

The case for the use of the Joey for an infant at risk of motor disability

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The situation

There are multiple causes for the risk of motor delay in an infant: neonatal accident, genetic pathology, prematurity, trauma. With regard to the occurrence of premature birth, it is estimated that up to 40% of the risk of sensorimotor deficiencies at the age of 2 years in former very premature infants, after-effects ranging from dyslexic disorders to total walking disability.

In general, these fragile infants have often spent a certain amount of time immobilized in an incubator in dorsal decubitus. This prolonged posture leads to a loss of elasticity in the posterior muscle chains, which can lead to shortening of the fibers concerned. The impact of the immobilization adds to the medical problems of the infant and can have an important repercussion on its sensorimotor development. However, few studies have focused on the early motor and postural rehabilitation of these infants.

In a healthy adult, the immobilization of a limb, following a direct trauma such as a cast fracture for example, is automatically reeducated by physical therapy with a progressive resumption of movement and muscular development of the weakened fibers. Knowing this, it appears absolutely necessary to set up a sufficient stimulation to allow the weakened newborn, precociously immobilized in incubator to:

- Recover the potential of an active motricity developed in utero with the elasticity of the related muscle fibers
- To accompany the development of motor functions adapted to the subject's clinic

Currently, the management of a fragile infant is complex, multidisciplinary, and often very heavy for the parents, who are already under intense stress due to the traumatic birth context. Two points are essential in this care. On the one hand, it is crucial to be able to make an early diagnosis of motor disability in order to rehabilitate the child as soon as possible and limit the consequences of motor disability on the child's general development. On the other hand, the early initiation of motor therapy also allows the maximum plastic potential of the infant's musculoskeletal structure to be realized. It is therefore essential to be able to assess and stimulate the motor skills of the infant from an early age.

Quadruped locomotion on Joey to assess and stimulate early motor skills

The first expression of motor skills in human infants, ex utero, on which motor therapy could be based, is observed in the delivery room when the child is positioned skin-to-skin on the mother's abdomen. He is then able to propel himself with the help of his four limbs to reach the maternal breast. Nevertheless, this primary motor capacity tends to disappear during the first weeks of life if the context allowing the child to propel itself is not reproduced.

Indeed, before the acquisition of head carriage, the child is unable to lift his head when lying on his stomach. A support under the spinal axis is then necessary to free the limbs from the constraint of the weight of the head so that the infant can move in quadruped position. The Joey is a tool to ensure the elevation of the infant's spinal axis in relation to the support, to free the range of motion in the limbs and allow the infant to move in any direction.

The benefits of Joey

Two major benefits are notable when using the Joey in an infant at risk of motor delay: the benefit of the quadrupedal position, and the benefit of stimulating the quadrupedal locomotion.

Positionally, placing a child on the Joey allows to work on the establishment of the quadruped posture. On the Joey, we observe a relaxation of the limbs towards the mat due to gravity, allowing to counteract this effect of shortening of the posterior muscle chains. In addition, the natural posture of the child in flexion on the Joey allows the spinal curvature to be maintained in relation to the developmental stage of the infant where the training is proposed. This, without preventing the establishment of cervical lordosis since the infant can raise and turn his head. The muscles of the upper triangle (from the skull to the shoulder girdle) are thus toned so that the infant develops head carriage.

Since the development of lumbar lordosis occurs later in the child's development, the infant's position on the Joey maintains flexion of the lumbosacral area and retroversion of the pelvis. The retroverted position of the pelvis is an essential aspect for the establishment of the quadruped locomotion. Indeed, it allows a sufficient amplitude of movement at the level of the legs, whether in flexion or in extension. The extension of the lower limbs, which allows the child to be propelled, is accompanied by an anterior tilt of the homolateral sacroiliac. If the infant's pelvis is basically already positioned in pelvic anteversion on a support, the extension movement of the legs will be restricted in terms of amplitude. The advantage of the Joey is that it maintains the infant's flexed posture.

Concerning the biomechanics of movement, the practice of crawling on the Joey trains the infant to produce flexion and extension cycles of the upper and lower limbs. By soliciting the muscular and articular system, it allows the development of the proprioception of the infant. The production of movement also helps to tone the muscular system or at least limit the shortening of muscle fibers that occurs during immobilization. The tactile, vestibular and visual systems are also solicited since the child moves on the Joey in all directions and at different speeds.

Acting as an inductive loop, the multiplication of sensory perceptions stimulates the integration and processing of different stimuli.

Finally, from a therapeutic point of view, a definite advantage of Joey sessions is the active production of movement, an important notion during a therapeutic protocol. Indeed, the active production of movement leads to the development of the coordination of movements, but also potentiates learning on the long term.

The Joey being a compact, easy to use and transportable tool, makes it possible to train parents to do the sessions at home. They can thus start the sessions as soon as they return home, which is a considerable advantage for the child because it allows them to benefit from the maximum plasticity of the human body; but also, for the parents who do not have to travel to carry out the rehabilitation. Finally, the parents are able to continue and extend the training period as long as necessary.

Moreover, the fact of being able to involve the parents of a child at risk of motor delay, in the care of their child, seems to bring comfort to the parents by making them active themselves for the progress of the child.

However, training to use the Joey is necessary. Supervision by a health professional is also recommended across training, especially for children with brain damage, to guide and reassure parents. Supervision can be close during the first few weeks of training to ensure that the training is done correctly and to note the child's progress in movement production and propulsion on the Joey.

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