Title: A Neonatal Rehabilitation Program for Preterm Infants at High Risk for Cerebral Palsy.

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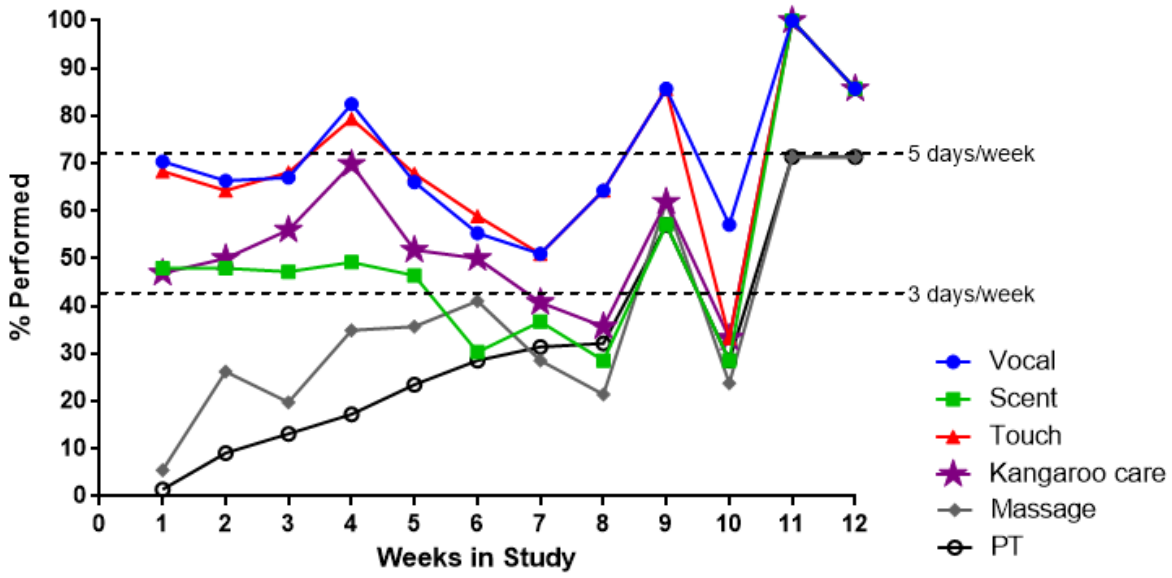
Background: Cerebral Palsy (CP) is the most common motor disability in children born preterm. Current strategies focus on early recognition in order to introduce therapies at a stage of rapid brain development where interventions may have a greater impact. Studies indicate that interventions focusing on environmental enrichment and emotional connection between mother and infant positively impact neurodevelopmental outcomes. The Neo Rehab program consists of 6 evidence-based interventions administered in a gestational age (GA) appropriate fashion by a parent (vocal soothing, scent exchange, comforting touch, kangaroo care, infant massage (starting at 29 weeks corrected (CGA) and physical therapy (PT, starting at 33 weeks CGA)).
Objective: To evaluate the acceptability, feasibility and fidelity of the Neo Rehab program during NICU hospitalization compared to usual care and examine its effects on short-term motor outcomes in preterm infants at risk for CP.

Design/Methods: Infants (≤32 weeks' GA and/or ≤1500 grams birthweight) were enrolled in a randomized controlled trial (RCT) comparing the effects of the Neo rehab program vs. usual care from March 2019 to October 2020. The preset dosing goal was for interventions to be performed 5 days/week. The acceptability, feasibility and fidelity of the Neo Rehab program were determined by performing direct observation, weekly interviews and activity log reviews. The primary short term motor outcome was evaluated using the Hammersmith Infant Neurological Examination (HINE) instrument at 3 months CGA.

Results: 70 preterm infants (GA 28.3 ± 2.7 weeks; 1139 ± 376 grams birthweight; 64.3% male) were enrolled with a 71% recruitment rate (even during the Covid-19 pandemic) and > 90% retention rate. Patients were enrolled in the study for an average of 5.9 weeks (range 2-12 weeks). An interim analysis was performed after 32 patients were enrolled. Parents visited an average of 3 days/week and interventions were performed as shown in Figure 1. The global HINE score at 3 months CGA (81.3% follow-up rate) was 9.1 points greater in the intervention group (p=0.037, *t*-test).

Conclusion: The Neo Rehab program is well accepted in the NICU setting. A goal a 5 days/week was not feasible and most families performed the interventions between 3 and 5 days per week. Preliminary HINE score data suggest that this type of parent-driven interventions represents a promising strategy to improve short term motor outcomes in high risk preterm infants. Further studies are needed to evaluate efficacy on long term motor outcomes.


100
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12
Weeks in Study
5 days/week
3 days/week
Vocal
Scent
Touch
Kangaroo care
Massage
PT