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DERLEME/REVIEW

Risky Baby Rehabilitation

Riskli Bebek Rehabilitasyonu

Tuba Tülay Koca¹

¹Sütçü İmam University, Faculty of Medicine, Department of Physical Medicine and Rehabilitation,
Kahramanmaraş, Türkiye

ABSTRACT

When we look at the definition of risky babies, the first to come to mind is preterm babies born before the 32nd week of pregnancy, but also postterm newborns, term low birth weight babies (<2500 gr), and babies with congenital anomalies are included in this class. With developing technology, it is possible to keep more risky babies alive. It is known that premature babies, compared to term babies, show suboptimal motor development behavior and self-regulation problems in all subsystems (mental, developmental, neurobehavioral, motor) in the 3rd and 6th months of their follow-up.

Early neurodevelopmental assessments of high-risk newborns should be performed, deficiencies should be determined, and physiotherapeutic intervention and family-centered rehabilitation programs should be initiated early in the needed areas. Although premature babies are thought to have problems only in the motor area, they now have difficulties in many neurodevelopmental stages, such as social, behavioral, life skills, sleep, language, nutrition, mental health, toilet habits, and communication. Some premature babies are diagnosed with autism and attention deficit, and hyperactivity disorder over time. This group of children with special needs should be closely monitored at every stage of their lives.

10% of preterm babies are diagnosed with cerebral palsy later in life. Cerebral palsy presents with non-progressive damage to the central nervous system as well as progressive problems in the musculoskeletal system. Parents, who were left out of treatment processes in the past, are now at the center of the rehabilitation team. It should be kept in mind that healthy babies will become healthy adults in the future.

Keywords: risky baby, rehabilitation, neurodevelopmental assessment, prematurity, cerebral palsy

ÖZET

Riskli bebek tanımına baktığımızda ilk olarak 32. gebelik haftasında önce dünyaya gelen preterm bebekler gelmekle birlikte postterm yenidoğanlar, term doğan düşük doğum ağırlıklı bebekler (<2500 gr), konjenital anomalili bebekler de bu sınıfta yer almaktadır. Gelişen teknolojiyle birlikte daha çok riskli bebekleri hayatta tutunabilmektedir. Prematüre bebeklerin, term bebeklere göre takiplerinin 3. ve 6. aylarında optimal olmayan motor gelişim davranışı ve tüm alt sistemlerde (zihinsel, gelişimsel, nörodavranışsal, motor) özdüzenleme sorunları gösterdiği bilinmektedir.

Yüksek riskli yenidoğanların nörogelişimsel değerlendirmelerinin erken yapılması, eksikliklerinin belirlenmesi ve ihtiyaç duyulan bölgede fizyoterapötik müdahale ve aile merkezli rehabilitasyon programlarının erken başlatılması gerekmektedir. Prematüre bebekler sadece motor alanda sorun yaşadığı düşünülse de artık sosyal, davranış, yaşam becerileri, uyku, dil, beslenme, ruh sağlığı, tuvalet alışkanlıkları ve iletişim gibi pek çok nörogelişimsel aşamada zorluk yaşamaktadır. Erken doğan bazı bebeklere zamanla otizm ve dikkat eksikliği ve hiperaktivite bozukluğu tanısı konur. Bu özel ihtiyaçları olan çocuk grupları hayatlarının her döneminde yakından takip edilmelidir.

Preterm bebeklerin %10'u hayatlarının ilerleyen dönemlerinde serebral palsi tanısı almaktadır. Serebral palsi santral sinir sistemindeki non-progresif hasarın yanında muskuloskeletal sistemde progresif problemler ile karşımıza çıkmaktadır. Geçmiş yıllarda tedavi süreçlerinde dışarıda bırakılan ebeveynler artık rehabilitasyon ekibinin merkezinde yer almaktadırlar. Sağlıklı bebeklerin gelecekte sağlıklı yetişkinler olacağı akılda tutulmalıdır.

Anahtar kelimeler: Riskli bebek, rehabilitasyon, nörogelişimsel değerlendirme, prematüre, serebral palsi

Correspondence Address / Yazışma Adresi

Tuba Tülay Koca, Sütçü İmam University, Faculty of Medicine, Department of Physical Medicine and Rehabilitation, Kahramanmaraş, Türkiye
e-mail: tuba_baglan@yahoo.com

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Introduction

With the developing technologies in the field of health, we can now keep more risky babies alive. Teratogenicity is also increasing due to reasons such as increasing environmental pollution, ionizing radiation, infections, and exposure to chemical and toxic substances in air, water, or nutrition. For this reason, health services now encounter a higher number of risky babies, and these babies cause high health expenses due to their needs. Prematurity seems to be particularly related to the mother's socioeconomic level and lifestyle, and its incidence is reported to be approximately 11% of all live births. While the preterm birth rate in Türkiye is reported as 12.9% in 2022, this rate is reported as 10-11% in the world after 2020. This rate may vary depending on the development level of the countries^{1,2}. Preterm birth continues to pose a serious burden on healthcare systems around the world. In this review, high-risk newborns will be defined, and neurodevelopmental evaluation and early physiotherapeutic intervention programs will be summarized in light of current literature.

Definition of a Risky Baby

When we look at the definition of risky baby, babies born before the 37th gestational week come first, but babies weighing less than 2500 g (low birth weight), post-term babies, large babies, babies born with congenital cardiac, central nervous system or orthopedic defects are also included in the risky baby category.

High Risk Newborn;

I. Low birth weight:

- * Term and low birth weight (<2500 g), LBW
- * Very low birth weight (<1500 g), VLBW
- * Very very low birth weight (<1000 g), VVLBW

II. Low weight for gestational age (SGA = small gestational age)

III. Large for gestational age (LGA): large baby

IV. Postterm

V. Premature and preterm baby

In premature newborns, hemodynamic and vital problems are first addressed in the intensive care unit. Corticosteroid administration for lung maturation, Vitamin K, especially for intracranial bleeding prevention, protection against eye infections and other systemic infections, and thermoregulation problems (Kangaroo mother care, protective wrapping, and dyspnea can be given as examples.

Neurorehabilitation begins in intensive care; It includes multisensory positive experiences that include vocals, smell, and touch, and motor training that includes massage and physical therapy. Especially preterm newborns need to be evaluated in terms of congenital anomalies such as the central nervous system, musculoskeletal system, and cardiopulmonary system.

Babies born before the 32nd week of gestation, have a significantly increased risk of audiovisual, cognitive, social, and motor disorders. Some term babies may develop hypoxic-ischemic encephalopathy due to hypoxia in the neonatal period. Cerebral palsy may also develop in up to 10% of premature babies. Many more babies are diagnosed with milder disorders later in life, including autistic spectrum disorder, mild cognitive and motor impairment, and attention-deficit/hyperactivity disorder. Today, we know that neurodevelopmental problems occur in the long term (adolescent and adult) in prematurity³.

Risky Baby Rehabilitation

It aims to support the development of babies, improve their physical and cognitive skills, ensure their nutrition, and prevent possible complications. Risky baby rehabilitation is an important process for babies and often requires a transdisciplinary approach and is customized according to the baby's needs. While

physiotherapy focuses on improving babies' muscle tone and motor skills, speech therapy supports babies' communication skills, and nutritionists create a nutrition plan tailored to babies' needs.

Premature babies may experience weakness in body muscles in the early period, delay in movements such as turning, sitting, crawling, and walking, lack of sucking and swallowing skills, and delay in speech in the later period. High-risk babies may have difficulty calming themselves down, cry frequently, and avoid movement. They may experience sensory issues such as hyperactivity or needing too much stimulation. The prevalence of these problems increases with lower gestational age and birth weight. Additionally, learning disabilities, clumsiness, developmental coordination problems, social-emotional difficulties, and other minor dysfunctions are also reported. Even at term age, the central nervous system is not mature enough to show pathological findings associated with corticospinal lesions. Therefore, because the motor pathways of preterm babies have not yet matured, the emergence of early atypical neuromotor patterns may not be associated with neurodevelopmental outcomes at later ages. Clinicians aim to ensure early diagnosis of developmental disorders and identification of preventive programs through neurodevelopmental assessments (NFA)¹⁻⁴.

Neurodevelopmental Assessments (NFA)

What steps should be taken to improve outcomes in premature babies? NFA focuses on the development of normal functions and is based on studies on stimulated and spontaneous motility, postural adaptation, variability in motor patterns, neurosensory function, and neuromotor and behavioral skills⁵.

The neurocognitive outcomes of preterm babies are poorer than those of term babies for many reasons, including brain damage and altered brain development. However, poor outcomes appear to be more closely related to the mother's socioeconomic status than to problems the baby may experience after birth. Additionally, prematurity is increasing in developing societies. Early intervention programs start in the first 24 months and continue until the school year. The main goal of these programs is to make the child as functionally independent as possible by using brain plasticity. Intervention programs conducted by many different centers are conceptually attractive but have not been consistently successful, and we do not have sufficient data on long-term outcomes⁶.

Diagnosis of Cerebral Palsy in Early Period

The definition of cerebral palsy is characterized by progressive problems in the musculoskeletal system due to non-progressive damage to the central nervous system due to prenatal, natal, or postnatal reasons, as well as problems in cognition, perception, behavior, social, and communication. Early detection is important for the success of the rehabilitation process. So, it is important to diagnose a child with cerebral palsy in early period.

Precht's general movements (GMs) assessment can be used by clinicians as a diagnostic tool to recognize cerebral palsy in the early months. In healthy newborns, GMs can be observed until the end of the first 6 months and are based on the presence of complexity, homogeneity, and rhythmicity in all body extremity movements. In children with cerebral palsy, this movement is more monotonous and weak. Loss of fidgety movements is a guide for the prognosis of the newborn baby⁷.

Neurodevelopmental Assessment Scales

These scales play a role in recognizing organic central nervous system problems in the early period and determining the deficiency in which neurodevelopmental steps are present, and thus provide guidance in determining the rehabilitation of at-risk babies and children.

Wechsler Scales, Behavior Assessment System for Children (BASC), Wechsler Memory Scale, Minnesota Multiphasic Personality Inventory (MMPI), Beck Depression Inventory (BDI), Boston Naming Test, Halstead-Reitan Neuropsychological Battery (HRNB), Tactual Performance Test and Sensory Perceptual Examination), Hand Grip Strength, Alberta Baby Motor Scale (AIMS), Peabody Developmental Motor Scale, Bayley Developmental Scale, Gesell Developmental test, Denver Developmental Screening test are some of them. These scales help plan early intervention and rehabilitation programs by evaluating babies'

motor, language, social, and personality skills. These scales have strengths and weaknesses towards each other⁸.

Family-Centered Physiotherapeutic Rehabilitation in the Early Period

Many factors can affect fetal growth and development, so these children should be included in early rehabilitation programs to stimulate brain plasticity. An educated parent plays a key role in the rehabilitation team⁹.

Various early physiotherapeutic intervention programs should be developed for preterm children with motor impairment. Unfortunately, no evidence is available on whether physiotherapeutic intervention programs for babies have a positive effect on long-term motor outcomes. Until about twenty years ago, traditional physiotherapeutic approaches focused only on the child's motor development. Since then, problems in cognitive, sensory, and social skill components, as well as motor development, have been recognized and a dynamic treatment process has been focused on that makes families the center of treatment.

Family-centered care, which recognizes the importance of involving family members as active and equal partners in the child's care, has become the preferred practice. The treatment goals of these centers are; to bring the relationship between mother-baby, and baby-environment to the most optimal level and to create a dynamic, developing treatment process. Parents should aim to support the baby's subsystem functioning, self-regulation strategies, competencies, attention and development, brain organization, development, increasing learning opportunities, improving communicative perceptions, and facilitating the desire to participate in the outside world. Current family-centered communication-focused intervention programs should be continued¹⁰.

Bobath neurodevelopmental therapy is a widely used method around the world to support the baby's sensory and motor development especially in hemiplegic cerebral palsy. Its goal is to ensure the child's functional independence and it includes sub-techniques such as environmental adaptations, providing parental communication, facilitation techniques, and assessment of tasks¹¹.

Coping with and Caring for Babies with Special Needs (COPCA), developed approximately 15 years ago. It is a family-centered early physiotherapeutic intervention program. It includes a family and education component and a neurodevelopmental component. It has been observed that premature children born before 32 weeks without significant organic central nervous system damage showed better motor recovery with the family-centered COPCA program than with standard physiotherapy programs¹².

It is known that preterm babies show non-optimal motor development behavior and self-regulation problems in all subsystems (mental, developmental, neurobehavioral, motor) at the 3rd and 6th months of follow-up compared to term babies¹³. Preterm babies are at high risk for motor developmental delays, learning difficulties, and behavioral problems. For these reasons, neurodevelopmental evaluation is essential. The risk of neurodevelopmental delay is especially high in children who develop sepsis and necrotizing enterocolitis (NEC)¹⁴.

Neonatal behavioral characteristics such as hypersensitivity and poor state regulation are associated with high levels of crying. Frequent crying behavior, especially in premature babies, indicates that these babies are hypersensitive, need high sensory input, and have poor adaptation abilities in disturbing situations. Clinical evaluations based on the newborn behavior assessment scale may help parents to clarify their babies' tolerance level to stimuli and to develop awareness of this issue¹⁵. Studies Show that early combined rehabilitation interventions (auditory, visual stimulation, oral motor function, respiratory functions, and neurodevelopmental training) improve short-term clinical outcomes in premature babies¹⁶.

In the study of Danks M et al. which investigated whether behavioral problems were related to motor abilities in pre-adolescent children with a history of very low birth weight, no relationship was observed, but it was observed that supporting motor competence in 11-13-year-old preteen children with low birth weight provided improvements in social behavior and attention. As a result, mild motor impairment was associated with poor attention and low social behavior, independent of low birth weight¹⁷.

Drawing is a graphomotor skill used early in assessing visual-motor coordination. In a retrospective study of 50 children aged 12-36 months to determine the frequency of graphomotor difficulties in children with perinatal central nervous system disorders and premature birth, only 13 children had graphical abilities below those expected for their age. One child couldn't use a pencil. The remaining 72% was found normal. As a result, it was concluded that there is a risk of developing difficulties in learning, attention, and fine motor skills in preterm children during the preschool period¹⁸.

High-risk babies may experience neurodevelopmental delays and problems in many areas later in life. These babies reflect these disorders into adolescence, youth, and adulthood (autism, attention deficit hyperactivity disorder, and other neurodevelopmental disorders). Healthcare expenses for risky babies are also high. This group with special needs should be closely monitored at every stage of their lives.

Conclusion

All children born under the 32nd week of gestation should have neurodevelopmental evaluations in terms of developmental outcomes and need for therapeutic support; their needs should be determined, and they should be included in family-centered physiotherapeutic intervention programs in the early period in cooperation with parents. Not every child may have needs in all areas. Infants at risk may have needs in different areas such as behavior, communication, language, sensory, nutrition, toilet habits, mental health, life skills, sleep, learning, and developmental needs. Parents should be equipped to determine their children's needs through neurodevelopmental evaluations, and the rehabilitation process should begin.

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