Analogue Scale and subsequently classified into four categories. Straight Leg Raise restriction and the classical symptoms of Gridhrasi were assessed using ordinal gradation.

Pain (using VAS Scale from 0-10)
 0- No pain -0
 1-3 – Mild Pain -1
 4-6 – Moderate Pain -2
 7-10- Severe Pain -3



ASSESSMENT CRITERIA Rogbala [17,18]	(0)	(1)	(2)	(3)	(4)	(5)
<i>Ruka</i> (Pain)	No Pain	Painful movement without limping	Painful movement with limping but without support	Painful, can walk with support only	Painful, unable to walk	Severe pain needs medication
<i>Stambha</i> (Stiffness)	No stiffness	Mild stiffness for 5-10 min	Moderate stiffness for 10-60 min	Severe stiffness for more than 1 hour		
<i>Toda</i> (Pricking sensation)	No pricking sensation	Mild pricking sensation	Moderate pricking sensation	Severe pricking sensation		
<i>Aruchi</i> (Anorexia)	Normal taste, feeling to eat food at time	Annanabhilasha – not feeling like taking food even if hungry	Bhaktadvesha- irritability to touch, smell, see, and listen to food	Abhaktachchanda - aversion to food because of anger, stress, etc.		
<i>Tandra</i> (Drowsiness)	No Drowsiness	Mild with no interference in daily activities	Moderate with manageable interference in daily activities	Severe with unmanageable interference in daily activities		
<i>Suptata</i> (Numbness)	Absent	Mild	Moderate			
Gauravta (Heaviness)	No feeling of heaviness	Occasional feeling of heaviness not affecting normal movements	Occasional feeling of heaviness affecting normal movements	A feeling of heaviness throughout the day severely affects the normal movements	A feeling of heaviness throughout the day severely affects the normal movements	

The clinical photographs below represent illustrative before-and-after Straight Leg Raise assessments. Statistical results were derived from the recorded scores of all participants included in the final analysis and not from these photographs alone.

2.11 Statistical Analysis

Ordinal variables were summarised using the median and interquartile range. The Wilcoxon signed-rank test was applied for within-group before-and-after comparisons. The Mann–Whitney U test was used for intergroup comparisons.

A two-sided p-value below 0.05 was considered statistically significant. The analysis was based on participants who completed the intervention and follow-up. No adjustment for multiple outcome testing was reported.

3. RESULTS

3.1 Participant Flow

A total of 24 participants were randomised, with 12 allocated to each group. Two participants in each group did not complete the study. Twenty participants were included in the final analysis.

Study stage	Group A: above knee	Group B: below knee	Total
Randomised	12	12	24
Did not complete follow-up	2	2	4
Analysed	10	10	20

The attrition rate was 16.7% in each group.

3.2 Participant Characteristics

The demographic observations were recorded for all 24 randomised participants. Fifteen participants were female, and nine were male. The 32–38-year age group represented the largest proportion of the study population.

Characteristic	Group A, n=12	Group B, n=12	Total, n=24
Age 25–31 years	1	6	7
Age 32–38 years	5	4	9
Age 39–45 years	6	2	8
Male	5	4	9
Female	7	8	15
Sedentary work	8	8	16
Active work	3	4	7
Labour-intensive work	1	0	1

Irregular food habits were present in 16 participants, while 14 reported no regular physical exercise. *Vata* or *Vata-Kapha* predominance was frequently observed in the Ayurvedic baseline assessment. These observations describe the enrolled sample and cannot independently establish causation.

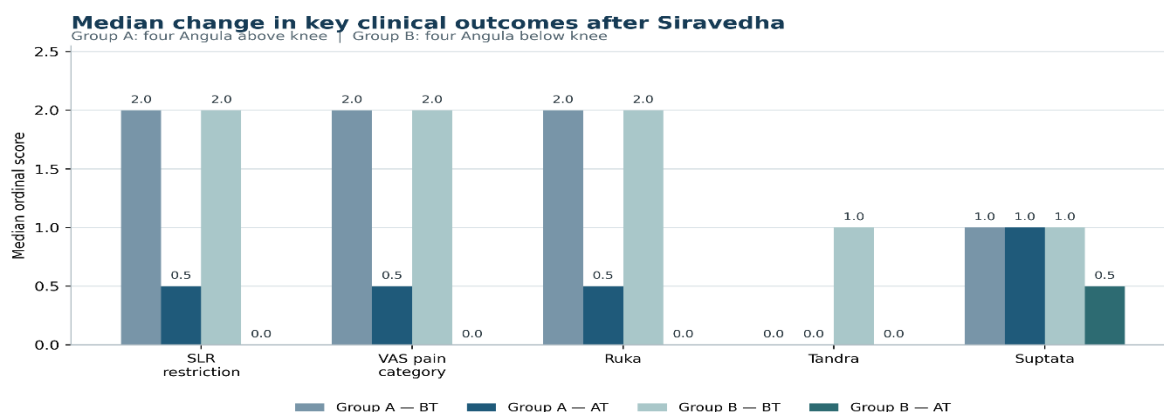
3.3 Clinical Outcomes

Both groups demonstrated statistically significant within-group changes in all nine assessed outcomes.

For SLR restriction, the median score decreased from 2.00 to 0.50 in Group A and from 2.00 to 0.00 in Group B. The within-group p-value was 0.004 in both groups. The post-treatment intergroup difference was not statistically significant.

The VAS pain category and Ruka followed the same pattern. Group A changed from a median of 2.00 to 0.50, while Group B changed from 2.00 to 0.00. Despite the larger descriptive median change in Group B, the post-treatment difference between groups remained non-significant.

Stambha, *Toda*, *Aruchi* and *Gaurava* reached a post-treatment median of 0.00 in both groups. *Tandra* and *Suptata* showed comparatively greater descriptive median changes in Group B, but their post-treatment intergroup comparisons were also non-significant.



Within-group $p < 0.05$ for all displayed outcomes; no AT between-group comparison was significant.

Graph: Combined comparison of key outcomes that showed a comparatively better clinical trend in Group B. BT, before treatment; AT, final after-treatment assessment. The outcome scales are ordinal and differ in range;

bar heights should not be compared across different outcomes. No post-treatment between-group comparison was statistically significant

Outcome	Group A BT median (IQR)	Group A AT median (IQR)	Within-group p	Group B BT median (IQR)	Group B AT median (IQR)	Within-group p	Intergr oup AT p
SLR restriction	2.00 (1.00)	0.50 (1.00)	0.004	2.00 (1.00)	0.00 (1.00)	0.004	0.661
VAS pain category	2.00 (0.00)	0.50 (1.00)	0.004	2.00 (0.25)	0.00 (1.00)	0.004	0.661
<i>Ruka</i>	2.00 (0.00)	0.50 (1.00)	0.004	2.00 (0.25)	0.00 (1.00)	0.004	0.661
<i>Stambha</i>	1.00 (1.00)	0.00 (0.00)	0.004	2.00 (1.00)	0.00 (0.00)	0.004	1.000
<i>Toda</i>	1.00 (1.00)	0.00 (1.00)	0.008	1.00 (0.25)	0.00 (1.00)	0.005	1.000
<i>Aruchi</i>	1.00 (0.00)	0.00 (0.00)	0.002	1.00 (0.00)	0.00 (0.00)	0.002	1.000
<i>Tandra</i>	0.00 (1.00)	0.00 (0.00)	0.046	1.00 (1.00)	0.00 (0.00)	0.014	1.000
<i>Gaurava</i>	1.00 (1.00)	0.00 (0.00)	0.014	1.00 (1.25)	0.00 (0.00)	0.014	1.000
<i>Suptata</i>	1.00 (1.00)	1.00 (1.00)	0.020	1.00 (0.25)	0.50 (1.00)	0.020	0.661

BT: before treatment; AT: final after-treatment assessment; IQR: interquartile range; SLR: Straight Leg Raise. Although the median of *Tandra* in Group A and *Suptata* in Group A remained unchanged, their Wilcoxon signed-rank p-values were significant. This indicates a change in the paired distribution of individual scores that was not fully represented by the group median.

3.4 Comparative Interpretation

Both groups showed significant within-group improvement. Group B demonstrated a comparatively better descriptive trend in:

- SLR restriction
- VAS pain category
- *Ruka*
- *Tandra*
- *Suptata*

The final post-treatment intergroup comparisons were not statistically significant. Therefore, the findings do not establish the superiority of the below-knee level.

4. DISCUSSION

4.1 Principal Findings

The present study directly compared the two anatomical levels described by *Sushruta* for *Siravedha* in *Gridhrasi*. Both levels were associated with statistically significant short-term changes in pain, SLR restriction, and the assessed classical symptoms.

Group B demonstrated a larger descriptive median change in SLR restriction, VAS pain category, and *Ruka*. *Tandra* and *Suptata* also showed a comparatively better descriptive response in Group B. Nevertheless, none of the post-treatment comparisons between the groups reached statistical significance. The below-knee level can therefore be described as showing a better clinical trend, but not as being statistically superior.

The within-group and intergroup findings answer different questions. A significant within-group change indicates that participant scores changed during follow-up. It does not, by itself, prove that the change occurred because of the selected anatomical level. A statistically significant intergroup difference would have been required to establish that one level performed better than the other, and such a difference was not demonstrated. Both groups received an active *Siravedha* procedure, and the study did not include an untreated, sham-procedure, or usual-care group. The observed within-group improvement may therefore include the effects of the intervention.

4.2 Interpretation of Clinical Outcomes

Pain, *Ruka* and SLR restriction followed a similar pattern. Both groups improved significantly, while Group B achieved a post-treatment median of zero. This suggests a favourable clinical response below the knee, but the post-treatment distributions of the two groups were statistically comparable.

Improvement in SLR restriction may reflect reduced pain-related limitation during lower-limb elevation. However, the study did not consistently evaluate motor power, reflexes, dermatomal sensory loss, nerve conduction or radiological changes. Improvement in SLR should therefore be interpreted as clinical functional improvement and not as evidence of structural nerve-root recovery.

Both groups reached a post-treatment median of zero for *Stambha*, *Toda*, *Aruchi* and *Gaurava*. These outcomes did not indicate a site-specific advantage.

For *Tandra*, Group A began with a median of zero, while Group B began with a median of one. The larger reduction in Group B partly reflects this baseline difference. Similarly, Group B showed a greater median

reduction in *Suptata*, but the post-treatment intergroup difference was non-significant. These findings support cautious description rather than a claim of superiority.

4.3 Relation to Previous Clinical Evidence

Vaneet Kumar and colleagues compared *Siravedha* with *Agnikarma* in *Gridhrasi* and reported improvement with both procedures.[17] That study supports the clinical relevance of *Siravedha* but does not compare the above-knee and below-knee levels. The present trial extends this work by directly comparing the two *Sushrutokta* levels.

A review of research on *Raktamokshana* documented its study in several Ayurvedic disease conditions and highlighted continuing clinical interest in bloodletting procedures.[18] However, the evidence remains heterogeneous, and procedure-specific as well as site-specific trials are necessary before drawing broader conclusions.

4.4 Ayurvedic Interpretation

Gridhrasi is predominantly understood as a *Vata* disorder, with *Ruka*, *Stambha*, *Toda* and restricted movement as major features. *Tandra*, *Gaurava* and *Aruchi* may indicate *Kapha* association in some participants.

The study interprets the response to *Siravedha* through *Raktamokshana*, *Srotoshodhana* and *Vatanulomana*. Controlled removal of blood is traditionally understood to reduce local *Dosha-Dushya* accumulation and relieve obstruction to the normal movement of *Vata*. In *Vata-Kaphaja Gridhrasi*, this may also be interpreted as a reduction of *Vata-Kapha Avarana*.

These Ayurvedic concepts provide the classical explanation for the observed clinical response. They were not measured as independent biological outcomes and should therefore remain interpretive rather than being presented as experimentally demonstrated mechanisms.

4.5 Contemporary Clinical Interpretation

Sciatica is clinically heterogeneous and may arise from nerve-root compression, inflammation, degenerative change, or a combination of factors.[19] The participants in this study were diagnosed clinically, and uniform imaging confirmation was not available. The trial population should therefore be described as clinically diagnosed *Gridhrasi*/sciatica rather than as a homogeneous imaging-confirmed radiculopathy cohort.

The study proposes that controlled venepuncture may influence local venous congestion, tissue pressure, microcirculation and pain perception. These mechanisms were not directly evaluated. Venous pressure, local perfusion, inflammatory biomarkers and neurophysiological changes were not measured. Such explanations should consequently be treated as hypotheses for future investigation.

Disc degeneration and related clinical symptoms are influenced by complex individual factors and do not follow a single structural or lifestyle explanation.[20] The sedentary work, irregular food habits, limited physical activity, and psychological stress observed among the participants are therefore descriptive characteristics. They cannot be interpreted as independently established causes because the study did not include an external control population.

4.6 Anatomical Interpretation Above the Knee

At the above-knee level, the selected region lies within the distal thigh. Superficial venous channels and their tributaries are present in the subcutaneous plane. However, the distal thigh generally contains greater muscular bulk, a stronger fascial envelope, and variable subcutaneous tissue thickness.

These features may influence the visibility and palpability of superficial veins. In some individuals, superficial venepuncture may therefore be technically less convenient than in a region with less soft-tissue bulk. The trial did not measure vein depth, vein diameter, visibility, palpability, procedural time, or the number of puncture attempts. Consequently, reduced procedural convenience at the above-knee level was not objectively demonstrated.

Deep advancement should be avoided because the major vessels and nerves of the distal thigh and popliteal region lie in deeper planes. *Siravedha* at this level should remain confined to a clearly identified superficial vein.

4.7 Anatomical Interpretation Below the Knee

The below-knee level lies within the proximal leg. Superficial venous channels and their tributaries are present in its subcutaneous tissue. In some individuals, reduced soft-tissue bulk may make a superficial vein more visible or palpable.

This anatomical feature may explain the practical impression of easier venous access below the knee. However, the superficial venous pattern is variable, and the study did not confirm the identity of the punctured vessel. It cannot therefore be stated that a particular named vein was consistently punctured.

Important neural and vascular structures must be considered during site selection. The common fibular nerve is particularly vulnerable around the fibular neck. The saphenous nerve may lie close to superficial venous structures medially. The tibial nerve and popliteal vessels occupy the deeper posterior region. These structures should not be approached through blind or deep needle advancement.

The comparatively better descriptive trend in Group B may be associated with easier superficial venous access, but this explanation was not tested. No ultrasound mapping or procedural-access measurement was performed. Anatomical convenience should therefore be presented as a possible interpretation rather than a confirmed mechanism of better clinical response.

4.8 Procedural Safety Interpretation

The classical four-*Angula* description identifies the level for *Siravedha* but does not remove the need for individual anatomical assessment. Before puncture, the operator should identify a suitable superficial vein through inspection and palpation.

The selected vein should be superficial, visible or clearly palpable and capable of being stabilised. Blind puncture, repeated probing and excessive needle depth should be avoided. The procedure should be discontinued if the participant experiences sharp electric pain, marked paraesthesia or unexpected severe discomfort because these may indicate neural irritation.

A pulsatile vessel should not be punctured. The posterior knee region should be approached cautiously because major vessels and nerves lie in the deeper plane. Aseptic preparation, controlled puncture, limited blood removal, careful needle withdrawal and adequate post-procedure compression are essential.

The trial did not systematically document all adverse events. Firm conclusions regarding comparative safety cannot therefore be drawn from the current data.

4.9 Clinical Implications and Future Scope

Within the limits of the present study, either *Sushrutokta* level may be considered when an appropriate superficial vein can be identified. The below-knee level showed a better descriptive clinical trend but cannot be recommended as universally superior.

Future studies should include larger multicentre samples and longer follow-up. A single primary outcome should be prespecified, preferably continuous pain intensity or a validated functional-disability measure. Effect sizes and confidence intervals should be reported in addition to p-values.

Ultrasound mapping could document the exact superficial vein, its diameter, depth and relationship with nearby nerves and arteries. Procedural variables such as vessel visibility, number of attempts, time required for access, bloodletting duration and participant discomfort should also be recorded.

Future trials should include blinded outcome assessment, allocation concealment and intention-to-treat analysis. A structured adverse-event table is necessary to evaluate local bleeding, haematoma, infection, vasovagal reactions, neural irritation and accidental arterial puncture. Objective assessments such as MRI, neurological examination or nerve-conduction testing may further clarify whether clinical improvement is accompanied by measurable neurological change.

5. Conclusion

Siravedha performed four patient-specific *Angula* above and below the knee joint, which was associated with significant within-group improvement in the assessed symptoms of *Gridhrasi*. Both groups improved in pain, SLR restriction, *Ruka*, *Stambha*, *Toda*, *Aruchi*, *Tandra*, *Gaurava*, and *Suptata*.

No statistically significant post-treatment difference was identified between the two groups. Although the below-knee group showed comparatively greater descriptive changes in SLR restriction, VAS pain, *Ruka*, *Tandra* and *Suptata*, these findings do not establish its statistical superiority.

The below-knee level may provide easier access to a superficial vein in some patients because of regional soft-tissue characteristics. However, this anatomical convenience was not objectively evaluated through ultrasound or procedural measurements. Both *Sushrutokta* levels should therefore be regarded as clinically comparable within the limits of the present study.

Selection of the *Siravedha* level should be guided by the classical four-*Angula* instruction, individual surface anatomy, and identification of a suitable superficial vein. Deep or blind puncture must be avoided to protect the adjacent arterial and neural structures.

6. Strengths

The study has several clinically relevant strengths:

1. It directly compared the two disease-specific *Siravedha* levels described by *Sushruta*.
2. The four-*Angula* distance was individualised instead of being converted into a fixed distance for every participant.
3. Both groups received a standardised single procedure using the same needle gauge and approximate bloodletting volume.
4. Pain, SLR restriction and the classical symptoms of *Gridhrasi* were evaluated.
5. Assessments were repeated up to Day 28.
6. Appropriate non-parametric tests were applied to the ordinal outcome data.
7. Attrition was numerically balanced between the two groups.

7. LIMITATIONS

The results should be interpreted within the following limitations:

1. Only 20 participants were included in the complete-case analysis.
2. The study was conducted at a single centre.
3. The follow-up period was limited to Day 28.

8. DECLARATIONS

Ethics approval: Institutional Ethics Committee, Ch. Brahm Prakash Ayurved Charak Sansthan; approval number CBP-IEC/2024/RS/MD/04.

Trial registration: Clinical Trials Registry–India; CTRI/2024/12/078778.

Consent to participate: Written informed consent was obtained from all participants.

Consent for publication: Specific written consent for publication of the clinical photographs must be confirmed before journal submission.

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