Restoring Functional Mobility in a Patient with Delayed Onset of Physical Rehabilitation Following a Hemorrhagic Stroke: A Case Report

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**Unique**
- Typical rehabilitation post-stroke is initiated as soon as the patient is medically stable.
- The most dramatic neurological recovery occurs within the first three to six months following medical stabilization. It has been suggested in the literature that early and frequent out of bed activity within the first 24 hours following stroke onset will enhance motor recovery. The patient in this case report was sedentary for three months following the onset of stroke and was non-ambulatory at the time of admission to sub-acute physical therapy.

**Purpose**
- The purpose of this case report is to describe the rehabilitative course, motor recovery, and functional gains for a patient who received delayed rehabilitation following a hemorrhagic stroke.
- This procedure reduces the risk of mortality and minimize disability until the intracranial pressure has returned to normal.

**Foundation**
- Hemorrhagic strokes account for only 10% to 15% of initial strokes, and are responsible for 35% to 56% of fatal strokes within 30-days of onset.
- Hemorrhagic strokes have been shown to result in greater disability and higher risk of mortality compared to ischemic strokes.
- Due to the severity of the patient’s stroke, a craniotomy and a follow-up cranioplasty was performed.
- Sub-acute physical therapy occurred six days a week for 45-60 minute sessions over the course of 10 weeks.
- Interventions consisted of therapeutic exercises, therapeutic activities, mobility training, and neuromuscular re-education.

**Objective Data upon Admission**

<table>
<thead>
<tr>
<th>Objective Measures</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety Behaviors</td>
<td>Impulsive</td>
</tr>
<tr>
<td>Cognition</td>
<td>A&amp;D x3; impaired cognition; impaired attention span; impaired spatial orientation and kinetic awareness; L-sided neglect</td>
</tr>
<tr>
<td>Strength</td>
<td>LLE: 0/5 strength; fluidic; moderate subluxation at L shoulder LLE: 3/5 strength</td>
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<tr>
<td>Coordination</td>
<td>Gross &amp; fine motor coordination impaired on the left side of body</td>
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<tr>
<td>Posture (in static stance)</td>
<td>Moderate left pelvic and trunk rotation; left weight shift; disorientation of neutral head position; unbalanced center of mass</td>
</tr>
<tr>
<td>Activity tolerance</td>
<td>Increased fatigue with activity; extended break time</td>
</tr>
<tr>
<td>Balance</td>
<td>Static sitting: Mild left weight shift; neglect of left upper extremity Static standing: Moderate left weight shift; moderate assistance to maintain position</td>
</tr>
<tr>
<td>Pain</td>
<td>No pain reported</td>
</tr>
</tbody>
</table>

**Interventions**

- **Supine:** glut squeezes; ankle pumps; bed slides; hip ABD; SLR; bridging; quad sets; resisted DF; sidelying clamsheils; Sitting: marches; hip ABD; hip ABD ball squeezes; long arm quad; Standing: marches; 4-way hip motions; mini-squats; terminal knee extensions
- **Bed mobility:** rolling L & R; supineleftrightarrow; supineleftrightarrow; sittingleftrightarrow; sittingleftrightarrow; Transfers: sitleftrightarrow; stand; bedleftrightarrow; WCleftrightarrow; WCleftrightarrow; WCleftrightarrow; standard chairleftrightarrow; SPT from WCleftrightarrow; toilet
- **Gait training:** within parallel barsleftrightarrow; using WBQCleftrightarrow; using wall railleftrightarrow; using DPCleftrightarrow; when standing: RUE supportleftrightarrow; no UE supportleftrightarrow; weight shifting in all directionsleftrightarrow; reachingleftrightarrow; Standing balance: RUE supportleftrightarrow; no UE supportleftrightarrow; balance tapeleftrightarrow; reaching for cones at various anglesleftrightarrow; NBSleftrightarrow; tandem stanceleftrightarrow; SLSleftrightarrow; Dynamic standing balance with therapeutic exercises
- **Sitting balance (feet on ground):** RUE supportleftrightarrow; no UE supportleftrightarrow; weight shifting in all directionsleftrightarrow; reachingleftrightarrow; Standing balance: RUE supportleftrightarrow; no UE supportleftrightarrow; balance tapeleftrightarrow; reaching for cones at various anglesleftrightarrow; NBSleftrightarrow; tandem stanceleftrightarrow; SLSleftrightarrow; Dynamic standing balance with therapeutic exercises

**Functional Outcome Measures**

- **MBI**
  - Week 1: 60/100
  - Week 4: ----
  - Week 7: ----
  - Week 10: 86/100
- **PPME**
  - Week 1: 1/12
  - Week 4: 4/12
  - Week 7: ----
  - Week 10: 9/12
- **30-second Chair Rise**
  - Week 1: 0
  - Week 4: 0
  - Week 7: 6
  - Week 10: 7
- **Gait Speed**
  - Week 1: 0.13 m/s WBQC
  - Week 10: 0.23 m/s WBQC

Gait speed was assessed secondary to inability to ambulate 20'. Assisted devices: wide-based quad cane (WBQC), single-point cane (3PC). Level of assistance: contact grasp assist (CGA); supervision (S)

**Conclusion**
- The patient progressed from a dependent functional state to a supervised to independent level of function.
- Despite the severity and chronicity of her functional impairments post-stroke, functional gains were noted over the course of care.
- It is possible that improved outcomes and increased level of independence were a result of the consistency and gradual progression of interventions.
- Limited data is available describing the outcomes of individuals who do not receive rehabilitative care within the first few days following stroke onset, but instead receive delayed physical rehabilitation.
- Future research should investigate the optimal timing of rest, return to activity and the initiation of physical rehabilitation following stroke in order to determine optimal functional activity.

**Figure 1** represents the patient’s functional level at the time of initial admission and again at discharge. 100% indicates independent; 90% modified-independent; 0% unable to perform.