

daytotjoey



Research Summary

A review of research carried out to examine the effects of early crawling training on the motor development of extremely premature infants.

Early intervention

Early intervention services and therapies are important for babies who are at risk of a disability or delay as, when used effectively and as early as possible, they can have a positive impact on that child's future development, including:

- ✓ Physical Development
- ✓ Social Development
- ✓ Emotional Development
- ✓ Cognitive Development

At Daytot, we believe that by intervening from day one, you can help babies at risk of delay catch up and make progress towards achieving age-appropriate developmental milestones.

Research shows that therapies and products that allow therapists and parents to work together, like Joey does, have a greater influence on a child's future development.

Promoting Early Movement

Joey facilitates hands-on training of reciprocal movements, encouraging the development of natural crawling skills which leads to independent 4-point crawling. The patented design provides infants with the optimum support and range of movement to ensure full flexion and extension of the leg, arm and pelvis can be achieved.



The Research

Current evidence suggests that early interventions can positively influence gross motor and locomotor development for infants with developmental disabilities or those who are at risk of delayed development. However, few prevention programmes exist for this population (*Dumuids et al., 2022*).

Studies (*Barbu-Roth et al., 2016; Forma et al., 2019; and Hym et al 2020; 2022*) have shown that early crawling training has the potential to influence the plasticity and development of the corticospinal tracts, ultimately contributing to the development of not only locomotion but a range of gross motor skills and the cognitive and psychological skills to which these motor skills have been linked.

Following this line of research, Dr Marianne Barbu-Roth and colleagues designed a new device, a mini skateboard, dubbed the 'CrawliSkate', to stimulate



crawling as soon as term age, with the goal to improve the sensorimotor development of infants at risk of postural and locomotor problems.

Doctor Marianne Barbu-Roth (MRB) is currently affiliated with the Integrative Neuroscience and Cognitive Center, Université Paris Cité (INCC UMR 8002 CNRS-UP) where she is the leader of the Perception-Action-Development Team. MBR is a specialist in the field of early motor and locomotor development in human infants.

Research Objective

To test the efficiency of the Joey to stimulate the active propulsion and motor development of very preterm infants during the first year of life.



The training aimed to:

- ✓ Increase postural tone of the neck and trunk muscles.
- ✓ Facilitate head rotations – left and right.
- ✓ Stimulate coordination and the symmetrical functioning (extensor-flexor equilibrium) of the leg and arm muscles.
- ✓ Reinforce the propulsive force of the legs.

It was believed that these different effects of the training should significantly improve the acquisition & development of:

- ✓ Head control (reinforcement of the neck muscles).
- ✓ Sitting posture (reinforcement of the trunk muscles).
- ✓ Standing posture (reinforcement of the trunk and leg muscles).
- ✓ Mature crawling and walking.

Inclusion and Exclusion Criteria

Inclusion	Exclusion
Term at Gestational Age (from 24+0 to 32+0 weeks)	Major brain damage: IVH stage 3 or 4
Possibility to begin the training from 37 to 41 weeks of Gestational Age	Antenatal malformation and / or karyotype problem
Pretest: tolerance of crawling on Joey (Sat O2 – heart rate)	Defined bronchopulmonary dysplasia / oxygen dependence after 36 GA
	Digestive problem / position on the stomach
	Auditory problem - visual problems
	Anomaly of the limbs

Methodology

Forty-four premature infants (born 24 and 32-weeks GA) were randomly split into three groups; Joey training, Mattress training (Physio) and a Control Group. Trained infants were positioned prone on Joey or a mattress for 5 minutes daily at home over a 2-month period when they left the NICU. The gross motor development of the 3 groups was assessed over 12 months of corrected gestational age (GA).

The Bayley Scale of Infant Development (BSDI III ed.) was the method used to statistically analyse risk of gross motor delay at 2, 6, 9 and 12 months of corrected gestational age.



The Results

Key Research Findings:

- Joey trained infants scored higher on the scale, compared to infants in the two other groups.
- Joey trained infants had better sustained sitting ability at 2 months.
- 85% of Joey trained infants had head control vertically at 2 months, compared to 15% of mattress trained infants.
- At 6 months, 50% of Joey trained infants could step with light hand support, compared to only 30% in the control group.
- At 9 months, 60% of Joey trained infants could crawl independently compared to only 20% in the Mattress and 38% in the Control group.
- At 12 months, 40% of Joey trained infants could walk with five independent steps compared to only 14.3% in the control group.
- Joey trained babies developed better head control, better sitting, rolling, and standing postures, compared to the other groups after 12-month assessment.

BSID-III ed. : Gross Motor scaled score

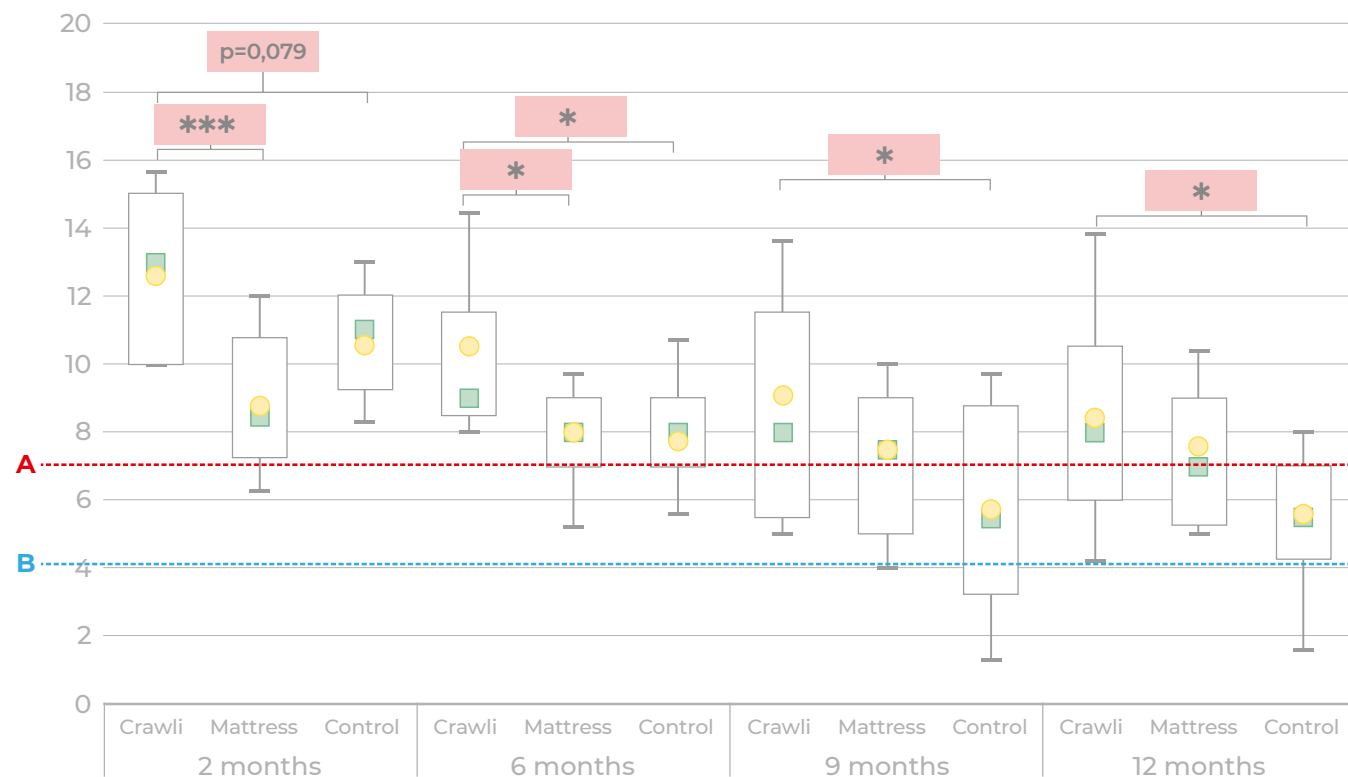


Figure - Gross motor scaled scores. A score below 7(A) is considered at risk for motor problems and a score below 4(B) is considered at very high risk for motor problems according to Jackson et al.2012. Whisker boxes represent the 10th, 25th, 75th, and 90th percentiles, the mean is symbolized by a circle, and the median by a square. Significant differences are indicated by * for $p < 0.05$; ** for $p < 0.01$; *** for $p < 0.001$; a p-value between [0.05;0.1] is annotated.

This research clearly demonstrates that early motor training can have a positive effect in reducing the risk of gross motor delay when implemented from term. However, Mattress trained, and Control group infants were still at mild – moderate risk of developmental delay at 9 and 12 months.

Based on these findings, we propose that Joey training continues until 6 months (CGA) and is used as an early intervention therapy tool, to aid clinicians and encourage parents to actively participate in daily therapy at home as part of their routine.

daytotjoey

For all their little journeys

Daytot worked in collaboration with Dr Marianne Barbu-Roth and her colleagues to integrate their extensive research findings, into an innovative, life-enhancing product for infants at risk of motor delay.

Our collective aim was to provide parents and therapists with a research-based product which helps improve the motor development outcomes, for babies at risk of early-years developmental delay.



Through extensive clinical trials with families, we have further developed the design of their 'CrawliSkate' prototype and are proud to be able to provide therapists and parents with a clinically proven product to help aid infant development.

We propose that, when combined with play and other early intervention therapies, Joey can help reduce the need for postural equipment in later years.



To learn more, visit:
www.daytotjourneys.com/daytot-joeey





Bibliography

Barbu-Roth, M. et al. (2016). Device for assisting the crawling of an infant. EP2974624A1

Forma V. et al. (2019). What does prone skateboarding in the newborn tell us about the ontogeny of human locomotion? *Child Development*, 90 (4), 1286–1302. DOI: 10.1111/cdev.13251

Hym, C. et al. (2020). Newborn crawling and rooting in response to maternal breast odor. *Developmental Science*. DOI:10.1111/desc.13061.

Dumuids-Vernet. et al. (2022). Effects of Early Motor Interventions on Gross Motor and Locomotor Development for Infants At-Risk of Motor Delay: A Systematic Review. *Front. Pediatr*, 10. 33-89. DOI: 10.3389/fped.2022.877345

Hym et al. (2022). Newborns modulate their crawling in response to their native language but not another language. *Developmental Science*. DOI: 10.1111/desc.13248

daytot joey

daytot

Daytot Ltd

29 Quarterlands Road
Lisburn BT27 5TN
Northern Ireland

Tel: +44 (0) 289 013 9337

Email: hi@daytotjourneys.com



www.daytotjourneys.com

Code: 200-008 rev002