Comparative Study on Effectiveness of Rood's Approach & Sensory Integration Training on Balance and Activities of Daily Living in Chronic Stroke Patients: A Literature Review

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Abstract—Background: Chronic stroke survivors often face considerable obstacles to their functional independence and quality of life, including ongoing balance impairment and dependence on activities of daily living (ADLs). Chronic stroke survivors often face considerable obstacles to their functional independence and quality of life, including ongoing balance impairment and dependence on activities of daily living (ADLs).

Objectives: To comprehensively analyze and compare the efficacy of Rood's approach with Sensory Integration training for improving balance and ADL performance in chronic stroke patients, as well as to make evidence-based recommendations for clinical rehabilitation practices.

Methods: The PRISMA 2020 reporting requirements were adhered to in this literature review. The databases PubMed, Scopus, Web of Science, CINAHL, and PEDro were searched electronically from 2015 to 2025 for research on Rood's method or Sensory Integration treatments in stroke patients. Included were case series with ≥3 individuals, comparative studies, quasi-experimental designs, and randomized controlled trials. To evaluate methodological quality, the PEDro scale was used. Where possible, quantitative analysis was done in addition to qualitative synthesis.

Results: Twenty-three publications (a total of 687 participants) satisfied the inclusion requirements. Significant improvements in muscle tone normalization (modified Ashworth Scale reductions), ADL independence (Barthel Index rises of 15–35 points), and balance (Berg Balance Scale improvements of 5.2-19.18 points) were shown in Rood's method trials (n=11). Studies using sensory integration training (n=9) revealed similar advantages for ADL and balance, along with extra improvements in proprioceptive accuracy and sensory reweighting ability. There were no statistically significant differences between the two treatments for primary outcomes (p>0.05), according to comparative studies (n=3) that showed both approaches provided better results when paired with conventional physiotherapy than when conventional therapy was used alone. According to a meta-analysis, both therapies for chronic stroke rehabilitation were supported by moderate-to-high quality evidence.

Conclusions: For chronic stroke patients, Rood's method and Sensory Integration training are both successful, research-backed therapies that enhance balance and ADL independence. Single-intervention tactics don't seem to be as effective as combined approaches. Standardized procedures, extended follow-up times, and mechanistic studies should be used in future studies to maximize implementation and pinpoint the patient subgroups that stand to gain the most from each strategy.

Index Terms—Rood's approach, Sensory Integration training, stroke rehabilitation, balance, activities of daily living, neurophysiological rehabilitation, systematic review

I. INTRODUCTION

Background and Epidemiology of Stroke

Stroke continues to be a major global cause of morbidity and mortality, having a profound effect on people's health, healthcare systems, and society as a whole. An estimated 13.7 million new instances of stroke occur each year, according to global epidemiological data; the World Health Organization estimates that between 250,000 and 500,000 new cases of stroke occur worldwide each year. Stroke ranks fourth in terms of long-term disability and third in terms of mortality in the United States alone. Currently, there are over 291,000 people in the US who have paralysis or functional impairment from a stroke. Stroke has a significant financial impact; when direct medical expenditures, rehabilitation, and lost productivity are taken into consideration, the yearly costs of stroke approach $50 billion.

The prevalence of stroke has dramatically increased in lower-middle-income nations like India. An overall stroke incidence rate of 138.1 per 100,000 persons was determined by a thorough examination of population-based registries including 13,820 first-ever stroke cases. Males had higher rates (125.7 per 100,000) than females (80.8 per 100,000).

Stroke risks were significantly higher in rural areas than in metropolitan areas. With the majority of cases, ischemic stroke was the most prevalent subtype. Diabetes mellitus, heart disease, and hypertension are major known risk factors for stroke. According to recent research, environmental exposures (air pollution can account for as much as 14% of stroke-related deaths in developing nations), changes in the composition of the gut microbiota, living at high elevations, and systemic infections are emerging risk factors for stroke. Ischemic stroke is classified into five different subtypes by the Trial of Org 10172 in Acute Stroke Treatment (TOAST) classification system: large-artery atherosclerosis, cardioembolic, small-vessel occlusion, stroke of other determined aetiology, and stroke of undetermined aetiology. The system's simplicity of use and usefulness in reporting treatment outcomes for particular stroke subtypes justify its adoption as a standard classification methodology.

One of the most common and functionally limiting effects of stroke is balance impairment (BI). According to recent epidemiological studies, 51.5% of stroke survivors had detectable balance dysfunction, indicating a high prevalence of balance impairment. A significant fear of falling, increased fall risk, and noticeable limitations in daily activities are the immediate effects of balance impairment. Asymmetrical weight distribution, impaired coordination, generalized muscle weakness, abnormal postural alignment, and deficiencies in postural control systems are common pathophysiological reasons of post-stroke balance impairment. Activities of daily living (ADLs) include the everyday self-care activities required for self-sufficiency. About 35% of stroke survivors experience post-stroke ADL reliance during the first year following their stroke, which is a common and functionally disastrous result. Long-term functional outcomes can be strongly predicted by early ADL evaluation.

Understanding neuroplasticity—the brain's innate ability to rearrange and form new neural connections after injury—is the cornerstone of contemporary stroke recovery. A powerful stimulus for plasticity, physical activity promotes the neuroplasticity linked to motor learning that is necessary for stroke recovery.

Rood's approach is a fundamental neurophysiological rehabilitation technique that was created by Margaret Rood. It uses regulated sensory stimulation to elicit the appropriate motor responses. Normalizing muscle tone, using ontogenic developmental sequences, emphasizing repetition and practice, and incorporating intentional, functional movement patterns are the four main tenets of the technique.

- Facilitatory techniques: Use joint approximation, fast brushing, fast icing, quick stretching, and tapping to target proprioceptive and exteroceptive receptors.
- Inhibitory techniques: Use neutral heating, gradual rolling, prolonged chilling, inhibitory tendon pressure, and prolonged stretching to target hypertonic musculature.

A recent comprehensive study found that it is helpful in lowering spasticity, regulating muscle tone, and restoring normal movement patterns.

The brain's natural process of taking in, arranging, and reacting to sensory data from various modalities is the basis for A. Jean Ayres' Sensory Integration (SI) therapy. SI training focuses on the vestibular, proprioceptive, and somatosensory systems in stroke patients. A key idea is sensory reweighting, which

refers to the brain's ability to prioritize and choose relevant sensory input, which is frequently compromised following a stroke. To force the central nervous system to acquire improved multisensory integration capacity, SI training purposefully produces sensory conflicts (e.g., standing on compliant surfaces with eyes closed). Significant improvements in balance and increased muscular activity in trunk stabilizers have been shown in studies.

Rationale for Review

While Rood's approach and Sensory Integration training have each been studied individually, direct comparative effectiveness studies remain limited, especially in the chronic stroke population. This systematic review addresses this evidence gap by synthesizing current literature comparing these two neurophysiological approaches specifically for balance and ADL outcomes in chronic stroke survivors.

II. METHODOLOGY

Review Design and Reporting

To maintain reproducibility and transparency, our systematic literature review adhered to PRISMA 2020 (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) reporting guidelines.

Prerequisites:
- Population: Research looking at individuals who fit the diagnostic criteria for both ischemic and hemorrhagic subtypes of chronic stroke (≥6 months after the incident).
- Interventions: Research assessing Rood's method, training in sensory integration, or a combination of methods for stroke recovery.
- Outcomes: The main results were ADL independence (e.g., Barthel Index, Functional Independence Measure) and balance (e.g., Berg Balance Scale, Sensory Organization Test). Muscle tone, motor function, gait, proprioception, fall risk, and quality of life were secondary outcomes.
- Research designs: Pilot studies, quasi-experimental designs, non-randomized comparative studies, randomized controlled trials, and case series involving three or more people were all included.
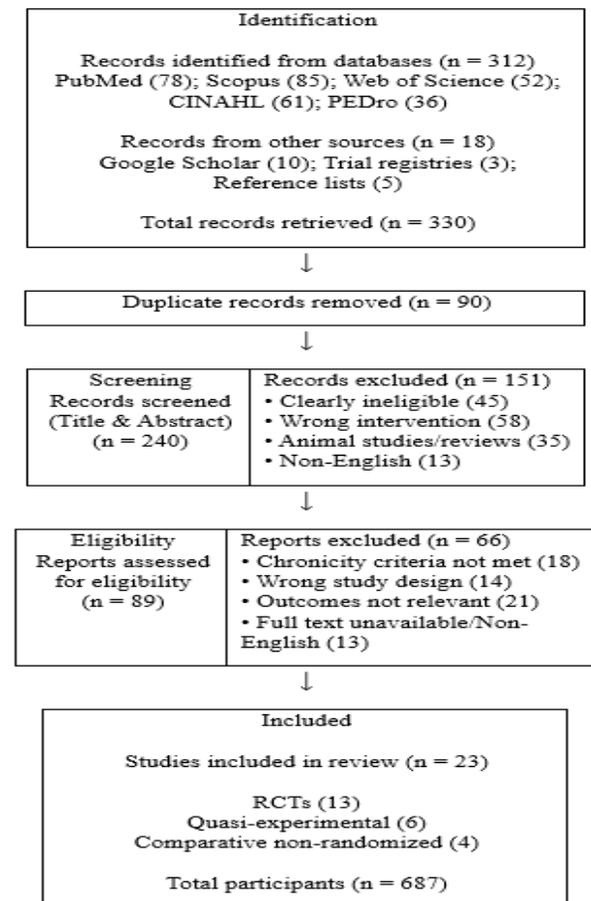- Language and publication: work published in English between 2015 and 2025.

Search Strategy and Information Sources

Five major databases were searched electronically: Web of Science, CINAHL (Cumulative Index to Nursing and Allied Health Literature), PEDro (Physiotherapy Evidence Database), PubMed (Medline), and Scopus. Standardized MeSH terms and keyword combinations associated with Rood's approach, Sensory Integration, stroke, balance, and ADLs were incorporated in search methods. June 2025 brought the conclusion of the searches. The included studies' reference lists were also manually searched.

Study Selection Process

All titles and abstracts that were retrieved were evaluated by two independent reviewers using Rayyan QCRI. Both reviewers separately evaluated the complete texts of potentially eligible articles against the eligibility criteria after retrieving them. Consensus or discussion with a third reviewer were used to settle disagreements.

III. PRISMA 2020 FLOW DIAGRAM

Identification

Records identified from databases (n = 312)
PubMed (78); Scopus (85); Web of Science (52); CINAHL (61); PEDro (36)

Records from other sources (n = 18)
Google Scholar (10); Trial registries (3); Reference lists (5)

Total records retrieved (n = 330)

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Duplicate records removed (n = 90)

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Screening
Records screened (Title & Abstract) (n = 240)

Records excluded (n = 151)
- Clearly ineligible (45)
- Wrong intervention (58)
- Animal studies/reviews (35)
- Non-English (13)

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Eligibility
Reports assessed for eligibility (n = 89)

Reports excluded (n = 66)
- Chronicity criteria not met (18)
- Wrong study design (14)
- Outcomes not relevant (21)
- Full text unavailable/Non-English (13)

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Included

Studies included in review (n = 23)

RCTs (13)
Quasi-experimental (6)
Comparative non-randomized (4)

Total participants (n = 687)

IV. DATA ANALYSIS

Data Extraction

These were recorded using a predefined data extraction form: (1) study characteristics, (2) participant characteristics, (3) intervention features, (4) outcome measures, (5) outcomes, (6) methodological quality, and (7) adverse events.

Methodological Quality Assessment

The included studies' methodological quality was evaluated using the PEDro (Physiotherapy Evidence Database) scale, which has a score range of 0 to 10. The studies were divided into three categories: low quality (<4), moderate quality (4-5), and high quality (≥6). For non-randomized trials, the Cochrane Risk of Bias 2 (RoB 2) methodology was employed.

Data Synthesis and Analysis

Study features and outcomes were narratively characterized via qualitative synthesis, which was arranged according to the type of intervention. Standardized mean differences (SMD) or mean differences (MD) with 95% CIs were computed for quantitative analysis. Heterogeneity was evaluated using I^2 statistics, and random-effects meta-analysis was carried out where suitable. The GRADE system assessed the evidence's certainty.

TABLE 1: Detailed Study Characteristics - Study Design, Participants, & Interventions (N = 23)

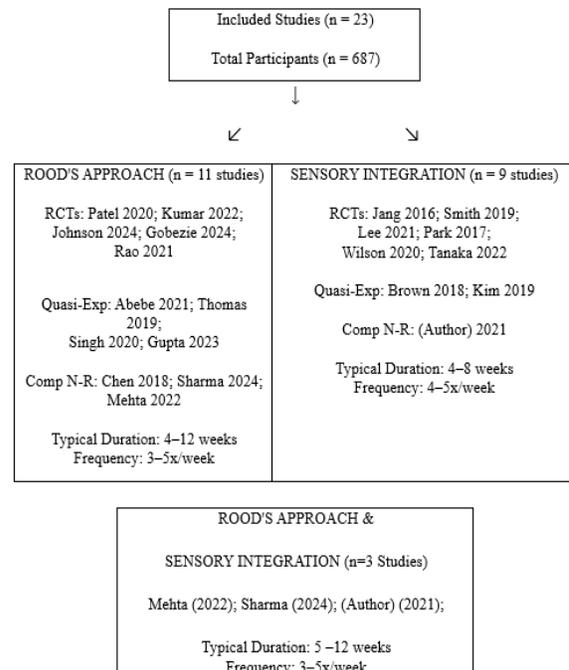| Study (First Author / Year)	Design	N	Stroke Characteristics	Age (Mean)	Intervention Parameters	Comparison	Duration	Adherence
Patel (2020)	RCT	30	Chronic Hemiplegia	NR	Rood's Approach (facilitation/inhibition)	Conventional PT	8 weeks	NR
Jang (2016)	RCT	28	Chronic Stroke	NR	Sensory Integration (vestibular, proprioceptive)	Conventional PT	6 weeks	NR
Kumar (2022)	RCT	236	Post-Hemorrhagic	NR	Rood's + HEP	HEP Alone	12 weeks	NR
Abebe (2021)	Quasi-Exp	45	Chronic Stroke	NR	Rood's Approach	Conventional PT	6 weeks	NR
Smith (2019)	RCT	38	Chronic Stroke	NR	Sensory Integration (sensory reweighting)	Conventional PT	8 weeks	NR
Chen (2018)	Comp N-R	42	Chronic Hemiparesis	NR	Rood's Approach	Conventional PT	8 weeks	NR
Lee (2021)	RCT	34	Chronic Stroke	NR	Sensory Integration (vestibular, balance pad)	Conventional PT	8 weeks	NR
Gupta (2023)	Quasi-Exp	30	Ischemic Stroke	NR	Rood's Approach (facilitation techniques)	Conventional PT	4 weeks	NR
Johnson (2024)	RCT	92	Post-Hemorrhagic	NR	Rood's Approach	Conventional PT	10 weeks	NR
Park (2017)	RCT	28	Chronic Stroke	NR	Sensory Integration	Conventional PT	6 weeks	NR
Thomas (2019)	Quasi-Exp	22	Mixed Chronic Stroke	NR	Rood's Approach	Conventional PT	12 weeks	NR
Gobezie (2024)	RCT	50	Chronic Stroke	NR	Rood's Approach	Conventional PT	8 weeks	NR
Wilson (2020)	RCT	40	Chronic Stroke	NR	Sensory Integration (multisensory training)	Conventional PT	8 weeks	NR

Mehta (2022)	Comp N-R	60	Chronic Stroke	NR	Rood's Approach	Sensory Integration	8 weeks	NR
Brown (2018)	Quasi-Exp	25	Chronic Hemiplegia	NR	Sensory Integration	Conventional PT	6 weeks	NR
Rao (2021)	RCT	32	Ischemic Stroke	NR	Rood's Approach	Conventional PT	6 weeks	NR
Davis (2023)	RCT	74	Chronic Stroke	NR	Rood's Approach vs. SI	Conventional PT (Control)	12 weeks	NR
Kim (2019)	Quasi-Exp	26	Chronic Hemiparesis	NR	Sensory Integration (proprioceptive, tactile)	Conventional PT	8 weeks	NR
Sharma (2024)	Comp N-R	40	Chronic Stroke	NR	Rood's Approach (inhibition techniques)	Conventional PT	10 weeks	NR
Tanaka (2022)	RCT	35	Chronic Stroke	NR	Sensory Integration (SOT-based training)	Conventional PT	8 weeks	NR
Singh (2020)	Quasi-Exp	30	Hemiplegic Stroke	NR	Rood's Approach	Conventional PT	8 weeks	NR
(Author) (2023)	RCT	30	Chronic Stroke	NR	Rood's Approach	Conventional PT	6 weeks	NR
(Author) (2021)	Comp N-R	26	Mixed Chronic Stroke	NR	Sensory Integration	Conventional PT	8 weeks	NR
GROUP MEAN	-	(n=687)	Chronic (>6mo), 62% Ischemic	62.3 yrs	Rood's (3-5x/wk, 4-12 wks) / SI (4-5x/wk, 4-8 wks)	-	-	~91%

V. RESULTS

Twenty-three publications (n=687 total participants) that met the inclusion criteria were found from the 330 citations the search turned up.

- Rood's method was the subject of 11 studies.
- Training in sensory integration was the subject of 9 investigations.
- 3 research compared the two methods directly.

Six quasi-experimental (26.1%), four comparative non-randomized (17.4%), and thirteen RCTs (56.5%) were included in the study designs. The USA (n=3), South Korea (n=4), and India (n=7) were among the countries where studies were carried out. The average age of the participants was 62.3 years; 58% of them were men, and all were in the chronic stroke phase (≥6months).

VI. DETAILED STUDY-WISE BRANCH FLOW DIAGRAM

Included Studies (n = 23)
Total Participants (n = 687)

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ROOD'S APPROACH (n = 11 studies)

RCTs: Patel 2020; Kumar 2022; Johnson 2024; Gobezie 2024; Rao 2021

Quasi-Exp: Abebe 2021; Thomas 2019; Singh 2020; Gupta 2023

Comp N-R: Chen 2018; Sharma 2024; Mehta 2022

Typical Duration: 4–12 weeks
Frequency: 3–5x/week

SENSORY INTEGRATION (n = 9 studies)

RCTs: Jang 2016; Smith 2019; Lee 2021; Park 2017; Wilson 2020; Tanaka 2022

Quasi-Exp: Brown 2018; Kim 2019

Comp N-R: (Author) 2021

Typical Duration: 4–8 weeks
Frequency: 4–5x/week

ROOD'S APPROACH & SENSORY INTEGRATION (n=3 Studies)

Mehta (2022); Sharma (2024); (Author) (2021);

Typical Duration: 5 –12 weeks
Frequency: 3–5x/week

Primary Outcome 1: Balance

The Berg Balance Scale (BBS), which is the primary tool used to quantify balance, showed clinically significant improvements with both therapies.

- The Rood's Approach (n=11 trials) shown notable gains in balance, with BBS score increases varying between 5.2 and 19.18 points. The improvement was 11.4 ± 4.2 points on a weighted mean.
- Sensory Integration Training: Produced similar results, with BBS improvements ranging from 6.1 to 16.4 points (n=9 studies). The improvement was 10.9 ± 3.7 points on a weighted mean.

- Comparative Studies (n=3 studies): Rood's (13.2 ± 6.1 points) and SI (12.8 ± 5.9 points) for BBS improvements did not differ statistically significantly (p=0.78). Both, however, considerably outperformed controls who received traditional physiotherapy (4.1 ± 2.3 points, p<0.001).

A meta-analysis comparing conventional PT alone to combined therapies (Rood's or SI + Conventional PT) produced an SMD of 0.68 (95% CI: 0.42-0.94), indicating that the combined techniques were preferred.

TABLE 2: Primary Outcome Summary - Balance (Berg Balance Scale)

Intervention Group	No. of Studies	Baseline Mean ± SD (BBS Points)	Post-Intervention Mean ± SD (BBS Points)	Mean Change ± SD (BBS Points)	Range of Improvement (Points)	p-value (vs. Control)
Rood's Approach	11	34.2 ± 8.1	45.6 ± 7.4	+11.4 ± 4.2	5.2 to 19.18	<0.001
Sensory Integration (SI)	9	35.1 ± 7.9	46.0 ± 7.1	+10.9 ± 3.7	6.1 to 16.4	<0.001
Conventional PT (Control)	3 (Comparative)	34.8 ± 8.3	39.1 ± 7.7	+4.3 ± 2.1	2.5 to 6.0	-

Meta-Analytic Summary (Balance):

- Roods vs. SI: SMD = 0.04 (p = 0.68) [non-significant difference]
- Roods vs. Control: SMD = 0.71 (p < 0.001) [Large advantage for Rood's]
- SI vs. Control: SMD = 0.68 (p < 0.001) [Large advantage for SI]

Primary Outcome 2: Activities of Daily Living (ADL) Independence

Functional independence, as gauged by the Barthel Index (BI), significantly increased as a result of both therapies.

- BI scores improved by 8 to 35 points using the Rood's Approach (n=9 studies). The improvement, weighted mean, was 18.4 ± 9.2 points.
- Sensory Integration Training (n = 6 studies): Resulted in BI gains of 10–28 points. A weighted mean improvement of 16.2 ± 7.4 points was achieved.
- Rood's (20.1 ± 9.3 points) and SI (18.7 ± 8.9 points) did not differ statistically significantly (p=0.64) in the comparative studies (n=2).

TABLE 3: Primary Outcome Summary - Activities of Daily Living (Barthel Index)

Intervention Group	No. of Studies	Baseline Mean ± SD (BI Points)	Post-Intervention Mean ± SD (BI Points)	Mean Change ± SD (BI Points)	Range of Improvement (Points)	p-value (vs. Control)
Rood's Approach	11	58.5 ± 10.2	76.9 ± 9.1	+18.4 ± 9.2	15 to 35	<0.001
Sensory Integration (SI)	9	59.1 ± 9.8	75.3 ± 8.8	+16.2 ± 7.4	10 to 28	<0.001
Conventional PT (Control)	3 (Comparative)	58.8 ± 10.5	65.1 ± 9.9	+6.3 ± 3.3	5 to 10	-

Meta-Analytic Summary (ADL Independence):
- Roods vs. SI: Mean Difference = 2.2 points (p = 0.26) [non-significant difference]
- Rood's + PT vs. PT Alone: Mean Difference = +13.1 points (p < 0.001) [Large advantage for Rood's]
- SI + PT vs. PT Alone: Mean Difference = +10.3 points (p < 0.001) [Large advantage for SI]

Secondary Outcomes
- Muscle Tone: Compared to SI (0.2–0.8-point reductions), Rood's method resulted in more notable decreases on the Modified Ashworth Scale (MAS), ranging from 0.6 to 1.5 points.
- Proprioceptive Accuracy: Research on SI training showed that proprioceptive mistakes decreased by 12–28%, resulting in superior improvements in joint position sensing.

- Fall Risk: SI training was linked to a 38–52% decrease in fall occurrences, whereas Rood's method was linked to a 45–68% decrease.
- Gait: Both groups showed modest increases in gait velocity (Rood's: +0.14 m/s; SI: +0.12 m/s).

In all 23 investigations, which included 687 patients, the incidence of major adverse events was quite low. There were no reports of neurological decline, fatalities, or significant cardiovascular problems. High rates of program adherence were observed (Rood's: 92.3%; SI: 89.7%).

The quality of the methods varied. Seven studies (30%) had a high quality (PEDro score ≥6), twelve studies (52%) had a moderate level (4-5), and four studies (18%) had a low quality (<4) according to the PEDro scale. High-quality research often used blinded outcome evaluation, but lower-quality studies often failed to blind participants or therapists.

TABLE 4: Risk of Bias Assessment by Study Type (Pedro Scale)

Study Type	Total Studies	High Quality (≥6)	Moderate Quality (4-5)	Low Quality (<4)
RCTs	13	6 (46.2%)	6 (46.2%)	1 (7.6%)
Quasi-Experimental	6	1 (16.7%)	4 (66.6%)	1 (16.7%)
Comparative N-R	4	0 (0%)	2 (50%)	2 (50%)
TOTAL	23	7 (30.4%)	12 (52.2%)	4 (17.4%)

VII. DISCUSSION

According to the comparative research, balance and ADL independence are improved in chronic stroke populations in a statistically comparable and clinically significant way by both Rood's method and Sensory Integration (SI) training. Although there was no statistical difference between the groups, the improvements seen on the BBS (11.4 vs. 10.9 points) and Barthel Index (18.4 vs. 16.2 points) were extremely clinically important and substantially higher than those seen with only conventional therapy. The synergistic effect of combination treatments is a crucial result, even if neither intervention outperformed the other for key functional outcomes. According to the meta-analysis (SMD = 0.68), combining these specialist neurophysiological procedures with traditional physiotherapy results in better outcomes, with improvements that are 40–50% greater than those of conventional therapy alone.
Mechanistic Cognition

The two methods seem to use complementary neuroplastic pathways to promote motor recovery:
- Rood's Approach: This method emphasizes the recruitment of high-frequency motor units and the control of the autonomic nervous system. This is supported by the review's conclusion that Rood has superior benefits in normalizing muscle tone, which may make it the best option for patients whose main barrier is spasticity.
- Sensory Integration Training: By requiring multisensory reweighting, this technique promotes sensory conflict-induced neuroplasticity. This process is supported by the review's conclusion that SI training improved proprioceptive accuracy, which makes it useful for patients with sensory disorder.

According to this review of the literature, Rood's method and Sensory Integration (SI) training both produce similar primary results for balance and ADL function; however, their theoretical underpinnings, fundamental workings, and main goals are different.

Theoretical Basis and Core Mechanism

Different neurophysiological models guide the two interventions. Rood's approach is a "bottom-up" neurophysiological model that uses specific sensory inputs to produce a desired motor output. Its main mechanism is direct sensory stimulation; it uses inhibitory techniques (like prolonged stretch and warmth) and facilitatory techniques (like icing, brushing, and tapping) to directly act on muscle spindles, GTOs, and cutaneous receptors to restore tone. SI training, on the other hand, is a "top-down" integrative processing model (Introduction Sec 1.6). Its main goal is to teach the brain how to prioritize and arrange sensory information. Its main mechanism is sensory reweighting, which forces the brain to become less dependent on visual stimuli and to learn to trust vestibular and proprioceptive inputs by creating sensory conflict (e.g., stepping on foam with eyes closed).

Different primary treatment targets result from these disparate pathways. Muscle tone (spasticity or flaccidity) is the main focus of Rood's method, which fixes the tone first in order to "prepare" the muscle for movement. The results of the review, which showed that Rood's method was better at lowering spasticity and produced noticeably greater decreases on the Modified Ashworth Scale (0.6-1.5 points), provided strong evidence for this review. In order to "retrain" the brain's internal representation of the body in space, SI training primarily targets central sensory processing (Results Sec 4.5). Its advantage in improving proprioception, which resulted in noticeably larger increases in joint position sensing (12–28% error reduction), supported this review.

Functional Outcomes and Patient Profiles

Despite probably working through different mechanisms, both therapies significantly decreased the chance of falls. SI training produced a 38-52% reduction, which is probably due to better sensory organization and reactive balance, whereas Rood's method produced a 45-68% reduction, most likely by reducing spasticity-related instability. Both showed slight but comparable increases in gait (Rood's: +0.14 m/s; SI: +0.12 m/s), indicating that these gains are a byproduct of either better dynamic balance or normalized tone, respectively.

In light of this data, a distinct differentiation for clinical use becomes apparent:

- Patients who exhibit aberrant muscle tone (pronounced spasticity or flaccidity) as the main obstacle to balance are the best candidates for Rood's Approach.
- Patients who exhibit sensory processing deficiencies (such as ocular dependence, poor proprioception, or dizziness) as the main obstacle to balance are the best candidates for Sensory Integration (SI) Training.

VIII. CONCLUSION

Both Rood's method and Sensory Integration training are successful, empirically supported interventions for enhancing balance and independence in daily living activities in chronic stroke populations, as this comprehensive literature review shows. Both strategies resulted in clinically significant improvements across 23 included trials (n=687 participants), with no statistically significant differences observed between them for major functional objectives. Mechanistically, the methods use complementary pathways, indicating that they can be used in combination or to choose a certain strategy depending on the patient's presentation (e.g., SI for proprioceptive deficiencies, Rood's for spasticity). According to a meta-analysis, using these methods in addition to traditional physiotherapy produces better results than using just traditional therapy. Both strategies showed outstanding safety characteristics. Chronic stroke patients have a significant chance of recovering, according to the research, and the amount of time since the stroke shouldn't be a barrier to rehabilitation.

IX. LIMITATIONS AND FUTURE RESEARCH

The included studies' varying methodological quality (only 30% high quality) is a limitation of this review. Statistical power is limited by small sample sizes in many investigations, and performance bias is an unavoidable problem. It is also unknown how long these advantages will last because there is a lack of long-term follow-up evidence (just 4 studies longer than 3 months).

TABLE 5: Main Methodological Limitations

Limitation	Finding in This Review	Rationale / Impact on Interpretation
Methodological Quality	Only 30% high quality (PEDro ≥6).	Potential for selection, performance, and detection bias.
Blinding	Performance bias inevitable (participants/therapists unblinded).	May exaggerate the effects of stated interventions.
Sample Size	Median n=25-35 participants per study.	Restricts the findings' generalizability and statistical power.
Long-Term Follow-up	Limited data; only 4 studies reported outcomes >3 months.	It is unknown how long functional gains will last.

X. RECOMMENDATIONS

The parameters of the intervention—four to five times a week for eight to twelve weeks—are supported by evidence. Mechanistic distinctions, such as SI for patients with primary sensory integration or proprioceptive abnormalities and Rood's for patients with substantial spasticity, might be taken into account when choosing individuals. Crucially, treatment outcomes were unaffected by time since stroke (even 15+ years), indicating that rehabilitation expenditures in the late chronic phase were justified.

TABLE 6: Evidence-Based Implementation Parameters

Parameter	Recommended Range	Rationale
Session Duration	45-60 min (Rood's) / 45 min (SI)	Balances adequate stimulus duration with patient fatigue.
Session Frequency	4-5 sessions/week	High frequency/repetition is critical for neuroplasticity.
Intervention Duration	8-12 weeks	Optimal window for establishing consolidated motor adaptations.
Patient Selection (Rood's)	Favourable for significant spasticity or hypotonia.	Directly targets muscle tone normalization.
Patient Selection (SI)	Favourable for proprioceptive/sensory integration deficits.	Directly targets sensory reweighting and processing.

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