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Motor Developmental Delay in a 17-Month-Old Preterm Child: Role of Pediatric Physiotherapy

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ABSTRACT:

This case study highlights the physiotherapy management of a 17-month-old preterm male child presenting with delayed developmental milestones and features of cerebral palsy (CP). The child showed significant motor delays with limited reciprocal movement, postural instability, and minimal speech development. A tailored physiotherapy program focusing on developmental facilitation and gross motor function improvement showed measurable progress in postural control and milestone achievement.

Keywords: Cerebral Palsy, Delayed Milestones, Physiotherapy, Preterm Infant, Developmental Delay

Introduction:

Cerebral palsy is a group of permanent movement disorders due to non-progressive disturbances in the developing brain. Developmental delays are often more prominent in preterm infants and low birth weight babies. Early intervention through physiotherapy plays a crucial role in improving functional abilities and minimizing disability.

Case Study :

Patient Information:

- **Name:** Ved Manojkumar Vasava
- **Age:** 17 months (Corrected age: 15 months)
- **Gender:** Male

Chief Complaints (as per mother):

The child is currently unable to stand or walk independently and has not yet achieved crawling or creeping milestones. He is able to sit only with support or by transitioning from a supine position, indicating a delay in gross motor skills. In terms of speech and language development, the child is limited to producing only bisyllabic words and is not yet forming meaningful sentences. Additionally, he is not performing age-appropriate activities expected for his developmental stage, which suggests a global developmental delay.

History:

Prenatal History:

The child was born to a 29-year-old mother and a 32-year-old father. During pregnancy, the mother was diagnosed with anemia, though no other antenatal complications such as trauma, hypertension, diabetes, or convulsions were reported. There was no significant family history or any notable obstetric or gynecological complications. All prenatal check-ups were conducted regularly.

Perinatal/Birth History:

The child was delivered via a planned lower segment cesarean section (LSCS) at 8 months of gestation, making him a preterm baby. The early delivery was prompted by the mother's low hemoglobin levels. At birth, the baby weighed 1.4 kg and exhibited an immediate birth cry, indicating initial respiratory adaptation.

Neonatal History:

Due to low birth weight and prematurity, the newborn was admitted to the NICU for observation. On the 5th day of NICU stay, the infant was referred to another hospital (Kasiba Hospital) due to suspected infection. He was hospitalized there for 15 days, during which his condition worsened, requiring ventilator support for 3 days. The baby was provided oxygen therapy and fed through a Ryle's tube. No neonatal seizures, congenital deformities, or other complications were reported.

Postnatal History:

At the age of 5 months, the child was hospitalized again for 4 days due to pneumonia and a further drop in hemoglobin levels. Developmental delays became evident by 6 months, when he failed to roll or perform midline hand activities. At 8 months, he was still unable to sit. Upon pediatric consultation, the delays were attributed to prematurity and low birth weight. Physiotherapy was initiated at 9 months, and the child began to show improvements in sitting and creeping initiation after 3 months of therapy. However, treatment was discontinued for another 3 months. At 16 months, he was brought to the physiotherapy outpatient department with continued developmental delays, including absence of reciprocal crawling and limited speech (only bisyllabus). Immunizations were administered on schedule, and socioeconomic background was reported as fair.

Developmental Milestones:

- Head control: 3 months
- Rolling: 10 months
- Sitting: 11–12 months
- Creeping: 13 months

On Examination:

- **Cooperation:** Playful and responsive
- **Speech:** Bisyllables
- **Eye:** Squint present
- **Head circumference:** 43 cm
- **Swallowing:** Able to eat orally
- **Posture:** Unable to maintain balance in kneeling
- **Protective Reaction:** Present in all directions
- **Balance in sitting:** Good

Upper Limb (UL) Function:

- Able to follow visual and auditory commands
- Self-feeding present
- Bilateral hand use good
- Can transfer objects, clap, grasp, and release
- No drooling or reprimitive movements

Lower Limb (LL) Exam:

- Tone: Slight increase in adductors, hamstrings, and calves
- Plantar reflex: Extensor with flexor withdrawal
- No contractures
- No influence of primitive reflexes
- ROM: Full and free
- LL reciprocation: Absent

Problem List:

- Delayed gross motor milestones
- Poor reciprocal crawling
- Unable to stand/walk
- No bimanual coordination in crawling
- Postural imbalance
- Reduced functional mobility
- Squint and limited speech (bisyllables)

Physiotherapy Goals:

1. Facilitate age-appropriate gross motor skills
2. Improve trunk control and balance
3. Initiate reciprocal crawling
4. Promote independent sitting and standing
5. Strengthen bilateral coordination
6. Improve protective reactions and transitions

Treatment Plan:

1. Facilitation of Independent Sitting:
Therapeutic activities focus on improving trunk control and pelvic stability to help the child achieve and maintain an upright sitting position without external support. Techniques such as dynamic reaching in different directions, use of therapy balls, and trunk activation exercises are utilized. These activities aim to enhance postural alignment, strengthen core muscles, and promote symmetrical weight-bearing through the pelvis.

2. Training for Transitioning from Supine to Sit:
To encourage the child to independently move from lying on the back (supine) to sitting, specific transitional movements are practiced. This includes guided rolling, side-lying push-ups, and trunk rotation activities. These exercises help in developing movement planning, initiating controlled momentum, and strengthening of the abdominal and hip flexor muscles necessary for the transition.

3. Crawling and Creeping Using Reciprocal Movements:
Crawling (on the belly) and creeping (on hands and knees) are key milestones in motor development that promote bilateral coordination, cross-pattern movement, and sensory exploration. The child is encouraged to perform these activities through play-based therapy, using visual and tactile cues, tunnels, or motivating toys to stimulate forward movement using alternate hand-leg combinations.

4. Balance Training in Kneeling:
Kneeling positions (both high kneel and half-kneel) are used to improve static and dynamic balance, postural control, and lower limb strength. The child is guided to maintain these positions while reaching, catching, or manipulating objects, which challenges the center of gravity and enhances equilibrium responses necessary for standing and walking.

5. Bimanual Coordination Tasks:
Activities that require the use of both hands in a coordinated manner are introduced to develop fine motor skills and upper limb synergy. These include clapping games, transferring objects from one hand to the other, stacking blocks, and manipulating simple toys. These tasks not only improve hand function but also stimulate attention, timing, and spatial awareness.

6. Sensory-Motor Stimulation for Visual and Proprioceptive Inputs:
Sensory integration techniques are incorporated to stimulate the child's visual tracking, body awareness, and proprioceptive feedback. This may include activities using textured surfaces, vibration, weight-bearing exercises, swinging, and visual tracking with lighted toys. These methods support the development of motor planning, spatial orientation, and adaptive responses.

7. Speech Stimulation Through Multisensory Cues:
To enhance language development, speech stimulation is provided using a multisensory approach involving auditory, visual, and tactile cues. This includes singing rhymes, using picture books, showing mouth movements in a mirror, and providing tactile feedback on the lips and face. These cues are used to prompt sound production, improve oral-motor control, and encourage imitation of sounds and simple words.

Outcome Measures:

- Gross Motor Function Measure (GMFM)
- Alberta Infant Motor Scale (AIMS)
- Pediatric Balance Scale

Discussion:

Preterm infants, particularly those with low birth weight, are at higher risk for developmental delay and CP. In this case, early physiotherapy intervention helped the child achieve several delayed milestones, although reciprocal crawling remained absent at 17 months. The presence of a squint and delayed speech indicates a possible multisystem developmental impact, warranting a multidisciplinary approach.

Physiotherapy strategies focusing on age-specific goals, neurodevelopmental techniques, and parent education significantly influence outcomes in children with CP.

Conclusion:

This case report emphasizes the need for early diagnosis and comprehensive physiotherapy intervention in children with developmental delays. Regular follow-up and interdisciplinary rehabilitation are key to enhancing functional independence in such children.

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