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## Effect Of Scalp Acupuncture And Physiotherapy On Motor Function And Activities Of Daily Living In Post-Stroke Hemiplegia: A Case Report

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### Abstract

**Background:** Post-stroke hemiplegia leads to severe motor deficits and impairment in activities of daily living (ADL). Scalp acupuncture has shown promise as a neuro-rehabilitative adjunct, potentially enhancing recovery when combined with physiotherapy. Physiotherapy forms the backbone of stroke rehabilitation, employing early, task-oriented, and individualized interventions to maximize neuroplasticity and restore motor function. Recent studies confirm that intensive and multimodal physiotherapy not only accelerates gains in strength, coordination, and daily living skills but also reduces post-stroke complications, enhancing quality of life and long-term independence for survivors.

**Objective:** To report the effectiveness of a combined scalp acupuncture and physiotherapy protocol (task-specific training) on motor recovery and ADL in a 58-year-old man with left hemiplegia secondary to right middle cerebral artery infarct.

**Methods:** The patient, with a history of hypertension and a 2-week-old ischemic stroke, underwent a 21-day intervention: daily scalp acupuncture (MS6, MS7, MS9, GV20; 30 min) and daily physiotherapy (30 min to 45 min). Outcomes included the Fugl-Meyer Assessment (FMA), Barthel Index (BI), upper/lower limb power, muscle spasticity (Modified Ashworth Scale), grip strength, and gait, measured at baseline, weeks 1–4.

**Results:** Substantial improvements were observed over four weeks: FMA increased from 24 to 51, BI from 30 to 70, upper limb power from 1 to 3, lower limb power from 2 to 4, spasticity improved from grade 2 to 0, grip strength from 3.2 to 9.4 kg, and gait ability from 0 to 4. No adverse effects occurred.

**Conclusion:** This case demonstrates that a combined scalp acupuncture and physiotherapy approach can markedly improve motor function and ADLs in subacute post-stroke hemiplegia. Such integrative protocols warrant further study in controlled trials.

**Key Words:** Stroke, Physiotherapy, Physical therapy, Rehabilitation, Post-stroke hemiplegia, Neuroplasticity, Scalp Acupuncture, Motor recovery.

## 1. Introduction:

Post-stroke hemiplegia is one of the most incapacitating after-effects of stroke, which is a major cause of adult disability globally.<sup>1</sup> In order to maximize neuroplasticity and functional recovery, early, intense therapy is essential.<sup>2</sup> Task-specific training in physiotherapy enhances strength, coordination, and everyday functioning.<sup>3</sup> Recent literature confirms that physiotherapy is a central pillar in post-stroke rehabilitation, employing individualized, evidence-based protocols that address motor impairment, ADL dependency, and promote neuroplasticity<sup>4</sup>

According to reports, complementary methods like scalp acupuncture, which are based on ancient Chinese medicine and contemporary neuroanatomical mapping, can improve motor recovery by activating the cortical regions that correspond to the afflicted limbs.<sup>5,6</sup>

Improvements in spasticity, sensitivity, and cortical modulation have been linked to specific standardized lines, including GV20 (Baihui), MS6 (motor region), MS7 (sensory area), and MS9 (chorea and tremor control area).<sup>7,8</sup>

Combining such stimulation with physiotherapy may yield synergistic outcomes<sup>9</sup>

## 2. Case Presentation

A 58-year-old male presented with left-sided hemiplegia, upper motor neuron facial palsy, and slurred speech, following a right middle cerebral artery infarct confirmed via neuroimaging. The patient had a medical history notable for hypertension, which was controlled. Stroke onset occurred 14 days prior to hospital admission. On clinical examination, the patient demonstrated significant motor impairment and dependency for daily activities. The primary deficits included pronounced weakness in both the upper and lower limbs on the left side, increased muscle tone, and marked limitations in movement and functional independence. These clinical features established the need for an integrative rehabilitation protocol targeting both neuroplasticity and functional restoration.

## 3. Intervention Protocol

### 3.1. Scalp Acupuncture

Following the WHO-standardized scalp acupuncture lines:

|                                      |                                             |
|--------------------------------------|---------------------------------------------|
| MS6 (Motor area)                     | for upper and lower limb movement           |
| MS7 (Sensory area)                   | for tactile sensation                       |
| MS9 (Chorea and tremor control area) | for spasticity modulation                   |
| GV20 (Baihui)                        | for tranquilization and cortical regulation |

Single-use sterile needles; perpendicular insertion; de-qi elicited; retention 30 minutes once daily for 21 consecutive days.

### 3.2. Physiotherapy Protocol

#### Warm-Up (3–5 min)

- Gentle passive range-of-motion (ROM) exercises for the shoulder, elbow, wrist, hip, knee, and ankle.
- Breathing and relaxation techniques.

#### Motor Re-education (10 min)

- Facilitation of voluntary movement** using neurodevelopmental techniques (NDT).
- Repeated practice of simple functional tasks (e.g., reaching forward, grasp-release).
- Mirror therapy for upper limb activation.

**Strengthening & Control (7–8 min)**

- Assisted active → active ROM exercises for hemiplegic side.
- Sit-to-stand training with support.
- Grip strengthening with soft ball or a hand exerciser.
- Ankle dorsiflexion and knee extension with manual resistance.

**Balance & Gait Training (7–8 min)**

- Weight-shifting in standing with parallel bars/support.
- Step training on a low platform.
- Overground walking practice (progressing from support to independent).
- Emphasis on symmetry, trunk control, and safe gait pattern.

**ADL Integration & Functional Tasks (3–5 min)**

- Practicing dressing, grooming, utensil holding, and transfers.
- Training in safe mobility for bed ↔ chair transfers.

**Progression Plan:**

- Increase repetitions and resistance gradually.
- Advance from supported to unsupported balance tasks.
- Transition from therapist-assisted walking to independent gait with/without aids.

**4. Outcome Measures and Timeline**

Fugl-Meyer Assessment (FMA) for motor function<sup>10</sup>

Barthel Index (BI) for ADL independence<sup>11</sup>

Muscle strength: Medical Research Council (MRC) scale

Spasticity: Modified Ashworth Scale (Bohannon & Smith, 1987)

Grip strength: Hand dynamometer

Gait: 0 (unable) to 4 (independent)

Blood pressure for safety monitoring

Assessments were done at baseline and at weeks 1–4.

**5. Results**

Following the 21-day combined intervention of scalp acupuncture and physiotherapy, the patient demonstrated remarkable functional gains. Objective assessments showed the Fugl-Meyer Assessment score increased from 24 at baseline to 51 by week four, indicating a substantial improvement in motor function. Similarly, the Barthel Index improved from 30 to 70, reflecting a greater degree of independence in activities of daily living. Upper limb power increased from grade 1 to 3, and lower limb power from grade 2 to 4 on the Medical Research Council scale. Spasticity, measured using the Modified Ashworth Scale, improved from grade 2 to 0, while grip strength rose from 3.2 kg to 9.4 kg. Gait function progressed from non-ambulatory to independent walking. Throughout the intervention, no adverse events were reported, and blood pressure remained well-controlled. These positive changes suggest that integrating focused physiotherapy and scalp acupuncture may synergistically facilitate recovery of motor function and daily living skills in subacute post-stroke hemiplegia.

Table.1 Outcome Measures

| Timepoint | FMA | BI | UL Power | LL Power | Ashworth | Grip kg | Gait | SBP mm/Hg | DBP mm/Hg |
|-----------|-----|----|----------|----------|----------|---------|------|-----------|-----------|
| Pre       | 24  | 30 | 1        | 2        | 2        | 3.2     | 0    | 160       | 96        |
| Week 1    | 32  | 40 | 2        | 2        | 1        | 4.5     | 1    | 150       | 90        |
| Week 2    | 39  | 52 | 2        | 3        | 1        | 6.8     | 2    | 144       | 88        |
| Week 3    | 46  | 63 | 3        | 4        | 1        | 8.1     | 3    | 138       | 84        |
| Week 4    | 51  | 70 | 3        | 4        | 0        | 9.4     | 4    | 130       | 82        |

**Key gains:**

FMA: +27 (24→51)

BI: +40 (30→70)

Upper limb power: +2 MRC grades

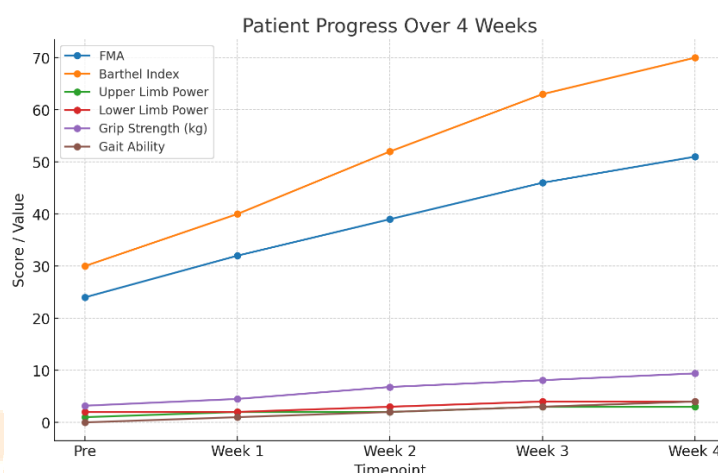
Lower limb power: +2 MRC grades

Spasticity: grade 2 → grade 0

Grip strength: +6.2 kg

Gait: non-ambulatory → independent

BP stabilized within normal range

**6. Discussion**

Recent systematic reviews and RCTs highlight that early, intensive, and task-oriented physiotherapy is effective in facilitating neuroplasticity, reducing disability, and improving ADLs after stroke.<sup>12</sup>

Multimodal physiotherapy protocols, including strength, coordination, balance, and functional task training, show superior efficacy compared to conventional therapy, leading to faster and greater improvements in motor control, independence, and quality of life.<sup>13</sup> Technological adjuncts such as virtual reality and robotic assistance are now routine in advanced centers, further supporting motor and cognitive rehabilitation.<sup>14,15</sup>

The patient's noticeable gains are in line with research showing that early scalp acupuncture can lessen stiffness and encourage motor cortex restructuring.<sup>16</sup> The pre- and post-central gyri are anatomically represented by the MS6 and MS7 lines, which may improve voluntary movement and sensory feedback.<sup>17</sup>

The cornerstone of stroke rehabilitation continues to involve physiotherapy, which can take advantage of activity-dependent plasticity when paired with focused neurostimulation.<sup>18</sup>

The rapidity and extent of improvement across several objective measures in just three weeks suggest the combination intervention may have hastened recovery, even though spontaneous recovery in the subacute stage is feasible.

**7. Conclusion:**

Scalp acupuncture appears to be a promising adjunctive therapy in early-stage rehabilitation. It may accelerate motor recovery and functional independence. This case shows that combining scalp acupuncture with physiotherapy may significantly help improve movement and daily living abilities in someone recovering from subacute post-stroke hemiplegia.

**Limitations:**

This single-case report does not include a control group, so we cannot draw firm conclusions about cause and effect. The patient's natural recovery during this early stage after stroke likely played a role as well. The short treatment period and absence of longer follow-up mean we don't know if the benefits lasted over time. Future randomized controlled trials with larger participant groups and long-term follow-up are needed to confirm whether the combination of scalp acupuncture and physiotherapy offers consistent benefits.

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