

ABSTRACT

Background: Pachygyria is a rare neuronal migration disorder characterised by an abnormally thickened cerebral cortex with a reduced gyral pattern, leading to significant neurological impairments. Children with pachygyria commonly present with global developmental delay, spasticity, poor postural control, and functional limitations resembling cerebral palsy. Due to the rarity of the condition, evidence regarding physiotherapy-specific interventions is limited, and management largely relies on general neurorehabilitation principles.

Methodology: This is a prospective single-subject longitudinal case study conducted on a 9-month-old male diagnosed with pachygyria confirmed by MRI. Baseline assessment revealed global developmental delay, hypertonia, spasticity (Modified Ashworth Scale Grade 3), poor trunk control, and an impaired neuromotor profile. Outcome measures included the Gross Motor Function Measure-88 (GMFM-88), Hammersmith Infant Neurological Examination (HINE), and Modified Ashworth Scale (MAS). A comprehensive physiotherapy programme was implemented over 12 months, incorporating Neurodevelopmental Treatment (NDT), strength training, functional mobility training, vestibular stimulation, oral motor facilitation, and caregiver education.

Results: Progressive improvements were observed in GMFM-88, HINE, and MAS scores over the 12-month intervention period across all outcome measures. GMFM-88 scores improved from 8.4% at baseline to 25.0% post-intervention (+16.6 percentage points), with the greatest gain in sitting ability (6.7% to 53.3%). Spasticity reduced from Grade 3 to Grade 1+ in most muscle groups, indicating clinically meaningful tone reduction. HINE scores demonstrated marked improvement, with a 72% reduction in tone abnormalities and marked reduction. However, standing and walking functions were not achieved, consistent with disease severity and age.

Conclusion: Structured, individualised physiotherapy resulted in clinically meaningful improvements in motor function, muscle tone, and neuromotor profile in a child with pachygyria. Early, goal-oriented rehabilitation combined with caregiver involvement plays a crucial role in optimising functional outcomes. This case highlights the importance of detailed case reports in guiding evidence-based practice for rare neurological conditions. Findings are limited by single-case design and lack of control.

Keywords: Pachygyria, Physiotherapy, Neurodevelopmental Treatment, GMFM, Spasticity, Paediatric Rehabilitation, Case Report, Neuronal Migration Disorder, Hammersmith Infant Neurological Examination.

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